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LEAN ON HR

– Explorative study on wastes in the Human Resource Flow –

Abstract

Key words: Lean, process flow, human resource flow, waste(s)

The Lean concept has become an increasingly popular tool for service companies seeking to improve their process flows, hence the development of Lean Service in addition to Lean Manufacturing. This thesis attempts to take Lean another step further by moving from the process flow in the service industry to observe the Human Resource flow. We seek to apply the concept on Human Resources (HR), so far an unexplored field within Lean. The aim of this thesis is to form a comprehensive list of wastes that occur on an individual level within organisations. Our findings provide a framework for an inefficient workday as well as a list of 11 wastes. These wastes were furthergrouped into individual, co-operational and structural issues. Comparisons with Lean service wastes show a lot of similarities. Comparisons with other management literature also show that similar findings have been found in other areas than Lean.

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THANK YOU NOTE

To our mentor Niklas Modig, thank you for providing us with the necessary data to write this thesis. Moreover for your persistent commitment and engagement, optimism and endless patience.

Stockholm, May 17th, 2010

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INNEHÅLL

1. INTRODUCTION

1.1 BACKGROUND

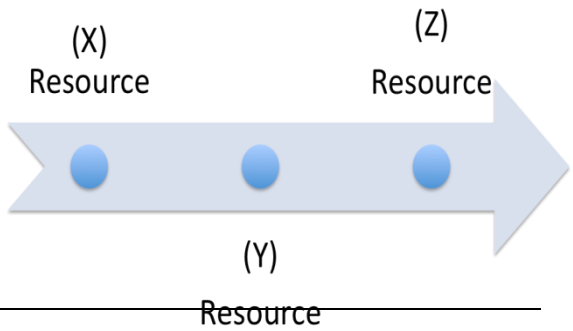
Recent trends such as the deregulation of markets, the emergence of new actors and economies, as well as continuous developments in technology have set a new pace in the business world. With a move towards globalization (Schifferes, 2008), the competition has greatly intensified pressuring companies to constantly improve their business strategies as well as innovate to stay on top. Meeting and even exceeding customers' demands and expectations have become crucial for companies' survival. In the end of 1980s, Toyota managed to excel in precisely this, delivering top quality through optimal performance (Hayes & Pisano, 1996). The company developed a concept, Toyota production systems, which would in the following years turn into a colossal breakthrough amongst businesses and spread throughout the world under the term LEAN in the western world (Hines, Holweg, Rich, 2004). Some authors have come to name the event as a new paradigm, to underline its innovative impact (Hines et al, 2004; Bartezzagi, 1999). Indeed at present, a lot of companies have adopted as well as adapted the Lean think to their own organisations in an attempt to improve their operations.

1.2 AN OPERATION AND ITS TWO DIMENSIONS

Fujimoto (1999) explains the dynamics of an operation as following. He describes an *operation* as each transfer of material or work. Within an operation there are several sequences of activities named *process flows.* There are two important dimensions to consider in an operation: the horizontal one, i.e. the *process flow*, and the vertical one, i.e. the *resource flow*. Improving the process flow will maximise *value-receving time*, which is the interest of the customer. Improving the resource flow, maximises *value-adding time*, which benefits the producer.

1.2.1 THE PROCESS FLOW

A *process flow* can be illustrated more specifically as followed. A customer has a need which initiates a procedure. The resources used in that process all complete an activity intending to add value to a

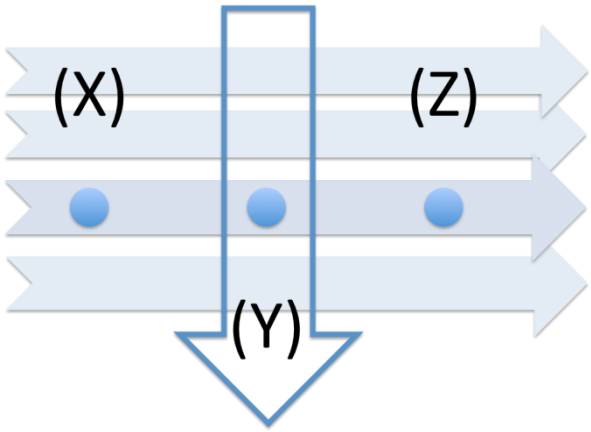


value receiver. Any time or work that does not add value is considered a waste. Basically a process flow consists of multiple value-adding resources - the material, machines and workers - and a single value-receving resource, which is the information i.e. product or service. Lean synchronisation in short, seeks a perfect flow in the process by attempting to eliminate any interruption in the flow.

The *throughput-time* is the time is takes for a unit to go through every stage of the process. Improving throughput-time is a continuous goal for production as it adds value for the receiver, who is the focal point in Lean manufacturing. In other words, throughput-time maximises value-receving time for the customer.

1.2.2 The resource flow

The *resource flow* is the quantity used in terms of mass of a resource. A resource flow consists of one single value-adding resource – a type of material, a machine or a worker - and multiple value-receving resources.



The *factor productivity* looks at how a resource maximizes its capacity, i.e. the value-adding time. Improving factor productivity is therefore also a continuous objective as it increases the efficiency of the resource flow from the producer's perspective. Improving factor productivity allows fully exploiting a production's resources and getting its money's worth in terms of costs.

1.2.3 Maximising value-receving and value-adding time

The customer being the number one priority, Fujimoto (1999) recommends the throughput-time be first prioritized. The processes should be constructed and managed to maximize satisfaction of the value-receving resource. Once this is implemented production can move on to serving its own benefits, rationalizing the value-adding resources and reducing the time or costs included in the production, in order to maximise value-adding time.

The factor productivity as well as the throughput-time can be improved in two ways. One method is to increase the density of information transmission: the time between operations is decreased and between activities such as waiting, walking and set-up time are reduced. Increasing the density is *"the heart of the Toyota-style management system and the source of its productivity advantage"*(Fujimoto, 1999). Another way to improve the flow is to speed up

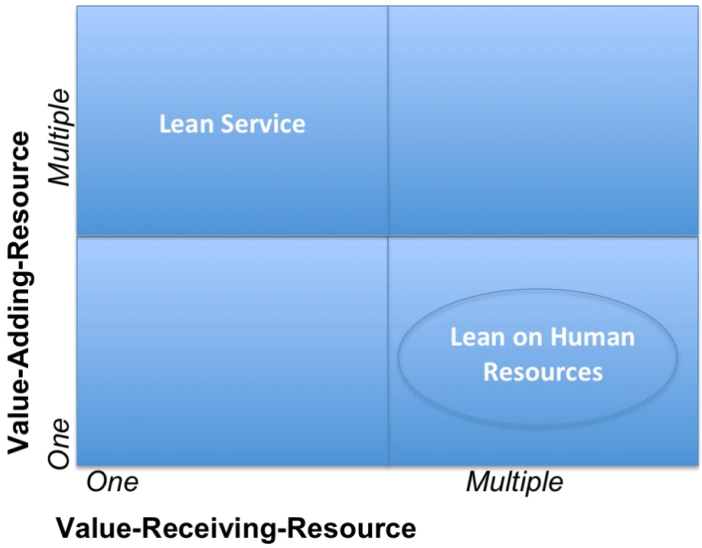
the operations and by that reduce the time for a unit to pass through a process. From the value-adding resource perspective, these actions entail lower set-up time and more value-adding producing time. From the value-receiving resource(s) point of view these improvements translate into a fast delivery of the product/service ordered.

1.3 From Lean Services to Lean HR

The concept of Lean manufacturing has successfully been used in other areas than production. The service industry for instance has been focusing on improving their process flows by increasing the density in value-receving time. Examples can be found in office environments and hospitals (Chaneski, 2005; Ballé & Régnier, 2007).

The factor productivity dimension however, is an unexplored field within Lean services. Nevertheless in the service industry in particular, Human Resources (HR) are the majority and essential component in an operation dedicated to the satisfaction of the customer. It is precisely in this area we wish to conduct our study, looking at the factor productivity of the human resource flow. Increasing the density of a human resource flow is interesting for the following reason. Imagine all the obstacles preventing a single employee from working efficiently on a daily basis. Multiply these by the amount of employees within a company as well as the number of working days. The result is a considerable amount of lost and wasted work hours, which should have been productive.

The purpose of this essay then is to identify all the obstacles that prevent the maximization of a white collar worker's value-adding time. Therefore instead of observing the process flow, consisting of activities a to c, we wish to explore the human resource flow from morning to evening in an office setting. We would be moving from Lean Service to Lean on HR. Doing so, our aim is to establish a general conclusion around human resource wastes, applicable to all office environments.



1.4 AIM

To form a comprehensive list of all wastes that can exist within a office environment and that occur on an individual level. This list aims to increase awareness amongst managers in order to facilitate the first step towards eliminating these wastes. On the bottom line the comprehensive list should serve as an early approach and framework to Lean applied on HR.

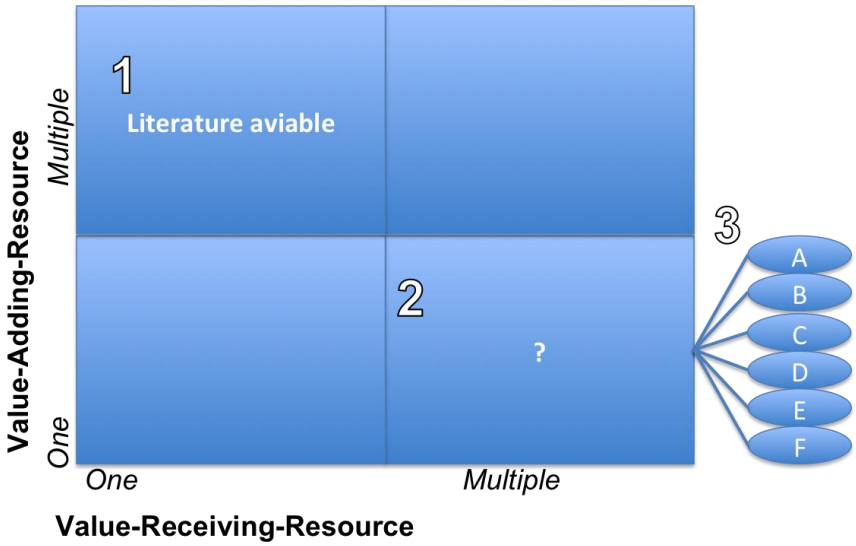
1.5 RESEARCH QUESTION

Given the aim of this thesis, the research question is:

- What wastes exist within a human resource flow?

2. LITERATURE REVIEW

We are first presenting earlier Lean literature (see square 1 on picture) and the traditional wastes occurring in production and service. There is no earlier literature within the field we are exploring (see square 2). Therefore to provide a broader understanding of our topic, we have included a short review of other relevant literature in this section (see point 3).



2.1 LEAN

2.1.1 LEAN PRODUCTION

The Lean concept emerged from Toyota's production system in the late 1980s, as a way to improve efficiency in the production chain and deliver flawless products to the customer (Hayes & Pisano, 1996). The Lean production is identified by seven principles (Womack & Jones, 2003) presented below. The purpose of presenting these principles is to provide a wide understanding of the Lean concept and its history. However we will mainly use the first mentioned principle, eliminating waste, as a framework in this thesis.

- *Eliminate waste* is a keystone in Lean production. One way to reduce non-value-adding material and time is to create order by using the 5 S's: sort, straighten, standardize, shine and sustain. To make this order clear, visualization is a good tool (Salem, Solomon, Genaidy & Minkarah, 2006).
- *Zero defects* is a principle that tries to minimize scrap and rework. Autonomation is the activity of preventing defects in the production process (Salem et al., 2006).
- *Pull instead of push* is created by a just-in-time inventory system. Instead of storing inventory, the material is ordered, produced and delivered when a need comes up (pulled through the system instead of pushed). The system that is used for just-in-time production is *kaban* which means "card" or "sign" in Japanese. The system works such that signs appear and show when a need arises and the production should start. A second system dealing with inventory is production levelling whose aim is to ensure that fluctuation in demand can be matched with a correct sequence of products in

minimum batches. A third system is to reduce the number of set-up activities to make it affordable to produce minimum batches (Salem et al., 2006).

- *Multifunctional teams* means that every worker is educated in many areas. The maintenance of a flexible workforce is a way to match labour requirements with fluctuating levels of demand (Salem et al., 2006).
- *Decentralization* puts the responsibility of the functioning on the workers. When the just-in-time system is put in place, the directions from the customers and the communication about the need must reach all the processes that are involved in the value-adding activities. This works most effectively with a decentralized organisation instead of a central push-based organisation (Reichhart & Holweg, 2007).
- *Vertical information systems* are used to share information between the production process' different stations (Salem et al., 2006).
- *Continuous improvement* is one of the most important concepts of Lean production; it should always be included in the work process as a team activity. Salem et al. (2006) state that the Lean system cannot be put in place by an outside consultant because the continuous improvement system will only work if the employees themselves are involved in the implementation of the system. The process of improving the processes is also a learning process for the workers.

As described, the aim of Lean production is to continually create value for the customer. The first step in accomplishing this is to identify wastes by zeroing in on the customer's perspective, determining what the latter defines as value as well as determining what the producers can change in the process to create or add this value (Tischler, 2006).

Seven types of wastes have been identified originating from the Toyota Production system; *overproduction, defects, unnecessary motion, unnecessary inventory, inappropriate processing, transporting and waiting* (Abdi, Shavarini & Hoseini, 2006).

- *Over/under production* can occur as a result of batch sizes that do not match the demand from customers. The just-in-time system is used to prevent this waste.
- *Defects* create rework in the production cycle and increase the production time as they generate products which are unable to be sold and use up valuable material.
- *Unnecessary motion* can be caused by a poor lay-out of the machines at the end of the production line. This is a waste because it does not maximize worker efficiency. *Unnecessary inventory* includes overstocking in warehouses and is created if

minimum order quantities are too high. Just-in-time is a key concept in the Lean methodology and leads to a reduction or even elimination of inventory costs as storage is non-existent (Salem et al., 2006).

- *Inappropriate processing* can be in the form of unnecessary packaging of products or through using the wrong equipment for the job. *Transporting* material, resources or products around does not add value to the customer. As such, the elimination of transports and the multiple handling of material will increase efficiency through saving time and costs. *Waiting* occurs when the process is hindered because material is missing.

2.1.2 Lean Thinking

Studies made by production companies applying Lean principles have shown an advantage in quality and productivity in comparison to other companies (Krafcik, 1988; Hayes & Pisano, 1996). Womack and Jones (1996) took the concept further when they wrote the book; *Lean Thinking*, where they investigate the possibilities of implementing the Lean concept to areas other than production. The Lean thinking concept is presented by Womack and Jones (1996) in five strides that are necessary to understand. They are implemented in the following order. Firstly, what value is for the customer needs to be determined, as what the customer finds valuable is what matters. This first step is called specifying value. The second step is to identify the value stream that takes place to achieve the value described in the first step. Every value-adding-activity should be recognized and the non-value-adding-activities should be reduced where possible. The third step in Lean thinking is the flow of the product through the system (we look more closely into different flows later in this literature review). When an understanding of the flow is reached, the pull instead of push system is possible to implement. The final step in this concept is to strive for perfection by constantly considering what creates value and how to eliminate waste.

2.1.3 Lean Services

As described above, the development of Lean thinking (Womack & Jones, 1996) has opened up new areas where it can be applied. The successful Lean principles can now be applied to service companies – an area that has generated considerable interest (Duclos et al, 1995; Hines et al 2004).

Based on Lean thinking, Ehrlish (2006) has written about the wastes that occur in Lean service. Examples of each waste in service situations suggested by Ehrlish (2006) are the following.

Overproduction can be "excessive screens on servicing systems, asking customers for unnecessary proof of claim, asking customers to call back during operating hours" (Ehrlich, 2006).

Unnecessary inventory is work in process, examples include back logs on customer requests, call transfers and unnecessary e-mails.

An example of *transporting* is carrying paperwork and moving materials between departments (Abdi et al., 2006). All documentation and information that needs to be transported can be included in this type of waste (Ehrlich, 2006).

Waiting can be caused by telephone queues, slow response when using online services, and waiting time caused by requests in need of authorization.

Inappropriate processing can be created through using the wrong technology such as datasystems, but also through manual errors.

Unnecessary motions can be physical movements that hinder productivity and also the act of searching for the right information among other employees.

The *defect* category concerns wastes generated by delivering the wrong information to the customer, usage of obsolete databases, rework, and errors when using online solutions to serve customers (Ehrlich, 2006).

The principle of specialization has been applied to mass services but the Lean principle suggests a different approach. It is better if every employee is multifunctional and is able to handle many of the customer's requests on their own, as this would eliminate queues and bottlenecks in the processes.

2. 1.4 THREE DIFFERENT FLOWS

2.1.4.1 MATERIAL FLOW

The flow of material can be found in production as described above but it can also be found in supply chains between firms. By integrating and collaborating the different suppliers it is possible to reduce inventory and through that reduce costs as well as lead times (Piercy & Rich, 2009).

2.4.1.2 Information flow

In a service company or in an office environment the processes are to a large extent in place to provide information. Tichler (2006) gives an example of a university that has improved its information flow. They saved time and reduced costs by using Lean principles in their process of handling applications. The possibility to apply Lean thinking is also shown by Piercy and Rich's (2009) study on pure service companies. They found that the implementation of Lean thinking and its integration within the supply chain leads to a decrease in inventory and shorter lead times.

2.4.1.3 People flow

An example of people flow can be seen in hospitals. This is an environment where the application of the Lean principles has proved successful. The implementation of Lean has resulted in a lower throughput time for patients, increased service quality and in turn, saved money for the health care industry (Ballé & Régnier 2007; Healthcare Purchasing News, 2007)

2.2 Studies made within other theory frameworks

Since this thesis is an explorative study, we have taken other sources of literature that briefly compare with and can be related to our findings. We are here presenting studies made in other frameworks than Lean concept.

2.2.1 Time-management

The concept time-management refers to a range of skills, tools and techniques used to manage time when accomplishing specific tasks, projects and goals. The term encompasses a wide scope of activities including: planning, allocating, setting goals, delegation, analysis of time spent, monitoring, organizing, scheduling and prioritizing. These activities aim to eliminate any disturbance or delay in the workflow and can be applied both on large-scale or individual processes. Several authors agree time management is relatively easy to understand though difficult to implement and master. (Finley, 2010; Forsyth, 2007). Finley (2010) emphasizes the need to act pro-actively instead of re-actively on problems.

2.2.2 Research on workflow

Ruggerio (2010) has completed studies on people who multi-task and believe they are efficient. Multi-tasking means performing several tasks simultaneously. However, biological and psychological studies have found that multitasking "places an increased demand on your

brain to continually change neural messaging. This makes tasks more difficult and leads to mental fatigue" (Ruggiero, 2010).

An study on financial analysts, software developers, engineers and projects leaders - similar groups of workers as our own survey – observed that many workers switch between tasks frequently during a day. In short the focus is not held upon one task for more than a couple of minutes (Robinson, 2006).

Smith (2000) writes in his article about the many unnecessary tasks executed in a company, which only end up wasting resources and time. He uses the term "Vampire functions" to describe any activity, function or process that do not add value or is no longer needed: "a vampire is dead but still can drain the life out of its victims" (Smith, 2000).

IRS has made a survey to examine how companies handle internet usage among employees. The survey investigated how companies deal with the employees' internet usage, and if companies have different policies. Almost every company banned obscene e-mails and pornography surfing but only a few companies where intolerant against employees doing online shopping during work hours. One company out of seven prevent employees from sending private e-mailing during work in their work policy (Reade, 2003).

According to Nesher (2006) studies have shown that an employee spends in average 12,81 hours per week online and out of that time is 24% spend on non-work-related websites. These habits are inconvenient for companies for several reasons: non-work related usage of the internet engenders costs, viruses can get into the system through downloaded software and finally employees' productivity are reduced.

2.2.3 PHYSICAL AND PSYCHOLOGICAL HEALTH

A study by Alapin et al. (2000) shows that poor sleepers score higher on tests made on fatigue and concentration during daytime than what good sleepers do. They find that bad sleep affects a person's physical functionality but also observe that negative psychological effects. According to Rasciute and Downward (2010), the physical health category in the economy literature is often mixed up with the notion of well being, which is rather related to psychological health. This leads to companies using questionnaires, getting the employees' own subjective opinion about their health instead of the real status of their physical functioning.

3. METHOD

3.1 RESEARCH APPROACH

We follow an open knowledge production in line with Popper's definition of the term (Björkegren, 1988). We are aiming for constructivism and not realism since we are creating a list of wastes which occur during a workday, based on the respondents' answers. A workday may actually contain other wastes as well. However unknown by the respondents they are not included. Keeping this in mind, we are not with this study presenting an absolute and confined version of an inefficient workday, but rather providing a framework of circumstances leading to ineffectiveness, based on how the respondents defined inefficiency. Furthermore we are assuming that changes occurring in society are caused by human actions rather than natural laws. Consequently, fragmented and ineffective working days are a result of the dramatically increased pace in organisations due to globalization and digitalization, which is very difficult for the average human being to keep up with. However we also assume change is possible to achieve through knowledge (30). On the bottom line, we believe a person can change his/her state of inefficiency by being aware of the obstacles preventing him/her to be as efficient as possible. Finally, pursuing open knowledge production, we are open for criticism of the following statements and accept alterations or further additions to our findings in future studies (Björkegren, 1988).

By creating a comprehensive list of wastes around Human Resource effectiveness, this study will be generating rather than testing hypotheses. In other words, we are attempting to make a contribution to Lean theory by conducting an inductive approach (Malhotra & Grover, 1998) to the subject of human resource effectiveness.

3.2 RESEARCH METHOD

Since the 1980s, there has been an increase in the use of empirical data, deriving from field observation and taken from industry, in the research in operations management (OM). The reason for this was to reduce the gap between management theory and practice, to increase the scientific recognition of the OM field as well as the usefulness of OM research to practitioners (Forza, 2002). Studies based on survey research in particular increased as a result of the recognition of the value of empirical research.

Our thesis moves from operational management towards human resource management. Nevertheless we are also using survey research to conduct our study. There are two types of

survey research, explanatory and exploratory. Explanatory research aims to draw causal relationships amongst variables (Malhotra & Grover, 1998). This type of research is not suitable for our study, since we are not aiming to determine the interrelated causes and effects of our findings. Exploratory survey research however, has been used as the source of our findings for the following reasons. "*Exploratory survey research* takes place during the early stages of research into a phenomenon, when the objective is to gain preliminary insight on a topic" (Forza, 2002). Indeed we are in the early stages of research on Lean on HR, from which we wish to gain more insight. Moreover we seek to contribute to the general body of knowledge in this particular area of interest through our compilation of wastes derived from the survey.

Our survey is in line with the distinct characteristics of acknowledged survey research (Malhotra & Grover, 1998). First it involves the collection of information from a large group of people, a large sample which enables us to generalize our findings. Second, we use a quantitative method when analyzing the data results from the survey, standardizing the information by categorising the answers in order to define the variable.
Moreover, the questions used in the survey are open-ended, which is a method only accepted in an explorative study and when the aim is to enlighten a phenomena that has not been previously studied (Malhotra & Grover, 1998), at least not publicly. We fulfil both these criterions and can therefore make use of this survey. The questions were also formulated in such a manner that the key words were described and explained; so as to make sure the respondent's understood the meaning of the question. In short using the survey answers as data for our study seemed an adequate research tool. Furthermore we have completed a cluster analysis, which is an appropriate method for analyzing our findings, since the study's aim is to classify the answers given into a manageable number of wastes (Forza, 2002).

3.3 DATA SET

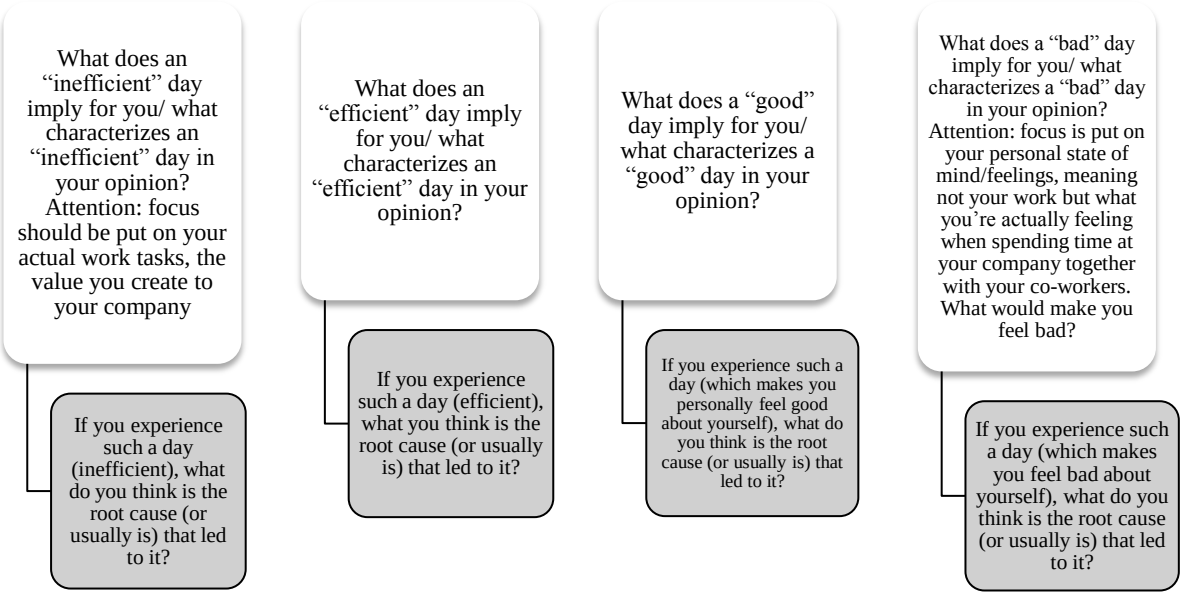
Our objective was to determine the causes of an individual's inefficient work day. We got access to a data set of answers to open-ended questions regarding a manager's inefficiency/efficiency, psychological well-being/ill-being in the work environment, which we used as our source of findings for the following reasons.

First, the data was useful as it allowed for a well-rounded representation of factors working men and women experienced as: disturbing their workflow, improving their efficiency, as

well as affecting their well-being in a positive or negative way. The correlation between being efficient and feeling well or being inefficient and being in bad shape comes across as well.

Second, this previously made survey was sent out in 2008 and 2009 to approximately 300 middle and high managers within nine different companies. These firms were operating both in the private and the public sector and were of different sizes. Therefore we considered this rather large sample of companies as a good representative of the norm.

In short, though this survey was not initially formed for the purpose of our thesis, we concluded it was very relevant in terms of topic, actuality, and reflective of actual circumstances.



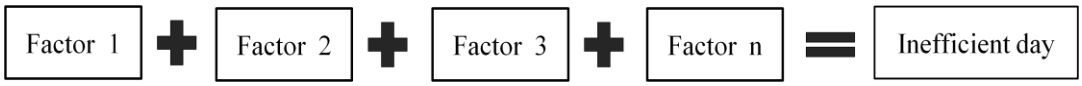
We chose to analyse the answers derived from these two sets of questions. The first set aim to define the terms (in)efficiency and well/ill-being whereas the second set of questions seek to find out the root causes when these situations occur.

3.4 Framework

The focus of this study is on inefficiency. The relationship between inefficiency and causes to inefficiency can be observed in two ways:

1. Inefficiency is caused by factor 1, which is caused by 2, and so on:

2. Inefficiency is caused by a number and combination of factors which can be summed up to determine the extent of inefficiency:



The multiple answers from the survey gave us an appreciation of the depth and width of the term inefficiency and its causes. The width was quite significant as the causes were numerous. However, because of the incessant/continual intercorrelations between causes and effects, it was impossible to determine a root cause to one's inefficient workflow. Therefore relation number one as the aim was disregarded in this study. Moreover the aim being to create a comprehensive list of all the possible causes, it seemed natural to opt for option number two by clustering the answers into coherent categories.

3.5 Empirical Steps – Data reduction

3.5.1 Categorisation

Though the study is centred on inefficiency, we concluded it was prudent to categorise the answers to the questions regarding efficiency, well-being and ill-being as well in order to get as complete and as substantial an image as possible.

Question	Nr of Companies	Nr of Respondents	Nr of Answers
Inefficiency	9	250	374
Inefficiency – cause	9	241	318
Efficiency	9	275	377
Efficiency – cause	9	261	348
Good day	9	251	383
Good day – cause	9	238	323
Bad day	9	251	297
Bad day – cause	9	227	267

The majority of the respondents stated several factors/reasons for being (in)efficient and being in good/bad shape. One answer was consequently divided and regarded as several answers instead so as to sort the similar factors in the same categories. Therefore, as shown in the table, the number of answers was more numerous than the number of respondents. A few answers were not comprehensible or irrelevant, which we chose to disregard and were not included in the statistics.

The above mentioned categorisation process was the same for each question and the following table shows the number of categories that were created based on the answers given.

Question	Nr of Categories
Inefficiency	17
Inefficiency – cause	21
Efficiency	28
Efficiency – cause	33
Good day	23
Good day – cause	29
Bad day	34
Bad day – cause	28

Moreover, we separated the responses to the "characterization/definition" and "cause" questions according to our own understanding of the answers. Many of the answers to the first set of questions were in our opinion, more "causes" than defining (in)efficiency. Subsequently we chose to classify these as such. Indeed, many of the respondents considered the first "defining" set of questions and the second "cause" set of questions to be the same. As a result, some answered "see above" to the second set of questions. These answers indicated once again the impossibility of finding a root cause and validating our choice of framework number 2.

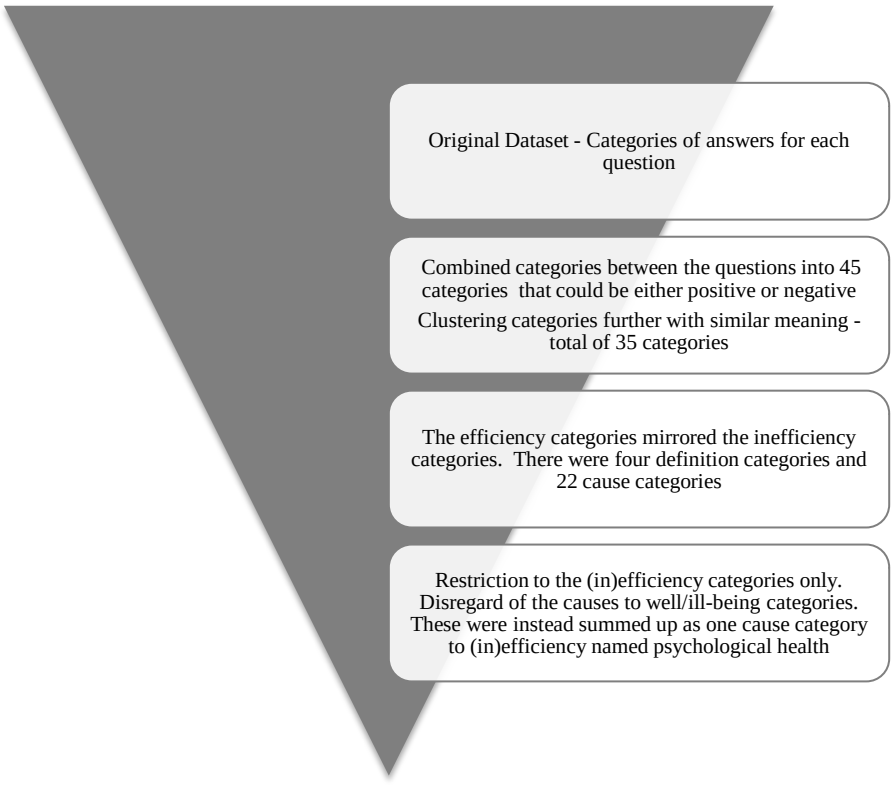
3.5.2 Confining the categorisation

Once we had set the categories for each question, it was apparent many of them were identical or perfect opposites. For example "lack of focus" or its opposite "being focused" existed both as a inefficiency category, ill-being category and efficiency category, well-being category.

Most of these categories appearing separately for each question basically had the same meaning, only in opposites. The different lists of categories deriving from the question 1 to 8 were therefore at first compiled into one common list of 45 positive/negative categories. This list was further shortened to 35 categories as we discovered several of them had a very similar meaning and could be compiled into one.

The inefficiency and efficiency categories were matching but for a couple of categories. The efficiency causes that had no opposites were subsequently added to the list of inefficiency causes, as we assumed their opposites were possible existing wastes.

The ill-being and well-being factors were also to some extent perfect opposites with each other, and some were coherent with the (in)efficiency causes. However they did not mirror the inefficiency categories perfectly the same way the efficiency categories did. The focus of the study being on inefficiency, we consequently chose to disregard the categories that were only mentioned as causes to bad/good psychological health and not inefficiency. We were left with 26 categories, four of which simply defined (in)efficiency, and 22 categorised as causes. Being in bad psychological shape is in itself a cause to being inefficient, it was therefore still indirectly present under the "psychological health" category in our study, but not analysed further.



3.6 Analysis steps

3.6.1 Defining an inefficient workday

Based on the four categories in which respondents had defined inefficiency, we presented four characteristics that determined whether a workday was considered inefficient. It sufficed if one of these criterions was fulfilled.

3.6.2 Clustering the 22 cause categories

We considered 22 categories as too extensive a material to analyse one by one. Consequently we clustered these categories further based on their similar meaning into 11 more broad and more "all-embracing" terms. Three of the 22 categories were in our opinion, more symptoms of wastes and inefficiency. These were not analysed further.

3.7 Limitations and problematic

As the questions were open-ended, the interviewees were at liberty to speak their mind. Consequently these answers could be biased as they were based on these persons' own understanding of their work time and surroundings. The responses given were accepted as true on our behalf, however we do keep in mind their bias leaves room eventual for flaws. Moreover, every interviewee gave one or more reasons to inefficiency, but did not necessarily inform of all kinds of wastes he/she encountered during a day. In addition, wastes that were unconsciously neglected were evidently not mentioned either, restricting our study further.

4. Empirics - Results from the surveys

As mentioned, 45 mirror categories were at first compiled. These can be found in the appendix. However we realised several of these had similar or identical meaning. 26 final categories resulted from a long process of classifying, re-classifying and compiling. Though the aim of this study is simply to determine a comprehensive list of wastes, the order in which the categories are listed below are from most to less frequent, based on the percentage results of both the efficiency and inefficiency questions, in order to get a better idea of the more common issues occurring within a company.

	Inefficiency				Efficiency			
Categories	**Inefficiency**		**Rootcause**		**Efficiency**		**Rootcause**	
Bad planning/prioritising	36	**11%**	79	**28%**	21	**6%**	70	**22%**
Lack of time	39	**12%**	6	**2%**	110	**29%**	17	**5%**
Lack of focus	34	**11%**	23	**8%**	19	**5%**	38	**12%**
Emergency problems	50	**16%**	22	**8%**	7	**2%**	21	**7%**
Unavailable material or people	26	**8%**	12	**4%**	10	**3%**	10	**3%**
Miscommunication	20	**6%**	34	**12%**	4	**1%**	11	**3%**
Technical issues	20	**6%**	10	**4%**	4	**1%**	9	**3%**
Lack of tasks	20	**6%**	12	**4%**	8	**2%**	4	**1%**
Unresolved issues	17	**5%**		**0%**	78	**21%**	13	**4%**
Low quality	15	**5%**		**0%**	60	**16%**	1	**0%**
Bad physchological health	15	**5%**	15	**5%**	2	**1%**	8	**3%**
Lack of skills	5	**2%**	8	**3%**	1	**0%**	11	**3%**
Unnecessary, time-consuming work	8	**3%**	8	**3%**		**0%**		**0%**
Negative ambience	2	**1%**	7	**3%**	16	**4%**	32	**10%**
Detached, unmotivated	1	**0%**	14	**5%**	5	**1%**	32	**10%**
Inefficient meetings	4	**1%**		**0%**	10	**3%**	3	**1%**
Feeling insufficient	4	**1%**	1	**0%**	1	**0%**	4	**1%**
Lack of resources	1	**0%**	12	**4%**		**0%**	6	**2%**
Different/without goal(s)	1	**0%**	2	**1%**	4	**1%**	6	**2%**
Bad physical health		**0%**	5	**2%**	1	**0%**	4	**1%**
Lack of control		**0%**	1	**0%**	3	**1%**	3	**1%**
Lack of understanding		**0%**	3	**1%**		**0%**		**0%**
No appreciation		**0%**		**0%**	3	**1%**	7	**2%**
Unchallenging tasks		**0%**		**0%**	8	**2%**	2	**1%**
Chance		**0%**	5	**2%**		**0%**	4	**1%**
Lack of overview		**0%**	1	**0%**		**0%**	3	**1%**
Total:	318	**100%**	280	**100%**	375	**100%**	319	**100%**

4.1 PLANNING, SCHEDULING, PRIORITISING

One of the most recurrent reasons for having an inefficient daily workflow has been due to issues related to bad planning of one's day or week. Wrong prioritisation was often mentioned as well.

4.2 Lack of time

A large number of people mentioned the lack of time to perform tasks as a factor of inefficiency. Even more so, a significant number of respondents answered the opposite, having enough time to perform time to perform tasks, as a key element to being efficient.

4.3 Lack of focus due to interruption or other

Another recurrent answer was the lack of focus preventing one from executing the task(s) in question effectively. While some just answered “unfocused”, others chose to explain why, the most frequent reason being “interrupted by colleagues”.

4.4 Emergency problems

The natures of the emergencies were never mentioned; nevertheless it was clear that it was a rather common issue amongst companies and occurring on a daily basis.

4.5 Unavailable material or people

The respondents have mostly named that they cannot get a hold of the right people or that they are waiting for information other people have not passed on, preventing one from doing his/her own work correctly.

4.6 Miscommunication

Unclear directives, failing dialogues, bad discussions are all named examples of miscommunication, the result being duplication of or flawed work. Not knowing what is expected of one has also been cited as a reason for inefficiency. The issues of miscommunication have often been linked with the lack of overview in the company in addition to unclear or contradictory instructions.

4.7 Technical Issues

When specified, computer bugs were the recurrent technical issues within the company.

4.8 Lack of tasks

Some respondents found they did not have enough to do, and so their day was not filled to its optimal capacity.

4.9 Unresolved issues

Unresolved issues meant problems remained under the surface and were never really solved. Respondents sometimes explained people postponed dealing with issues, leading to them resurfacing continuously.

4.10 Low quality

Some respondents felt the quality of the work they delivered was not good enough and not up to expectations.

4.11 Bad psychological health

Stress was frequently mentioned as a bad psychological health factor, usually caused by work overload.

4.12 Unnecessary time-consuming work

These include mostly spam or other unnecessary emails that appear in one's inbox and are time-consuming to simply go through and delete. Email conversations were defined as inefficient as well. Ineffective bureaucracy leading to unnecessary tasks has also been mentioned.

4.13 Lack of skills/knowledge

Lack of skills necessary to execute tasks has been mentioned. It was unclear whether this was due to the appointed task being outside of one's job description, or simply because the person was lacking competence.

4.14 Inefficient meetings

Meetings with no outcomes, too many meetings, meetings of long duration, having to attend meetings irrelevant to oneself are included in this category.

4.15 Feeling insufficient

Feelings of unworthiness, of not being right for the job, or not succeeding in fulfilling one's own expectations have been mentioned as barriers to efficiency.

4.16 Negative ambience amongst colleagues and in the work environment

Bad atmosphere in the working environment has been said to have negative impact on oneself.

4.17 Lack of resources

Absent or sick personnel have been mentioned as a lack of resources. Lack of human resources means less people to execute necessary tasks. The result becomes an overload of work for the employees that are present.

4.18 Being detached, unmotivated

Lack of drive or will and low engagement are examples of answers given and regrouped under this category.

4.19 Personnel working towards different goals or without goal

Working towards different goals or without goal have been mentioned, it is difficult to work effectively when working in different directions or without direction.

4.20 Physical health

Lack of sleep and bad eating habits were most often mentioned as causes to being inefficient.

4.21 Feeling of control is missing

This category relates to the feeling of being powerless, where it is impossible to impact the current situation.

4.22 Lack of understanding from other colleagues, not listened to

This category is similar to the negative ambience in the working environment category. Whereas the latter is more about a general feel in the working place, this category is slightly more focused on the respondent in question, feeling ignored by his/her co-workers.

4.23 No appreciation shown for one's work

Feeling unappreciated, that one's effort is not contributing to overall performance is another implicit cause of decrease in motivation. This category is actually the mirror of an efficient category, indicating the respondents rarely encounter this type of issue at work.

4.24 Dealing with unchallenging and uninspiring tasks

This category is linked to motivation as well. Uninspiring tasks lack the ingredient that drives towards action, or at least good performance. As the previous category, this is also a category deriving from the "efficiency" answers and therefore not a common issue amongst the interviewed workers.

4.25 CHANCE

This category basically indicated the respondent did not know what caused him/her to be inefficient. However this category appeared very seldom.

4.26 LACK OF OVERVIEW

Lack of overview is similar to working without goal as they both imply a lack of understanding of their tasks and their purposes.

These are the 26 final categories we found as causes to an inefficient workday. As mentioned, some of these were never mentioned in the answers to the question of inefficiency but cited in as factors contributing to an "efficient" day. We therefore still included them in the list as their opposites could translate into obstacles in the workflow. In the following section, these categories will be clustered into head-categories which will form our comprehensive list of wastes occurring in the human resource flow.

5. ANALYSIS

As mentioned in the method, the (in)efficiency categories consisted of definition categories and cause categories. The first step in our analysis will consequently be to present a definition of inefficiency within this context of office environment in order to better understand the factors considered by the managers as causes to inefficiency. This definition will provide a framework for our list of wastes. The second step accordingly will be to set up a comprehensive list of inefficiency causes drawn from the numerous surveys.

5.1WHAT IS AN INEFFICIENT WORKDAY?

To proceed in this research, it is necessary to set the framework of an individual inefficient workday. Based on the answers given by the respondents of the survey, we defined the term inefficiency. Four of the categories found in our empirical study were used to define inefficiency, as we considered these more as results of inefficiency rather than rootcauses:

- Lack of time
- Low quality
- Lack of tasks

– Unresolved issues

The general consent was that an inefficient workday is equivalent to a day where the individual has not completed the daily tasks he/she set out to do. One was inefficient when he/she failed to fulfill one or both of these criterions: quality and quantity. On the one hand, quality could be described as poor and not up to expectations, and/or as problems dwelling under the surface, unresolved. On the other, the quantity of work was defined as either lacking, leading to slow workdays, or on the contrary it was in excess, leading to uncompleted workload.

In short the general thought implied by the term inefficient, i.e. performing less than in the most optimal possible way, is an insufficient criterion to fit the definition of an ineffective work day in this context. For example an individual may have been efficient in the sense that he/she effectively worked all day, however executing emergency errands rather than his/her assigned and planned tasks. In this paper, this scenario counts as an inefficient work day.

The definition of efficiency based on the data reflected the opposite of the notion of inefficiency. It was described as having the time to accomplish what one set out to do and actually do it or, do better than expected.

Having provided a definition to an inefficient workday, we will now cluster the remaining 22 categories into wastes that lead to being ineffective at work.

5.2 List of possible wastes

We have chosen to frame our focus on a list of possible causes that lead to an inefficient workday and we classified our empirical findings further into clusters. We found 22 categories to be too broad a list, in particular due to the fact that many were of very similar nature and could be classified under a common umbrella term. In other words, the 22 categories we found from the surveys were clustered into 11 groups of waste. As mentioned above the causes are inter-correlated, however we are not seeking to depict the linkages between the causes but rather to create a comprehensive list. Some causes were a lot more recurrent than others, implying they are more common barriers to inefficiency. An alternative or complementary explanation to their frequent appearance can also be that they were simply more conscious amongst respondents. Nonetheless the list is not affected by these statistics, since our aim is to determine an understanding in width of possible wastes existing in an office. Therefore, the less recurrent categories are not less significant because they are not as frequent. Instead they are included in the list as they can still be key in an important negative outcome. The umbrella terms we defined are presented below.

5.2.1 Waste 1: Bad Preparation

- Planning, scheduling, prioritizing

Bad planning suggests the time to execute tasks has not been calculated and predicted correctly resulting in bad schedules and lack of time. Bad prioritisation basically translates into more important matters having been neglected, or, task one which seemed less important was not done but without its completion prevented the more important task two to be executed. Indeed, allocating an appropriate amount of time to perform a task as well as doing it well requires a good agenda. Without a schedule or to-do list it becomes more difficult to keep track of what has been done and time becomes scarce. Without the right prioritization of tasks, the more important but uncompleted tasks can create a halt in the process. The respondents blaming their inefficiencies on bad planning, scheduling and prioritising consequently all imply the importance of taking the time to prepare, plan ahead in order to actually have the time to execute the necessary tasks in an efficient manner. We thought it relevant to name this type of waste as *bad preparation*.

5.2.2 Waste 2: Distraction

- lack of focus due to interruption or other

When performing a task, a certain amount of concentration is required to be efficient in executing it. Yet many of the respondents lack focus for the various reasons mentioned earlier. Moreover, when being interrupted by colleagues, even for a very quick moment, it can be rather difficult to regain focus. Instead of remaining concentrated on one task and completing it, the individual's focus becomes divided between several responsibilities. Things do not get done as quickly or well as they should, creating inefficiency. To resume this category to one word, we named it *distraction* rather than "lack of focus".

5.2.3 WASTE 3: COMMUNICATION ISSUES

- Personnel working towards different goals or without goal
- Miscommunication leading to duplication of or flawed work
- Lack of overview

In larger organisations today the complexity of the structure requires for different divisions to be coherent with each other so as to perform optimally. Every employee within the company can be hard working and yet, if the colleagues within the same department are not working towards the same objectives, or the colleagues between departments are not aiming towards the same overarching goals, the overall outcome will still be inconsequential. In short their work will have minimal impact and a feeling of "effort in vain" will appear and spread throughout the company. The same sentiments are shared for misunderstandings between units or colleagues as well. On the one hand they lead to several individuals unnecessarily performing the same tasks while other tasks remain undone. Also, the misunderstood directions can simply cause unsatisfying results, as the tasks have not been performed according to the desired requirements. Furthermore the lack of overview of the organisation and its aims can frustrate the single individual as he/she does not know the purpose of his own work and cannot see the "bigger picture".

All of these issues point towards problems of *communication* within an unstructured organisation, mostly from top to bottom. The organisation's vision has not been communicated properly and therefore directions have not been expressed clearly. As a result there is a lack of unity, which degrades work productivity as individuals' strengths and skills are not utilised in the most optimal way. Employees naturally become inefficient; their tasks seem to lack meaning, they are ineffective regarding tasks they do not understand and subsequently they lose the will to impact their own productivity.

5.2.4 WASTE 4: DEFECTS IN RESOURCES

- Technical issues
- Lack of resources

Computer bugs or defective computer systems in general can create significant problems in one's daily work as people are nowadays so dependent on computers. Everything is digitalized (Basu, 2004), technology is continually developing and becoming increasingly complex for the average individual with no IT-experience or skills. Therefore when a bug occurs, it is very difficult or even impossible for the average working person to solve the issue on his/her own. The personnel's work is delayed as their main working tool is not functioning correctly, leaving them paralysed until the IT system is repaired.

The lack of human resources was mentioned many times. It often regarded a sick personnel, low staffing which leads to work overload as other people need to fulfil both their own and the absent people's tasks. In particular when these tasks are prioritised over one's own, the person becomes inefficient in terms of his/her own agenda.

Though not explicitly mentioned in the answers, we believe the term "resources" can refer to financial ones, as well as steering documents. Worth noting, though not explicitly mentioned amongst the respondents are the important role of steering documents in communication. Steering documents are usually present within any large complex organisation. If these are not updated properly with the correct information people can end up creating their own solutions to situations which occur frequently and which should be solved easily by a new effective steering document.

The term *Resources* embraces technical, economical and human capital issues, hence we thought it appropriate to name this category as such.

5.2.5 WASTE 5: LOW MOTIVATION

- Being detached, having a negative state of mind
- Dealing with unchallenging and uninspiring tasks
- Feeling insufficient and unworthy, not right for the job or not succeeding in fulfilling one's own expectations
- Feeling of control is missing: impossible to impact the current situation
- No appreciation shown for one's work

This study is restricted to white collar workers who we believe have a natural and personal drive to perform their tasks well. Though not explicitly mentioned by the respondents, we think their motivation to work is to a large extent intrinsic, rather than a function of monetary incentives. All of the subcategories above have a negative impact on the individuals' attitude towards his/her work. They subsequently translate into a loss of *motivation* and hence the lack of intrinsic drive to achieve tasks efficiently.

5.2.6 WASTE 6: BAD TEAMWORK

- Negative ambience amongst colleagues and in the work environment, negative impact on oneself
- Lack of understanding from other colleagues, not listened to

Relationships with colleagues are crucial in delivering results. Employees are very dependent on each other in organisations, as few tasks can be performed by one single person. Therefore employees need to exploit each other's competences and skills in a complementary and optimal way, as well as have an agreeable working ambience to have the incentive to perform well. Feelings of neglect and a hostile environment affect personal effectiveness. Teamwork is in short essential for both the divisions within an organisation and the organisation as a whole.

5.2.7 WASTE 7: WAITING

- unavailable material or people

The point of working in an organisation or company is about operating together; people are dependent on each other and need assistance from each other to attain the business's defined goals. When people are unavailable or late, even for a couple of minutes or material is inaccessible, it naturally creates inefficiencies in an individual's day as he/she is brought to a temporary halt in his/her own workflow. The deadlines affecting other people's work can therefore be classified as critical or essential since the workflow of the company is put on hold if they are not met. A butterfly effect spreads throughout the entire company, as one person's delay leads to another person's hold-up and so on. The waste itself is translated into *waiting* time; we therefore used the latter as the umbrella term for this category. The waiting category is the most prominent in showing the dependent relationship between individuals in an organisation.

5.2.8 WASTE 8: LOADING

- unnecessary time consuming work

As mentioned our study is based on open-ended questions, meaning the answers can be biased and the executed work can be experienced as pointless while it is not necessarily the case. For example, bureaucratic tasks that need executing can be experienced as redundant and time consuming by the employees and yet are necessary to maintain structure within the company, as well as enable an overview of its objectives and performances. While we cannot establish whether or not these tasks are unnecessary in the respondents' circumstances, we have accepted their answers as truth.

Other time consuming work mentioned were unnecessary emails. This type of waste is highly probable in every organisation, again due to the digitalization of working methods. Unnecessary emails include spam mail but also mails irrelevant to oneself. Though some emails can be quickly identified as spam, others need reading before one can decide whether they are irrelevant. Having to go through these emails might only take 5-15 min at a time, however multiply this amount by several times a day and number of working days and a more significant amount of hours are lost. One might also wonder why people receive so many irrelevant emails from colleagues or customers. It could be because it is unclear for the surrounding actors who they should turn to or involve in various matters, due to lack of structure within the organisation. We call this category *loading*, as other's actions place burdens on someone else.

5.2.9 WASTE 9: LACK OF SKILLS

- Lack of skills/knowledge

If the personnel lack required competence it is natural the work will not be carried out optimally. Though not explicitly mentioned why, we believe this issue is mostly a HR issue: either the wrong individual was hired, or the individual was wrongly placed in the organisation. Furthermore, this category is closely linked to Resources. In situations of absent personnel, present employees can have been ordered to perform tasks that are usually not within their area of expertise, creating inefficiency as well. In situations where technical issues are present, the personnel often lack the competence to solve IT problems as it is often not included in their job description.

5.2.10 WASTE 10: BAD PSYCHOLOGICAL HEALTH

- Bad psychological health

Bad psychological health or feeling down can be triggered by several factors, however stress was the recurrent cause in our survey. Factors affecting stress are found both on the workplace and in the households. In the workplace, stress is most likely triggered by work overload or failure to perform tasks well. The reduction of the kind of stress created by a feeling of not completing tasks is an overall objective of this thesis; if time is managed in a good way and systems preventing wastes are implemented the work can be done on time.

5.2.11 WASTE 11: BAD PHYSICAL HEALTH

- Bad physical health

Different factors we have categorized under physical health are sleeping habits, followed by eating habits, and exercise habits. One can draw a parallel with elite athletes whom need to exercise, eat and sleep well if they are to perform at their best level. This applies for personnel in the office work as well to a certain extent. If an employee feels physically tired due to one of the above mentioned reasons, the outcomes of his performance will most likely suffer in terms of quality but also in quantity.

5.3 OTHER CATEGORIES

Three additional sub-categories were defined which we were unable to sort under our list of 11 wastes. These were:

5.3.1 EMERGENCY PROBLEMS

This category was one of the most recurrent answers amongst the respondents. However emergency problems can take the shape of any of the above mentioned categories, as well as be a cause or effect of any of these. In addition it can be due to external factors such as natural catastrophes, which cannot be classified as a waste within a company. Therefore we considered emergency problems as a symptom of the above mentioned categories rather than a root cause in itself.

5.3.2 INEFFICIENT MEETINGS

We resonated around this category the same way we did for emergency issues. We find inefficient meetings rather a symptom of bad planning or scheduling, or bad communication of the meeting's intended content and outcome, than a root cause to inefficiency.

5.3.3 CHANCE

Chance was mentioned by a few respondents as affecting their efficiency level. "Chance" was of no great value as it did not indicate anything concrete, apart from implying the respondents

did not know what caused them to be inefficient, possibly indicating a structural issue. In addition this sub-category appeared less than a dozen times. We therefore chose to disregard it.

Being neither a cause of waste nor a definition to an inefficient workday, but rather symptoms of these, emergency problems, inefficient meetings and chance were disregarded during the rest of the analysis.

6. SYNTHESIS

In the office work environment the personnel is the essential resource and most likely the most costly in terms of work hours. It is therefore important to exploit human capital in the best way to optimize efficiency, this by reducing the wastes occurring in their daily work. When establishing the list of wastes, we realised we could separate them into three different levels, requiring different approaches to tackling them. These are the individual, the co-operation and the structural levels. All of these wastes, though occurring on a micro-level within the organisation need be dealt with the assistance of the organisation itself and not left to the employees to solve on their own. The objective of this is beneficial for both parts, as the staff becoming more efficient leads to the company improving its performance and adding value to the customer. Applying Lean principles in this environment, the first step is to identify which of these wastes occur in the organisation in question. The second is to come up with solutions to eliminate or reduce these wastes. The purpose of dividing them into the following levels then, is to determine on which level companies should execute this second step, where to intervene so as to best cope with these issues.

Since this comprehensive list of wastes is our own, it is difficult to describe exactly how a company should invest their efforts in improving efficiency as no previous public study has been made. However we would like to share our understanding of what type these wastes are and how they relate to an organisation.

6.1 INDIVIDUAL LEVEL

- Bad Preparation
- Low Motivation

- Distraction (caused by personal issues)
- Bad Psychological Health
- Bad Physical Health

Wastes classified under individual level are wastes that concern the individual directly, in the sense that he/she is the key player in making change happen to reduce these wastes. An individual can to a large extent affect his/her own planning and scheduling, his/her motion and eating habits, or how often he/she allows non work-related things create distraction, such as private text messaging. Moreover, only the individual can ultimately make the necessary changes to improve his/her well-being or increase his/her motivation, at least the intrinsic kind. However it is up to the organisation to initiate change and mobilize the staff to do so, by intervening on the micro-level i.e. the individual level. The organisation needs to be the initiator, the influencer, but in the end only the individual can solve these personal problems. For example, an organisation can trigger improved behaviours amongst its staff by creating a health program with common principles to all its personnel in order to incorporate a new way of eating and training. Though the program would be designed by the company on an overarching level, it aims to reach out to every working individual. The solutions would slightly vary for every individual as they all require different hours of sleep, different diets and such. The new physical habits, if properly adopted by the working individuals, will result in better physical shape and increase personnel's abilities to concentrate and perform tasks. Improved efficiency amongst every employee results in an overall improved efficiency for the organisation.

6.2 Co-operational level

- Waiting
- Bad Teamwork
- Distraction (caused by colleagues)

Wastes that need to be tackled on a co-operation level are wastes we believe are closely related the company's organisational culture and its values. Teamwork issues as the term itself suggests require the co-operation and joint efforts of all individuals belonging to that particular group if their overall performance is to be improved. If the will to compromise and assist each other are not mutual, one person's efforts will be pointless. Unavailable people or material we believe are mostly linked to the deadline culture which exists in a company and the amount of weight put on respecting the deadlines. Not being able to get a hold of people

or material is also co-operation issue and the entire staff needs to be mobilized in unison to integrate new values vis-à-vis respecting everyone's time.

The distraction category was also due to interruptions from colleagues. Therefore we saw it fit to classify it as a co-operation issue as well as this type of distraction is not in majority reliant on the individual self. Distractions are inevitable as everyone has different calendars. However as much as it is important for people in an organisation to be available to their colleagues, it is also important for these colleagues to respect the personal time needed to execute one's own tasks. When one is continually disrupted in his workflow, it is natural that person does not get his/her work done due to repeated lack of focus, which can also eventually lead to the waiting category. Once again it is a question of organisational culture, therefore as this type of distraction needs to be addressed as a collaboration issue, and everyone needs to work towards a joint solution and not a tailor-made one like the health program in the previous example.

Visualisation has often been found a good tool and could be used these co-operation issues as it allows to analyse them from a distance and with good overview.

6.3 STRUCTURAL LEVEL

- Defects in Resources
- Communication Issues
- Loading
- Lack of Skills

Wastes that need tackling on a structural level are to a larger extent related to the organisation's structure and bureaucratic configuration than the other two types of wastes. Defects in resources such as technical issues or sick personnel directly impact the entire office. Bad communication of goals and tasks from top to bottom or on a horizontal basis point toward a lack of directives, possibly because there are not any clear ones. Unnecessary and time consuming work, wrong positioning within the company, delegating tasks to the wrong people who lack the right competence are indications of a lack of order and clear allocations of work tasks. All these issues require a certain restructuring of the organisation and therefore an intervention on a "macro" level of the organisation.

Individual level	Co-operational level	Structural level
Bad Preparation Distraction Low Motivation Bad Psychological Health Bad Physical Health	Waiting Bad Teamwork Distraction	Defects in Resources Communication issues Loading Lack of Skills

Even though all of these wastes directly impact the individual's workflow, the level on which they should be tackled can vary depending on their nature. Wastes that are more inherent to the person should be tackled on an individual level, whereas teamwork problems for instance which enclose several individuals are co-operational issues. Finally, issues regarding inadequate skills or bad transmission of information, need to be coped with on a structural level within the company.

Having established a comprehensive list of wastes as well as grouping them into larger frameworks we will in the following section compare these wastes with previous Lean literature as well as other theoretical concepts.

7. CONCLUDING DISCUSSION

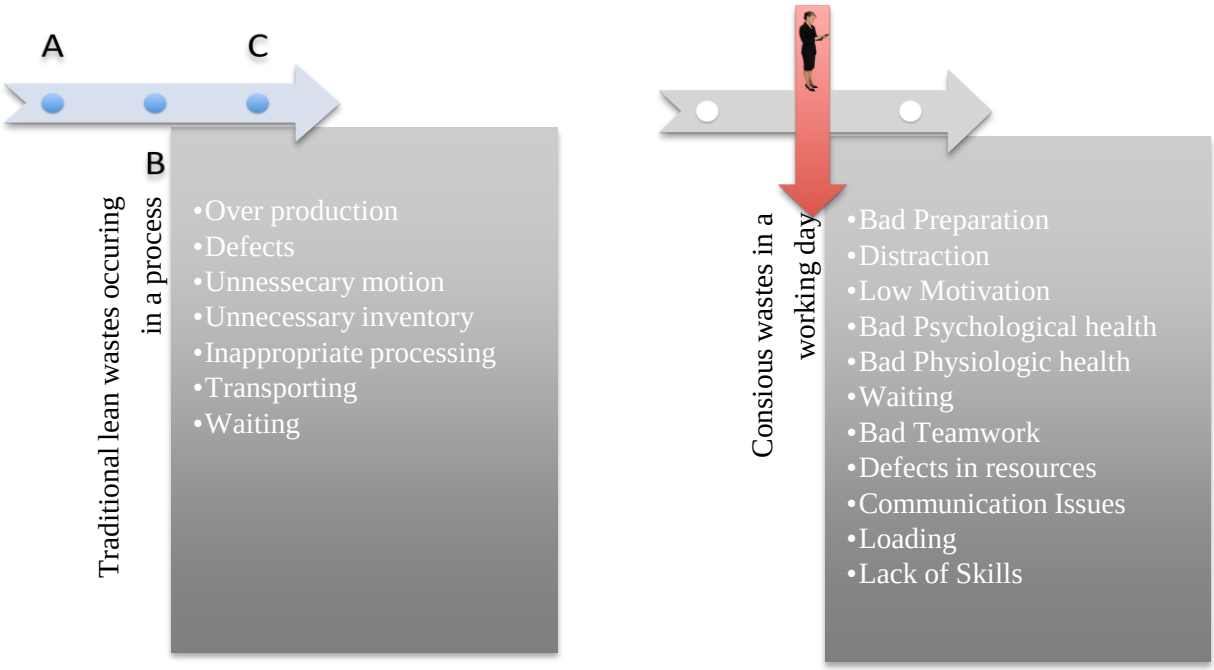
7.1 LEAN SERVICES VERSUS LEAN HR

Lean manufacturing or service starts with a customer need. With that as a starting point, a process is initiated where a product/service is formed through value-adding activities to finally be delivered and satisfy the customer's need. In such a process, the employees are components in making sure its flow is fluid, with as few interruptions and non value- adding activities as possible. In Lean production, there is therefore one value-receving resource, and several value-adding resources, which are the capital and human resources devoted to creating a product.

In this paper we are looking at Lean HR instead. We are focusing our attention on the personal workday and the obstacles that prevent that day from being optimally efficient. We are therefore looking at one value-adding resource, which is an organisation's human capital, and multiple receiving resources. While applying Lean on HR it is important to keep the overall process, which creates value to the customer, in mind: as Fujimoto (1999) points out it

is the density increase in throughput-time which is the first priority in implementing Lean. The personnel in a company need to grasp the concept of Lean Service before Lean on HR can be applied to increase factor productivity.

Our list of comprehensive wastes will be the first step in applying Lean on a personal level. To better grasp Lean HR and its deviations and similarities from Lean Services, we will now contrast our list of wastes with the seven traditional wastes deriving from Lean Services.



7.1.1 Overproduction

As mentioned in the literature review, overproduction occurs when production or services exceeds the strict quantity ordered by the customer (Abdi et al, 2006). Some of the sources of overproduction in Lean Service can also create an extra load on the human resource, for example unnecessary proof of claim results in extra work for both the customer and the staff. Our loading category is equivalent to overproduction as it also entails unnecessary work performed by an employee. The individual's time, which is the resource, has been wasted and used more than what is necessarily needed to perform a task.

7.1.2 Defects

Defective information that reaches the customer affect will result in a dissatisfied customer, which is neither possible to repair nor rework (Ehrlich, 2006). It is difficult to translate this type of production waste to a personal working day waste. Basically, all of the wastes in our

list will result in a defective performance on behalf of the employees. However a parallel could more specifically be drawn to the factors that are inherent to the individual's capacity to perform optimally; a "defective" employee will undoubtedly result in defective work/information. These are physical health, psychological health, skills, defects in resources and to a certain extent motivation. Technical issues are included in "Defects in resources", which are not intrinsic to the individual, yet when they occur they also constitute a defective resource for the firm. In addition, motivation affects the individual's will more than his/her capacity to work. Nonetheless it is often difficult for an individual in an office suffering from a serious lack of motivation, to overpower this deficiency and still perform efficiently. Motivation can therefore also be included in this category to a certain extent.

7.1.3 UNNECESSARY MOTION

Unnecessary motion results in extra movement for the workers (Ehrlich, 2006). The Lean service has this category applied to human resources, but none of the respondents in our study mentioned it as a waste and is therefore not included in our list. We believe that unnecessary motion could be an issue if the company is global and a lot of travelling is needed to attend meetings. Even so, with progress in technology, a lot of meetings nowadays can take place through internet tools such as skype, enabling people from all corners of the world to attend.

7.1.4 UNNECESSARY INVENTORY

Unnecessary inventory entails storing of unfinished material or customer information (Ehrlich, 2006). No respondent has complained about their inventor and most of the inventory an employee in a work office has nowadays is digital. This category does not really affect factor productivity but rather throughput-time which is related to the process flow.

7.1.5 INAPPROPRIATE PROCESSING

According to the Lean literature the wrong use of resources is cause for inappropriate processing waste (Ehrlich, 2006). Our resource category affects the process of a white collar worker as well, if the company does not have a good back-up plan for absent personnel or defective computers, the people who are working do not have the possibility to perform efficiently. The work day becomes inappropriately processed. Moreover our skills category can be included here as well. People lacking the right skills to perform a task have been mentioned as a factor of inefficiency. A parallel can then be drawn to inappropriate processing regarding those people in the firm whom are not rightly placed based on their competence. These people, being wrongly placed constitute a waste as they are not assigned

to the right tasks. Would they be assigned to the tasks they are best at performing, the outcome would be increased efficiency.

7.1.6 TRANSPORTATION

Transporting is similar to unnecessary inventory, not very influent on an employees' workday according to our study. The tasks usually do not require transportation since as mentioned, most work are nowadays transmitted via technology. The eventual transportation time and cost of important printed documents from office to office is often not very significant, at least not according to the respondents since no one has complained about this either. Transporting therefore does not have an equivalent waste in HR work flow.

7.1.7 WAITING

Waiting can be for material or for authorization (Abdi et al, 2006), this waste is basically identical to the waiting category in our list. The units can differ between the two environments in terms of waiting for material/information or tangible goods, however the principle of waiting for someone else to be able to get started on one's own task remains the same.

7.1.8 LEAN HR – THE SOFT VALUES DIMENSION

The remaining categories from our list where no parallel could be drawn with Lean services' seven wastes are: preparation, teamwork, communication and to a certain extent motivation.

The concept preparation is built into the entire Lean thinking system. The Just-in-time model basically incarnates this concept seeing that as soon as an order is placed, all equipment must be prepared and ready to execute tasks. Nevertheless bad preparation does not appear as a waste in Lean manufacturing, hence it is a supplementary category only found in our list.

Teamwork, communication and motivation allows for a thin line to be drawn between Lean HR and Lean Service. This is where we believe they differentiate: Lean HR adds an additional dimension of "soft values" to (in)efficiency. These are certainly necessary in Lean production as well, employees need to communicate and coordinate properly in order for all elements of the production chain to function correctly. However, while a production company relies heavily on both its personnel and equipment - and arguably its personnel to a larger degree since they are the source of machine invention - an office is even more dependent on its personnel and the chemistry existing amongst them to perform optimally. Machines, once built, do not for example require motivation and good communication the same way a company offering intangibles services do, to perform well.

Many of the wastes we found matches the one used in Lean services but some are adjusted or added to fit the employees work day better. One difference we would like to comment on is the flexible workforce with multi-skilled employees proposed in Lean service (Ehrlich, 2006; Womack & Jones, 1996) since our study does not consider mass services but rather middle- to high managers who's skills often are obtained during several years. This is a reason for the importance of using the valuable time effective

7.2 COMPARISONS TO OTHER MANAGEMENT LITERATURE

As mentioned in the literature review, the effectiveness and efficiency of human resources have been studied in other theory frameworks. We will in this section present literature we found that are similar to some of the wastes we have established above. The purpose of doing so is simply to show that though no Lean solution has yet been applied on HR, companies can find other sources of literature that can assist them in eliminating these wastes. Basically, there is no point in re-inventing the wheel.

The first area is the time-management literature. Forsyth (2007) preaches planning work ahead to achieve good results. Following a pro-active system needs to become a habit amongst workers in order for it to be successful; making it work for a couple of days is not enough. Implementing a proactive attitude for longer than that is where most people fail (Finley, 2010). Our "Bad preparation" waste seems to reflect the issues of re-activity instead of pro-activity accurately.

Distraction problems have also previously been studied. Literature and research (Ruggerio, 2010; Robinson, 2006) show that lack of focus is a big issue in the work environment. Ruggiero (2010) explains multi-tasking is a source to ineffectiveness as it causes mental fatigue. Moreover, Ruggiero (2010) suggests individuals stop trying to multitask and instead put similar tasks in blocks so that they are able to do one thing at the time, for example first go through the mailbox and then make the necessary phone calls. Robinson's (2006) description of studies on interruptions at work creates a broader understanding of how often they occur. The study found that the average time to work with one task before getting interrupted by another person or starting to use another advice such as a mobile phone was three minutes and five seconds and every occasion an interruption occurs additional time is needed to regain focus.

In our analysis of the waste loading respondents have mentioned that some tasks they perform are unnecessary. Smith (2000) strengthens this assumption through his research on "vampire

functions", which recount various unnecessary tasks executed within a company: rework, steps and tasks not adding value to the process, completing reports no one looks at, people doing the same things in different departments and counting things that don't need counting.

Finally, the research and recommendations about physical and psychological health are already used within companies. Literature regarding sleeping habits and its effect on fatigue and concentration ability was presented in the literature review section (Abdi et al, 2006) as an example of the importance of physical health, even for non-athlete related work. Interesting from a managerial perspective is the study by Rasciute and Downward (2010) as they point out that the physical status is often mixed up with the subjective feeling of well-being. This is in line with our finding in which the subjective opinion of the respondents were collected; the number of respondents mentioning physical health were rather small. In short, physical health often needs more attention than employees might realise and this insight can be useful when trying to improve this waste.

7.3 Discussion - Hypothetical categories

The aim of this thesis has been to create a comprehensive list of human resource flow wastes. We would like to open our thesis for discussion by suggesting two additional wastes to our list, which we were surprised non of the respondents had mentioned, but which we believe would complete our comprehensive list. Our assumption is in line with our study's weakness, being it is limited to conscious wastes. Therefore we believe following additional two wastes to be unconscious, but still present within some organisations.

7.3.1 Direct waste

We were surprised no one confessed to direct waste, such as reading the news on websites or wasting time on the phone/text messaging. The non-attendance of this category in our survey led us to conclude: the respondents do in reality waste time text messaging/surfing/talking on the phone, only they do not consider it a waste. They isolate these moments instead of adding them up and believe they have only wasted a few minutes a day, hardly affecting their work. They fail to see the accumulation of wasted minutes here and there doing non-related work during an entire day. As another possibility, they see themselves as great multi-taskers who manage to both work and perform private tasks at the same time, therefore not considering it a waste. This hypothesis can be supported by Neshers (2006) findings on internet usage not concerning work issues among workers and the fact that companies act to prevent inappropriate internet usage (Reade, 2003).

7.3.2 Inventory

This category is one of the most common wastes in the Lean production. A lot of the existing inventory nowadays is virtual. Nonetheless, though not a lot of physical inventory is kept in office environments nowadays, an employee's virtual inventory can be extremely disorganized due to the extensive amount of documents that are stored and accumulated over the months, let alone years. If these are indeed disordered, which we believe to be very likely, inventory becomes a waste as it is time-consuming to find the right files. The same goes for one's inbox, without a proper folding system, important emails can easily get lost and unimportant ones simply occupy space. This category could also eventually be compared to the unnecessary motion waste in Lean manufacturing. The time that is lost walking around can be paralleled to the time lost searching for the right information or documents.

7.4 Final comments

We hope that this thesis can be viewed as an early approach to apply Lean principles on a personal workday and that it will be of use for further studies of Lean on HR. The comprehensive list we have compiled gives room for new studies, both in the broad terms of Lean but also on every specific waste. Each of the wastes found can be a topic of its own, and further developments of these wastes would greatly complement our thesis. We especially hope that future studies will be made on the implementation of Lean principles on a human resource flow, i.e. personal workday. It would be interesting to see the outcomes in reality and their effects on companies' productivity.

8. REFERENCES

Abdi, F., Shavarini, S.K. & Hoseini, S.M.S. 2006, "GLean Lean: how to use Lean Approach in Service Industries?", *Journal of Services Research*, vol. 6, pp. 191.

Alapin, I., S. Fichten, C., Libman, E., Creti, L., Bailes, S., Wright, J. 2000. *Journal of Psychosomatic Research*, vol. 49 , no 381, 390

Ballé, M. & Régnier, A. 2007, "Lean as a learning system in a hospital ward", *Leadership in Health Services*, vol. 20, no. 1, pp. 33-41.

Bartezzagi, E. 1999. The evolution of production models: is a new paradigm emerging? *International Journal of Operations & Production Management* vol. 19, no. 2, pp. 229.

Basu, K. 2004. *Is globalization a force for good in India?*, Retrieved 2010-05-17, from http://news.bbc.co.uk/2/hi/south_asia/3481855.stm

Björkegren, D. 1988, *Företagsekonomisk kunskapsproduktion inom områden med låg teoribildning*, , Stockholm.

Chaneski, W.S. 2005, "Company Applies Lean Techniques In The Office", *Modern Machine Shop*, vol. 78, no. 6, pp. 44.

Ehrlich, B.H. 2006, "Service with a smile", *Industrial Engineer*, vol. 38, no. 8, pp. 40.

Finley, D.C. 2010, "Master Time", *Advisor Today*, vol. 105, no. 1, pp. 61-61.

Forsyth, P. 2007, "Making the most of your time", *Engineering Management*, vol. 17, no. 4, pp. 12-15.

Forza, C. 2002, "Survey research in operations management: a process-based perspective", *International Journal of Operations & Production Management*, vol. 22, no. 2, pp. 152-194.

Fujimoto, T. 1999, *The evolution of a manufacturing system at Toyota*, Oxford University Press, New York. pp. 85-115.

Hayes, R.H., G. Pisano. 1996, Manufacturing Strategy: At the intersection of Two Paradigm Shifts, *Production and Operations Management*, vol. 5, no 1, pp. 25-42.

Healthcare Purchasing News. 2007, "OR Department uses Lean to cut unneeded inventory and saves money", *Healthcare Purchasing News*, Nov 2007, vol. 31, no 11, p.p. 68-69

Hines, P, Holweg M, Rich. N, 2004, Learning to evolve: A review of contemporary Lean thinking. *International Journal of Operations & Production Management*, vol. 24 no. 996

Krafcik, J.F. 1988. Triumph Of The Lean Production System. *Sloan Management Review* vol. 30, no 1, pp. 41.

Malhotra, M.K. & Grover, V. 1998, "An assessment of survey research in POM: from constructs to theory", *Journal of Operations Management*, vol. 16, no. 4, pp. 407-425.

Nesher, R. 2006, "Employee misuse can put your company at risk", *Business Journal (Central New York)*, vol. 20, no. 25, pp. 22.

Piercy, N. & Rich, N. 2009, "Lean transformation in the pure service environment: the case of the call service centre", *International Journal of Operations & Production Management*, 2009, vol. 29, no. ½, p. 54-76.

Rasciute, S. & Downward, P. 2010, "Health or Happiness? What Is the Impact of Physical Activity on the Individual?", *Kyklos*, vol. 63, no. 2, pp. 256-270.

Reade, Q. 2003, "Employers crack down on staff misuse of internet and e-mail", *Personnel Today*, , pp. 39-39.

Reichhart, A. & Holweg, M. 2007, "Lean distribution: Concepts, contributions, conflicts", *International Journal of Production Research*, vol. 45, no. 16, pp. 3699-3722.

Robison, J. 2006, "Too Many Interruptions at Work?", *Gallup Management Journal Online*, , pp. 1.

Ruggiero, B. 2010, "Where Did the Day Go?", *Bank Investment Consultant*, vol. 18, no. 2, pp. 19-20.

Salem, O., Solomon, J., Genaidy, A. & Minkarah, I. 2006, "Lean construction: From theory to implementation", *Journal of Management in Engineering*, vol. 22, no. 4, pp. 168-175.

Smith, G.P. 2000, "`Vampire' habits drain the profitability from a company", *New OrLeans CityBusiness (1994 to 2008)*, vol. 20, no. 39, pp. 25.

Schifferes, S. 2008, *Globalization splits rich and poor*. Retrieved 2010-05-17, from http://news.bbc.co.uk/2/hi/business/7230202.stm

Tischler, L. 2006, "Bringing Lean to the office", *Quality Progress*, vol. 39, no. 7, pp. 32-38.

Womack, J. & Jones, D. 1996, *Lean Thinking*, Touchstone, London.

Womach, J. & Jones, D. 2003, *Lean Thinking: Revised and Updated*, Simon & Schuster, New York, NY.

9. APPENDIX

Kategori	Beskrivning - negativt
A	Kvaliteten på arbetet blir inte hög
B	Kvantiteten på arbetet blir inte hög, det har inte hunnits med tillräckligt många saker relativt vad som vore önskvärt
C	Det finns för lite jobb som kan göras, uppgifter saknas
D	Det finns för mycket jobb att göras, mer planerat än vad som hinns med, oförmåga att säga nej till uppgifter
E	Uppgifter har prioriterats felaktigt
F	Uppgifter blir ej lösta, problem blir "hängande i luften"
G	Oeffektiva, dåliga eller onödiga möten
H	Då respondenten inte hinner se sina kollegor ordentligt
I	Akuta problem kommer upp som måste lösas direkt
J	Personal saknas på arbetsplatsen
M	Planering/förberedelsa saknas eller har gjorts ofullständigt. Även andras brist på planering ingår.
N	Material, dokument eller personer finns ej att tillgå då det behövs, tid går åt till att vänta på dessa
O	Resurserna som behövs i arbetet fungerar ej, t.ex. datorer eller styrdokument
P	Kommunikationen i företaget fungerar ej vilket leder till att arbete ej utförs, utförs dubbelt eller görs på fel sätt
Q	Uppgifterna som görs hade ej behövts göras som t.ex. onödiga mail som läses eller byråkrati som tar tid
R	Under en uppgift blir personen störd vilket gör att fokus tappas, tid försvinner direkt samt effektiv tid försvinner då det tar tid att hitta fokus igen
S	Kunskapen för att utföra uppgiften saknas, respondenten vet inte vilka uppgifter som ska utföras
T	Dålig psykisk hälsa, stress, dåliga förhållanden hemma etc.
U	Dålig fysisk hälsa pga dålig sömn, dåliga matvanor, sjukdom etc.
V	Motivation saknas, personen är oengagerad, oinspirerad, den egna inställningen
X	Kollegor påverkar personen negativt, medarbetare har ej roligt tillsammans och vissa klagar
Y	Situationer som är går ej att påverka själv, då känslan är att kontroll saknas
Z	Andra personer har ej förståelse för respondentens situation och dess arbetsuppgifter, blir ej lyssnad på
Å	Respondentens egna känsla av att inte vara betydelsefull, jobbet som görs känns inte rätt för den själv

Ä	Man får ej eget ansvar, förtroende saknas från medarbetare eller chefer, får ej bestämma själv
Ö	Respondenten bidrar inte i arbetet, det som görs blir inte uppskattat alternativt det hinns inte med
AA	Respondenten får inte beröm, uppskattning eller positiv feedback på sitt arbete alternativt får kritik
BB	Arbetsmiljön är dålig, trivseln låg och dålig stämning
CC	Dåligt flöde i arbetet, det som ska göras hinns inte med och inte extra uppgifter som vore önskvärt. Det är för mycket att göra, "inget" blir gjort
DD	Samarbetet kollegor emellan finns inte eller är dåligt, stöttar inte varandra och saknas "vi-känsla", små eller stora konflikter
EE	Uppgifterna är inte utmanande, nya och framåttänkande utan tvärt om
FF	Respondenten får inte feedbak på arbetet som utförs
GG	Problem lyckas inte lösas, uppgifter blir utförda dåligt, respondenten är inte effektiv på att skapa kvalitet
HH	Respondenten känner sig inte effektiv, skapar inte hög kvantitet
II	Respondenten är ofukuserad
JJ	Personalen jobbar mot olika mål, utan mål eller misslyckas med målen
KK	Slumpen bestämmer dagens situation
LL	Andra personer gör påhopp, ger felaktig eller orättvis kritik,anklagelser på respondenten eller annan person
MM	Andra personer på arbetsplatsen (chefer eller kollegor) gör ett dåligt jobb
NN	Helheten saknas
OO	Respondenten jobbar med annat än vad som står i arbetsbeskrivningen alt. vet inte riktigt vad arbetsbeskrivningen innebär
QQ	Respondenten känner sig otillräcklig, har höga förväntningar som ej lyckas leva upp till
PP	Mänskliga faktorn påverkar hur situationen artar sig

Note: There were a total number of 43 categories. FF, GG, HH, LL and MM and Ä only appeared in the answers to the “feeling well/ bad” questions and were not analysed, leaving us with 37 categories.

Moreover, the following categories had very similar meaning and were therefore compiled into a single one:

- B, D, H, CC
- E, M
- R,II

- S, OO
- X,BB,DD
- Å, QQ
- Ö, AA
- KK,PP

As a result we ended up with 26 categories.