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# Improving Processes Through Lean -Management

## Case Study

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<p>The idea for the thesis came from the senior executives at Itella, who wish to improve the financial performance of the company, which is not increasing fast enough. Therefore, the management has decided to change the way they do business and have chosen to turn Itella into a Lean organisation.</p> <p>The purpose of this thesis is to explain the first steps of Lean transformation at Itella Logistics Oy concentrating on its Customs &amp; Forwarding –department aiming to improve the efficiency and flexibility of the department. The outcome of this thesis is to offer suggestions to the management of Itella Logistics' Air &amp; Sea for improvement and development.</p> <p>The thesis will explain the principles and origins of Lean management and the tools used for Lean implementation at Itella. The main tools presented in the theoretical part are Value Stream Mapping and Competency Matrix, which were used to study the current state of operations at Itella Logistics.</p> <p>With the data collected with these tools and employee improvement suggestions, a set of areas for improvement were collected to be presented to the management as results of the study of which some of them were found applicable in other departments and beneficial for the entire organization. The significance of the employees within the company and their experience, creativity, and knowledge in the company was identified as an issue that should be more firmly established into the corporate culture, instead of obstructing it.</p> <p>Also the whole awareness of the project within the company arose as an issue. How many people in the organization understand the essence of Lean or how it will affect or change the nature of his or her work or affect the success of the whole Lean transformation.</p>	
Keywords	Lean Management, Value Stream Mapping, Process Improvement, Competency Matrix, Lean Transformation

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Appendix 2. Competency Matrix, Customs & Forwarding

## **1 Introduction**

This thesis concentrates on the Customs & Forwarding -department within the Air & Sea Business Unit in the Tuusula office. The department is located next to the Sea Freight and Air Freight departments, where cooperation is a daily routine and the Customs & Forwarding department performs all customs clearances for the Sea Import - department.

The Customs & Forwarding department consists of eight people, one of whom is the department manager and the other seven are brokerage operators. There is ongoing recruitment for the product manager's position for the Customs & Forwarding department. The department manager reports straight to the director of Air & Sea.

Itella Logistics is a logistics service provider, wherein the raw material to provide the service, is data. Data is received from the customer in different forms, yet it is mainly numbers, such as pick-up times, dimensions, weights, addresses, names, special instructions, and goods descriptions. Data does not always come directly from the customer, as it can come through the customer's agent or other carrier, though there is always a need for the specific data needed to successfully perform the service. How fast the data is moving between players is crucial for smooth service and often includes many partners outside Itella Logistics itself. Courier companies who deliver necessary documents, such as Bills of Lading or other commissions, are still necessary to be physically moved.

The purpose of this thesis is to offer suggestions to the management of Itella Logistics' Air & Sea for improvement and development. Specifically, it will talk about how to improve the efficiency and flexibility of the Customs & Forwarding department, alongside the company-wide iLean -project, which is about implementing Lean -philosophy into the daily operations of Itella Logistics as a part of its strategy.

## 2 Company Profile

Itella Logistics Oy is a part of Itella Group, which is fully owned by the State of Finland. Itella Group consists of three business groups:

Itella Mail Communication, which is the nationwide daily mail service provider.

Itella Information, offering financial process innovation as a service.

Itella Logistics Oy is one of the largest logistics operators in Northern Europe, the Baltics, and Russia with services covering all forms of logistics, including road, sea, and air freight, warehousing, parcel services, and contract logistics. Itella Logistics strives to be the leading service provider in the logistics business in the areas it operates. Through a large number of partners, Itella Logistics is able to provide transport services anywhere in the world (Itella Corporation, 2013).

Itella Logistics has domestic presence in eight countries: Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Romania, Russia, Slovakia, and Sweden. Together it has around 30 offices in total (Itella Corporation, 2013).

Itella Logistics provides approximately 30% of Itella Group's turnover and employs approximately 7000 employees globally.

The study for this project was conducted along with the company-wide iLean –project, where Lean philosophy is implemented throughout the Itella Logistics organization as a part of their strategy. The purpose for this is that Itella executives wish to improve the financial performance of the company, which is not increasing fast enough. Therefore, the management has decided to change the way they do business. Most companies today are forced to make similar significant development projects, such as turning Lean, not only to increase profits or generate more wealth to its shareholders, but in some cases it can be a matter of simply staying in business (Kotter, 1996). The Lean implementation process will begin internally and gradually move to reach customers and suppliers. The Lean change in Itella's terminals and warehouses have proven to be rather successful, yet changes in those particular environments are generally easier to measure and results appear faster, as opposed to office environments.

## 2.1 Definition of Forwarding

Forwarding as a concept seems to be unfamiliar to most people and it is not easy to explain, as it includes multiple tasks within the field of logistics. The definition of Forwarding, approved by the International Federation of Freight Forwarders Associations (FIATA), is as follows:

*Freight Forwarding and Logistic Services means services of any kind relating to the carriage (performed by single mode or multimodal transport means), consolidation, storage, handling, packing or distribution of the Goods, as well as ancillary and advisory services in connection therewith, including but not limited to customs and fiscal matters, declaring the Goods for official purposes, procuring insurance of the Goods, and collecting or procuring payment or documents relating to the Goods. Freight Forwarding Services also include logistical services with modern information and communication technology in connection with the carriage, handling, or storage of the Goods, and de facto total supply chain management. These services can be tailored to meet the flexible application of the services provided (International Federation of Freight Forwarders Associations, 2012).*

In addition to this, the forwarders at Itella Logistics also offer Intrastat declarations, which is the system used to gather information and statistical declarations of trade between Finland and the European Union (Finnish Customs, 2013).

## 2.2 Description of Services

The Customs & Forwarding departments' services in Import and Export:

### IMPORT

- Customer service
- ITU – import clearance according to the data provided by the client. (Invoice, packing list, certificates, release note). Tariff classification, when necessary.
- Stamping of possible permits/certificates/release procedures at the customs office/harbor (courier).
- Truck booking.
- Preparation and archiving of electronic import clearance documents and mailing them to the client.

- Invoicing.
- Claiming necessary licenses, permits, or certificates.
- Veterinary border inspection/fill in CVED- document.
- Booking of domestic trucking/container haulage.
- Bonded warehousing IMA.
- T-transit (non-declared goods).
- Release of shipment to another carrier or to client.

#### EXPORT:

- Customer service.
- ELEX – export clearance according to the data and instructions provided by the client. (Invoice, packing list, certificates, means of transportation road/air/sea, border crossings, transit countries, destination etc).
- Stamping of necessary permits/certificates at the customs office (courier).
- Sending the EAD -document/MRN-number to the client/carrier.
- Sending the exit confirmation to the client (corresponds to the 3<sup>rd</sup> part of the old SAD-document).
- Invoicing.
- Booking of domestic trucking/container haulage.
- Electronic TIR Carnet.
- CMR.
- T-transit (non-declared goods).
- T2L,T2F (EU-trade).

The Customs & Forwarding department performs similar services and consultation for Itella Logistics International Road and Sea Import –departments internally.

#### INTRASTAT

The system used to gather information and statistical declarations of trade between Finland and the European Union (Finnish Customs, 2013).

#### CUSTOMER CARE

-Comprehensive customer service, including forwarding for international freight, warehousing, and coordination of services.

-Import and export clearances, IMA-warehousing, coordinating domestic and international trucking. -All loading and unloading, CMR and electric TIR Carnet, Intrastat, and Invoicing.

-The customer has one contact person who takes care of everything regarding international freight.

The expertise of the Customs & Forwarding department is closely related to customs clearances, as well as the making and mastering a variety of transport documents. Itella Logistics is an authorized partner of Finnish Customs, which means Itella Logistics has to follow and meet the high demands and standards of security and compliance set by Finnish Customs. As a trusted partner, the customs procedures are faster and the goods require fewer inspections by the customs officials, resulting in faster transportation to the destination. All authorized partners are also obliged to perform self-monitoring to make sure the goods going through customs are cleared with correct CN-codes, which is the abbreviation of "Combined Nomenclature" -the commodity codes used for export declarations and declarations in the EU internal trade (Finnish Customs, 2013). The nature of the work is very versatile compared to other departments within Air & Sea and requires the expertise of various tasks, and in some cases, total control of a customer's supply chain.

The performance of the department is currently measured with the following Key Performance Indicators:

1. Number of shipments.
2. Speed of invoicing (The aim is towards faster invoicing, not accurate due to software issues. Current average is 7,4 days the target is to reduce it to 6,4 days).
3. Expenses, purchasing invoices.
4. Reliability (country-level).
5. Budgets (per department).
6. Self-monitoring (validity of customs clearances, number of corrections).
7. Customer satisfaction (customer satisfaction survey 30%).

### **3 Lean Management**

#### **3.1 Brief history of Lean**

Lean philosophy originates from the automobile industry in the United States in 1910 when Henry Ford first created the moving assembly line and pioneered the basics of mass production, which led the United States to overtake Europe as the world's industrial superpower (Nicholas, 2011). The second revolution and the birth of Lean Philosophy happened in Japan after the Second World War, when two Toyota executives, Eiji Toyoda and Taiichi Ohno, created the Toyota Production System (TPS). This was an improved version of the assembly line pioneered by Henry Ford (Nicholas, 2011). The Japanese industrialists had already been studying Henry Ford's methods before the outbreak of the Second World War, but soon after the war, when Japan was defeated and the country's economy was down, the Toyota executives had to think of another way to survive the post-war depression. The significant change that Toyota created replaced the American manufacturing philosophy, which is to produce products in large batches with fewer options. Toyota changed its way of manufacturing to produce products according to the demand –resulting in the production of smaller batches, while offering a variety of different models, thus making it possible to produce one piece at the time of any type of product the customer wanted. This was later referred to as "one-piece flow" (Nicholas, 2011). Flow became important as it was considered a significant improvement. Instead of the old way of focusing on individual machines and their operating efficiency, the Toyota executives noticed that they needed to focus on the product flow through all the steps of a process, which included correctly sizing the machinery and lining them up in a suitable order for increased efficiency and a smoother flow. Toyota also gave power to the employees by giving the machine operators the authority to monitor quality and even stop the whole product line if any defects were discovered. Toyota has ever since dominated the world as the leading automobile manufacturer in which other companies try to imitate, yet somehow they are never quite able to match Toyota's performance and capability to change and continuously improve their processes.

Traditionally, people have perceived Lean to be applicable only in manufacturing, which is not true. Lean principles have been used in every industry, from manufacturing to office work, as the same principles can be applied anywhere to any kind of work

in order to increase efficiency. However, Toyota is still the leading example of the potential of a completely Lean organization (Lean enterprise Institute Inc, 2009).

### 3.2 What is Lean?

The origins of Lean came about during a time of crisis, as shown above in the case of Toyota. However, many companies today are facing the same situation in the ever-changing global markets and changes in overall demand make many companies turn Lean (Liker and Hoseus, 2008). Lean is a philosophy where an organization aims to maximize value to its customers by minimizing waste (Lean enterprise Institute Inc, 2009). Lean philosophy is, above all, a very customer-centric way of thinking. A healthy addition to the philosophy would be to consider Lean philosophy as a tool to create more value, rather than focusing on 100% waste elimination. Lean is a philosophy that must be fully accepted and engaged by the whole organization in order for it to be successful. In a sense, it is misleading to call or describe the implementation of Lean as a project, as it is more of an engagement or transformation. It could be described as, "a race without a finish line" (Nicholas, 2011 p.1). One of the core principles of Lean philosophy is "the search for perfection" and in the ever-changing world of business, the situation never stays the same. Therefore, it becomes clear that Lean philosophy should be accepted as a never-ending project where everyone in the organization needs to be completely engaged in its principles, and such changes do not happen overnight. Lean philosophy is relatively simple to learn and understand, yet the challenges lie in the implementation of Lean. This is because it is often difficult to see what perfection is during process design and managers need to change their ways to manage people in terms of motivating, rewarding and engaging them into the Lean journey. The change of management, behaviors, and people's ways of thinking is the most difficult part of Lean transformation, rather than simply changing processes, tools, and systems (Kaizen Institute, 2005). Furthermore, it is easy for anyone to understand that in the real world perfection is impossible to achieve, though there is always room for improvement in every step (Ad Esse Consulting Ltd, 2007).

### 3.3 Principles of Lean

Lean philosophy concentrates on continuously improving processes by constantly identifying sources of waste and removing them. In theory, there are endless opportunities for improving processes, yet in reality there must be limits as processes require re-

sources, which in turn are not often limitless (Nicholas, 2011). Therefore Lean philosophy can also be perceived as a quality improvement tool, as it can seriously cut back throughput time within the processes (Nicholas, 2011). Lean philosophy also provides a way to specify value and build the value stream in the way that the production flows without interruptions in the best possible sequence (Nicholas, 2011).

James Womack and Daniel Jones (2003) identify the basic Lean principles as:

- Value
- The Value Stream
- Flow
- Pull
- Perfection

### 3.3.1 Definition of value

Value could be defined as any activity the customer is ready to pay for. Therefore, waste is defined by the customer and created by the producer, which cannot accurately define value. This is due to the fact that in today's world, business managers are mostly interested in meeting the immediate needs of the shareholders and in doing so, neglecting the long-term success of the company. This mindset has distracted senior managers from seeing the details of the realities of creating value for the customer (Womack and Jones, 2003). Therefore, priority number one should be rethinking value from the customer's viewpoint, before thinking about how to satisfy employees or suppliers (Womack and Jones, 2003). Value added is when raw materials are turned into a physical product or a service that the customer wants. Anything that takes resources, such as time and money, without adding value is identified as waste (Liker and Hoseus, 2008). The beginning of any Lean transformation should begin from the identification of value.

### 3.3.2 The Value Stream

The value stream is an important part of Lean philosophy. Value Stream could be described as the set of all processes and actions needed to produce a product or a service (Womack and Jones, 2003). Value streams can be mapped down to identify the

steps that actually add value, to separate them from the steps that do not add value, which helps reduce or even eliminate the non-value-adding steps (Womack and Jones, 2003). Value Stream mapping is a useful tool to help visualize the value-adding and non-value-adding sequences within each process.

### 3.3.3 Flow

Flow is the uninterrupted completion of tasks along the value stream that make the product or service run from order to delivery, or from raw materials to the customer without any interruptions (Womack and Jones, 2003). Flow is what Lean philosophy tries to achieve in the end: fast, an uninterrupted and inventory-free way to produce a product or a service. This is exactly what the "Just-In-Time" tool aims to achieve. The problem with achieving the perfect flow is the concept of perfection. What is considered perfect, or even good, for a certain process in an organization? In most organizations some or all of the processes have never been planned in the first place. Therefore, the challenge lies in designing the processes in the best possible way. What separates the successfully designed processes depends on what is considered good in an organization. The areas for improvement are endless. The successful quest for flow begins first in understanding the processes and focusing on the value-adding parts and waste elimination through mapping and measuring (Ad Esse Consulting Ltd, 2007).

### 3.3.4 Pull

Products and services that an organization produces should be pulled through its processes, instead of being pushed, thus making the process flow (Ad Esse Consulting Ltd, 2007). Producing more than what demand requires is referred to as over-production in Lean philosophy, and therefore is a major waste that companies should avoid. Changing the mindset from "push"-philosophy to pull –philosophy is paramount.

### 3.3.5 Perfection

Perfection should follow after the Lean principles have been utilized: Value has been correctly defined and understood from the customer's point of view, Value Streams have been identified, waste has been removed and the change from push strategy to pull and flow –strategy has been utilized. Perfection is achieved when this process has been repeated as long as perfect customer value can be achieved with zero waste (Lean enterprise Institute Inc, 2009).

### 3.3.6 Definition of waste

Waste can be defined as any processes or activities that require and occupy resources but create no value (Lean enterprise Institute Inc, 2009). One of the fathers of Lean, a former Toyota executive, Taiichi Ohno (1912-1990) identified seven basic types of waste, or in Japanese, "Muda":

- Defects
- Over-production: Producing goods not demanded by the customer
- Over-processing: Steps in the process that are not necessary
- Motion: Movement of goods or employees that is not necessary
- Waiting: People working in the downstream activities waiting for the upstream activity to be performed
- Transport & Handling: Unnecessary moving or handling of goods
- Inventories

(Womack and Jones, 2003)

Later, James Womack and Daniel Jones (2003) introduced an eighth waste to Ohno's seven original wastes: Manufacturing of goods and services that do not meet the needs of the customer. At first it could be argued that it could be included in over-production or inventories, but indeed it is not. What Womack means here is that companies that lose sales or find themselves in a position where they simply cannot get their product or service sold, it could be that the fault is indeed not in the price or design, but that the product or service does not meet the customer's needs. Therefore it is pointless to produce the product or service from the very beginning. Lean philosophy is about building a customer-centric, flexible organization that is able to adjust itself according to customer demands and changes in the market through continuous improvement. Continuous improvement should be among the top priorities to any organization as the success and ability to survive is largely dependent on the ability to adapt to changes and demands in the environment (Nicholas, 2011).

Flexibility is a major part of the Lean philosophy as well, as a Lean organization is always striving for improvement in every level of its operations. Continuous improvement

also involves the organization's ability to change and quickly adapt according to changes occurring in the environment from which it operates (Nicholas, 2011). Changes can be anything from changes in the economic climate, society, a global catastrophe, or simply a walkout by the staff. A purely Lean organization also works to eliminate, or at least minimize, the uncontrollable changes or issues rising from the organization.

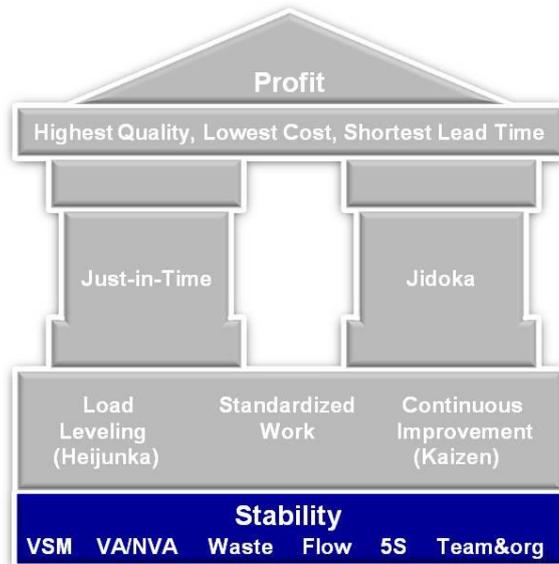


Figure 1 The House of Lean (ITELLA, 2012)

The House of Lean in Figure 1, illustrates how the basic Lean principles and tools provide the basis for achieving the highest quality with the lowest cost, through the shortest lead time, resulting in increased profits and customer satisfaction.

### 3.3.7 Jidoka

Jidoka is also known as "autonomation" or "automation with a human touch," which is to prevent defects from occurring by stopping the machinery or the whole production line immediately when a defect or a mistake is found. This is an important quality assurance tool, as workers are able to detect the source of the defect and fix it on the spot if possible, and make adjustments so that similar mistakes never happen again. This prevents the defected parts moving forward downstream and distracting the next steps in the manufacturing process, while simultaneously eliminating overproduction (Womack and Jones, 2003).

### 3.3.8 Just-In-Time

Just-In-Time (JIT) aims for the absolute elimination of all waste by striving to create process flow, which means having all the items needed at the right place, at the right time, in the right quantity. This enables single piece flow. The ideal execution of JIT should then result in no leftover inventory (Taiichi, 1988). Achieving this is, of course, easier said than done, since a product or service can consist of multiple parts, which increases the risk for error.

### 3.3.9 Kaizen

Kaizen means continuous improvement of any activity or process by increasing value through reducing waste (Womack and Jones, 2003). It utilizes everyone in the organization, from management to the workers, to continuously strive for improvement and standardization by emphasizing the importance of teamwork, which should hopefully result in further suggestions for improvement. Many Lean organizations have special Kaizen –groups who meet regularly to discuss improvement opportunities and to implement them. Through Kaizen philosophy, responsibility is divided amongst the workers at the shop floor, which should again increase commitment and overall morale in the organization.

### 3.3.10 Standardized work

The significance of standardized work is as follows: when a new employee is recruited, usually one person is named to train him/her to do the job. If there is no standardized work, everyone does the job in the way they personally feel is the best way. The new recruit will then learn to do the job the way the person training him/her does the job, which is not necessarily the best way to perform it. Also, the busy environment in the office indicates that the new recruit has to start doing the work rather fast without comprehending the process entirely. This causes the newcomer to improvise and come up with their own way of performing the job. Since everyone in the office that performs the same task has their own individual way of performing the job, the different ways are usually not shared or discussed. A standardized way to perform a task should be discussed with the employees to find what the best way truly is, and have it written down as a standard that is then shown to new employees. Improvements would be then discussed together and the written standard should be updated as changes or

improvements occur (Liker and Hoseus, 2008). "Standardized work is the foundation for creating a repeatable process that reliably produces the desired result" (Liker and Hoseus, 2008 p.126). A significant advantage of standardized work is the fact that all the responsibilities of each worker performing a certain task are written down, which in turn reduces the undesired confusion regarding the responsibilities of each worker.

### 3.3.11 Value Stream Mapping

Value Stream Mapping (VSM) is probably one of the most used tools in Lean philosophy as it helps to visualize every step within each process and helps to distinguish the value-adding and non-value-adding steps within the Value Stream that a product or a service goes through in an organization (Liker and Hoseus, 2008). The idea is to first map the current state of the process. It is extremely important that the Value Streams are drawn accurately at the place where the actual work is performed, by the people working there, rather than basing them on written instructions of how the work should be done, for example. The Value Stream Map should reflect reality as much as possible. After the current VSM has been drawn and carefully analyzed, a new "future state map" is drawn to reflect the desired goal or future vision of how the current process is to be improved in order to get where to the desired goal (Liker and Hoseus, 2008). To achieve these developments, the improvement targets should be written down and plans should be set (Lean manufacturing tools, 2013). Value Stream Maps can also help new employees, other employees, or benighted managers to understand what an employee who works in a certain process actually does. Areas for improvement usually appear during the mapping process itself. An example of this could be a worker who is explaining his/her tasks to a consultant who is drawing the map of what issues most likely will arise at that point. A person performing the task or the entire process is most likely an expert on understanding where the process can be improved.

### 3.3.12 The People Value Stream

As James Womack had introduced an eighth waste to Ohno's seven original wastes, "Manufacturing of goods and services that do not meet the needs of the customer" (Womack and Jones, 2003), other companies, such as Canon Corporation for example, defined nine wastes that are relatively close to the original seven wastes. One of them titled, "Waste in human resources," is quite interesting (Nicholas, 2011 p.65). In Itella's iLean, this has been defined as "the waste of unused human talent." Human talent

may also include human creativity and ideas that people have for improvement. If these are not utilized to improve the work, it results in waste. Jon Miller (2005) argues that unused creativity makes processes less effective, which in turn increases the seven wastes and results in lower profitability (Kaizen Institute, 2005). In the Toyota culture, there is a principle called "the human systems model," which has been a crucial part of Toyota's success throughout the years. According to Liker & Hoseus, (2008) it is how Toyota trains their staff to do more than their jobs, but to be committed to the Toyota System. Toyota has introduced the concept of the People Value Stream, which utilizes similar methodology as value stream mapping. This is done as value is added when a person is learning something and being challenged while working. Waste in this concept does not insinuate a lack of productivity. Therefore, waste is all the time that is spent not learning (Liker and Hoseus, 2008). Toyota recognizes that a large part of a person's workday is spent on performing routine tasks, breaks, or ineffective meetings, yet they feel that they do provide their staff more value by adding training and development. This way the workers are gaining advanced skills by learning about the more challenging aspects of their tasks, such as problem solving and teamwork. All of these new skills increase chances of moving onwards up in the organization. Moreover, it motivates people to engage themselves with the Toyota system (Liker and Hoseus, 2008). How this all relates to Lean –philosophy, is that encouraging and training people to become problem solvers reduces waste and creates flow (Liker and Hoseus, 2008).

In the value stream mapping phase, the value-adding and non-value-adding parts of the process are identified. In the People Value Stream –concept, we must ask ourselves what are the capabilities and skills that a worker has to have in order to execute the activities the customer is willing to pay for. In the Toyota example, by Liker and Hoseus, (2008) they argue that a worker, apart from having the responsibility to perform his/her core task in the organisation, they all have a second task involving process improvement.

For iLean project a special employee competency matrix was created where all the value adding steps were shown on an Excel sheet and then every individual employee filled in which ones could he or she perform. The results would give us the overall flexibility of the department and show where training is needed.

Skilled and motivated people are crucial to any organisation and especially in Lean organisations, the mutual trust and respect between the workers and management is of paramount interest. Without engagement in continuous improvement, the whole Lean transformation is not effective. Therefore, the importance of organizational learning comes along. At Toyota, mistakes and errors are seen as opportunities for learning and thereby improving. Solutions for fixing or overcoming errors are shared throughout the organisation to ensure continued learning (Liker and Hoseus, 2008).

## **4 Lean in Itella Logistics**

The iLean transformation at the Itella Logistics' Air & Sea department in the Tuusula office started on September 11<sup>th</sup> 2012 with the selection of the core team that would be responsible for the first steps of Lean implementation. The team consists of eight people representing all of the functions of Air & Sea, as well as the Road department, and is conducted by a project manager from the corporate level. This team received a brief, yet thorough, presentation about Lean philosophy, as no one was familiar with Lean principles yet.

The following will explain the first steps in the Lean transformation at Itella Logistics and the research done to identify the current state value streams and competency matrix. This will identify how many shipments one operator can handle in one working day and offer recommendations on how to improve the efficiency and operations of the Customs and Forwarding department based on the competency matrix -tool.

### **4.1 Research Methods**

The first task given to this team was mapping the current state of the processes within the Air & Sea using the Value Stream Mapping concept to illustrate and separate the value-adding from non-value-adding parts of the processes and to identify Kaizen – opportunities. The project managers negotiated and designed the schedule for the Value Stream Mapping sessions. This took place with at least one operator joining the iLean team to explain his/her tasks and go through the whole process so the iLean team could map the Value Stream and discuss the process to identify areas for improvement. For the Brokerage department, which handles a variety of services, the iLean project management decided to focus on the core processes and the ones identified as the most time-consuming for now to fit the project scope. The processes drawn

were: Export customs clearances for Postal packages, Export customs clearance for Road department, Export process for Snowmobiles to Russia, Intrastat –declaration process, standard Sea Import process, including import clearance, and the import process, including bonded warehousing.

Value Stream Mapping started with having one or two of the actual operators within the department come to explain the process task-by-task while the iLean team drew the process on a simple sheet of paper. This was done to all of the processes chosen from the brokerage department. After the first drafts were completed, they were gone over once again with each operator to make sure of the authenticity of the process, and the Kaizen opportunities found were marked with stars. This step resulted as the second draft of each Value Stream Map (VSM).

For better visual appeal and clarity, the VSM drafts were amended with Microsoft Vision software and uploaded to the Itella intranet for everyone to access. This is a small example of the transparency of Lean organizations.

After this, a special Excel sheet, or Value vs. Non-Value-Adding matrix was created based on the value streams in order to measure the duration of each process – Process and Lead –time. To do this, each of the iLean team members spent two to three days sitting behind a worker discussing and measuring the time of each process and filling them in to a specific Excel sheet. These, “a day in the life of” (DILO) sessions took place within a period of two weeks. The idea behind this was to find areas for improvement, as opposed to simply recording the duration of each process too specifically. The person sits behind another person, observing and writing down everything that happens during the day and marks it on the Excel Sheet, including the duration of each task. These were full 7,5 hour days dedicated to observing, timing, and spotting areas for improvement.

Below, is presented the table, which includes the action codes used to fill in the DILO – Excel sheet. The action codes presented in green illustrate value adding and the action codes in red represent non-value-adding steps.

Table 1 Value Adding and Non-Value Adding Action Codes

<b>QUOTATION:</b> 1 Request / receive offer email / phone 2 Check rates (airlines, shipping lines) 3 Prepare offer (INTO, Excel, email) 4 Give offer to client	<b>CLARIFICATION</b> (email, phone, WEB, etc.) 21 Check MBL/confirm it 22 Get POD 23 Clarification emails / phones 24 T&T	<b>WALKING:</b> 37 Walk to pick print outs 38 Walk to the terminal 39 Find goods in the terminal 40 Leave docs on the pallet / in terminal mailbox 41 Hand over SI to reception desk
<b>INTO registration / update:</b> 5 Register new client in INTO 6 Open file in TMS / update it 8 Monthly closing in Infocenter 9 Open AWB in INTO 10 Attach HAWB TO MAWB	<b>CUSTOMS:</b> 7 Input customs data to PROSPED 25 Receive/send customs confirmation 26 Hand over docs for brokerage/customs clearance 27 Intrastat filing	<b>MANUAL:</b> 42 Write down Ref No on SI 43 Write drivers instructions on labels 44 Looking for / checking information (docs, email, quotations) 45 Enveloping
<b>BOOKING</b> (emails, phones, etc.): 11 Receive booking 12 Book carrier (shipping line, trucker, airline, Etc) 13 Confirm booking details to client/agent 14 Send FBL to customer 15 Send pre-advise to agent 16 MRN registration in Finnair terminal	<b>INVOICING:</b> 28 Hand over docs for invoicing 29 Update income / expenses 30 Allocate SI in INTO 31 Invoicing	<b>PRINT / SCAN:</b> 46 Print out docs 47 Scan docs for pre-advise
<b>DOCS:</b> 17 Terminal advice 18 Make FBL, HBL, AWB, MBL instructions, other docs 19 Check / collect docs / (for pre-advise, brokerage, etc) 20 Archive	<b>INTERNAL:</b> 32 Discuss work related issues	<b>IT ISSUE:</b> 48 Into, Outlook, PC problem, etc
	<b>FINANCE:</b> 33 Check credit limit 34 Request credit limit info 35 Forward SI to reception desk	<b>EXPLAINED TO ME:</b> 49 Explained to me
	<b>PRIVATE:</b> 36 Private	

By recording the process and lead times, rough estimates of how many shipments one operator can handle in the brokerage department in one day are formed. However, achieving accurate results proved to be too time consuming for the scope of this thesis and slightly irrelevant for Lean implementation within the company at this point. As the nature of the tasks within the Customs & Forwarding -department are all different and depend on numerous other parties, of whom most are outsiders from the company, but who play a crucial role in the process for the brokerage service. These parties include: shipping companies, agencies, courier companies, postal services, customers, and Finnish customs. The promptness of the service, lead time, and duration of the process is dependent on these factors. Therefore, it is extremely time consuming and difficult to get accurate results or even an average of the process- and lead times within the Customs & Forwarding department. This is because every day is different and the amount of shipments varies from day to day.

Once the DILO- sessions had been completed, the next step was to record the process and lead times into the Value Stream Maps and calculate the total process and total lead time of each process and identify the "diamonds" – the areas for improvement, or

“Kaizen” opportunities. This meant updating the Microsoft Vision –files that had been prepared earlier and printing them out for more convenient studying.

#### 4.1.1 Competency Matrix

The second problem the management wished to have addressed is the organization or formation of the Customs & Forwarding –department. One of the studies conducted in the iLean –project was to have every worker in Air & Sea fill out a competency matrix based on how well they can handle a certain product or service. With the received results the overall flexibility of the whole department and the competency percentage of each employee was calculated. A similar Excel –sheet was created to represent only the Customs and Forwarding department to calculate the overall flexibility of the brokerage department alone, which the Air & Sea –matrix did not show. While doing so, more opportunities for improvement for this tool arose, and this will be explained later.

#### 4.1.2 Research objective

The main objective for the research performed with the above-mentioned tools was to find areas for improvement according to the Kaizen –philosophy. Secondly, as requested by management, a calculation of approximately how many shipments one operator can handle in one day was done. This was calculated using the results of the process time – lead time –measurement from the Value Stream Mapping phase. Thirdly, the issue of manning or organization of the department is addressed using a Competency Matrix –tool to identify the current flexibility percentage of the department and to illustrate the overall competency percentage of the department. The Competency Matrix can also be used as an effective management tool for other purposes.

#### 4.1.3 Reliability and validity

Due to the project scope and the variety of different tasks included in the routines of the Customs & Forwarding –department, some processes had to be excluded from the context of this research. Therefore more research is needed if one wishes to map down 100% of the departments processes. The research in this thesis is mostly based on qualitative methods combined with process mapping the results can be considered reliable as the data was collected from studies and interviews with the actual workers performing the tasks and took in to account their views and opinions on areas of improvement, which is basic Lean –philosophy. The quantitative methods were consid-

ered secondary and unreliable due to the fact that the time scheduled for the measurements and timing of the processes was inadequate in order to receive reliable results. The bottom line is that in Lean transformation there is not a correct way of executing it. Each company decides the tools and methods individually and as this project ends by giving out recommendations on areas of improvement – the very end results of the success of the implementation of Lean is not included as it may take months or even years.

## 5 Research results

Based on the data gathered from the DILO –sessions, the printed out Value Stream Maps were updated with the process times and Lead times. The results were as follows:

Process time illustrates the time period needed to perform all of the steps in a particular process. Lead time illustrates the total time spent completing a process, including time spent waiting for example documents or customs confirmation, etc.

With these numbers, a rough calculation can be computed easily to find out how many shipments one operator can handle in one day. For this calculation, only the process time is used. As the standard work day at Itella Logistics is 7,5 hours (420min) per day, the calculation formula is as follows:  $420\text{min}/13\text{min} = 32,3$ .

For regular customs clearance of Postal shipments, one person should be able to perform approximately 32 shipments in one day. The same formula can be applied for the other processes as shown on Table 2.

Table 2 Shipments in One Month

	Process Time	Lead time	Shipments in one day	Shipments in a month (x21)
Export customs clearance (Itella Posti)	13	40h 34min	32	678
Export customs clearance (Road)	6	26min	70	1470
Export customs clearance (BRP-snowmobiles)	27	48h 27min	16	327
Intrastat	6	17min	70	1470
Import & bonded warehousing	84	9h 24min	5	105
Standard Sea Import	59	4h 59min	7	149

The problem with this system is its reliability, as work experience in the department and discussions during the DILO –sessions have shown that the nature of work in the Customs & Forwarding –department is not exactly easy to measure quantitatively. Each

shipment varies in simplicity. This, for example, could mean the number of CN-codes and how many rows there are in the Commercial Invoice, which determine the length of the process. The accuracy of the information provided by the customer is variable. Sometimes customers' invoices might not contain the VAT-number, or the CN-codes are wrong or expired, which means that the operator has to find the correct code. Also, IT-related problems affect the duration of the processes. An example of this is when the connection to Finnish Customs has a temporary failure. More thorough and large-scale research would provide more accurate results, even with only a calculated average, but still would not be reliable because the number of shipments varies according to the day of the week and even time of year. As a Key Performance Indicator, the number of Shipments is inaccurate, as it does not speak the truth about the workload within the department. There is no standard number of shipments that go through the department every day. The variation in the amount of shipments is rather large and there is no standard in the way the data is given to the operator. An example of this is the commercial invoice-, or proforma invoice, which is necessary in order to perform customs clearance. Each customer has their own type of invoice, which might not have accurate data needed to smoothly perform the process.

In the case of the postal shipments customs clearance, if the service order received from Itella Posti is missing data, the papers are returned back to Itella Posti Customer Service to retrieve the information from the customer. The operator working in the Customs & Forwarding –department is not permitted to contact the client directly as the client is actually a client of Itella Posti. Regardless, it slows the process down. The same goes with any other type of shipment; if the necessary documents do not contain the data required, time is wasted on contacting the client or client's representatives or the shipping company to receive the correct data. Finding a more thorough and accurate process to measure the capability of the department requires more study, as measuring the performance in terms of how many shipments one operator can perform in one day is impossible to accurately compute due to there being no such thing as a standard shipment.

## 5.1 Competency Matrix

The second problem the management wished to have addressed is the organization or formation of the Customs & Forwarding –department. One of the studies conducted in

the iLean –project was to have every worker in Air & Sea fill out a competency matrix based on how well they can handle- or serve a customer. See Appendix 1. for the whole Air & Sea department, in which the top column contains all of the main processes performed in the department and each operator’s personal competency percentage. Overall flexibility for the whole Air & Sea –department is 44%. The highly specialized work and lack of cross-functional training was also identified during the DILO sessions as an issue that needs to be addressed.

A similar flexibility matrix was created as well for the Customs & Forwarding – department separately and the results are as follows: (see Appendix 2.) Flexibility in the Customs & Forwarding department is 68,2%, so it is above the overall Air & Sea percentage. The flexibility percentage is calculated as an average of the competence percentages below each process, so it does not accurately represent reality, because the individual areas of flexibility are not reflected in the average value. However if the flexibility percentage sinks below 42,9%, the stability of the service level within the department is in jeopardy, as there are three or less skilled workers to provide the service. Particularly in Finland, where people enjoy at least a four-week annual holidays and one-week winter holiday, this tool could be helpful when designing the holiday schedule. Particularly during the summer months, when the holiday season begins in May and can last until September. With this in mind, it is easy to see how work group or a team of only two people that is capable of performing a particular service can be unstable or even dangerous in terms of the stable service level. For example, what happens if one of them is on holiday and the other one has to be absent for illness? Preferably, there should be at least three persons capable of performing each other’s duties to avoid jeopardizing the service level.

## 5.2 iLean project Kaizen –opportunities

Listed below are the results of a sample of the Kaizen opportunities identified by the iLean team during meetings, VSM –sessions, and DILO –sessions. Identifying them and starting to improve these issues is essential in Lean –philosophy. After the identification of these issues, a special Kaizen –team was formed from workers in the Air & Sea –department to dig into these issues and make improvements. The following is hand-picked particularly for the Customs & Forwarding –department, but some of them are also applicable in other departments and beneficial for the entire organization.

1. Standards for filling and updating the customer register: This is an almost daily task in the brokerage department and sometimes insufficient information is entered, such as entering an incorrect VAT number or no VAT number at all. This results in failed customs clearance and extra work when an operator needs to look for the correct VAT number and add it to the system. There should be a standard procedure for filling out the customer register completely.
2. Sales leads forwarded to sales: This refers to the flow of information between Operations and Sales. Should the sales department receive information on every new addition to the customer register, a fixed process for keeping Sales and Operations informed of spot quotes, closed deals, etc, is required. Someone also introduced the idea of a central registry of quotes.
3. Notification of goods coming to the terminal: Goods are sometimes in the terminal without the operator receiving the information fast enough. This has proven to be problematic, especially with the operators in charge of Customer care –accounts. The cooperation between operations and the terminal staff should be enhanced to decrease lead time.
4. Counting of HS codes per product requires printing of all inputted data in the Intra-stat process: Intrastat printing is excessive, requiring massive amounts of paper and printer ink. Is there any better way to collect the CN- codes without printing?
5. Visual Management and process visualization: Files in plastic folders have markings regarding ETA/ETS loading and stages in the file, but each operator using their own marking system. A standard is needed here, particularly for Sea freight and shipments that are going to be stored in a bonded warehouse. The reason for this is that Sea Freight –shipments usually take weeks to arrive and therefore the folders being used to store the documents are stored for long periods of time and are updated whenever some new information on the shipment becomes available, such as changing ETA – dates, packing lists etc. A standard basic folder could be used for storing them, in which would be a cover sheet where the operator could write to update all the details and steps already performed regarding the shipment, so that the cover sheet would always indicate the current status of the shipment. Examples of these could be: has the shipment been invoiced yet, is the shipment going to a warehouse, or is truck

booking required upon arrival. At the moment, it seems that all operators have their own ways of making notes or handling their shipment folders. A standard is needed for easier understanding of the phase of each shipment, such as in the circumstance where someone needs to take over somebody else's tasks to cover for an absence. A standard visual management tool representing the phase of each shipment makes it a lot easier for another operator to take over and it also saves a lot of time spent on getting on top of things. This could be among the first steps for standardized work.

6. Accepting incomplete bookings: The Customs & Forwarding department receives incomplete or insufficiently updated service requests from the Sea Import – department, Itella Posti, and the Itella Road department. In most cases there is vital information missing to successfully perform the import clearance. The data missing can be incorrect or even missing the commercial invoice or a proforma invoice, the wrong details of the feeder vessel, etc. In most cases the file is returned to the department and to the operator in question to correct the information. This results in time wasted in waiting and unnecessary movement. Sometimes the brokerage operator is forced to search for the information themselves, which takes time away from them focusing on their core tasks. Moreover, if the CN-codes or the descriptions of goods are incorrect and the Customs officials do not pass on the declaration, an undesirable and time consuming process of correction is performed. One of the department's KPI is the number of corrections done within the department. This has to be kept to a minimum as part of the authorized partnership with Finnish Customs. Standardization and clear job descriptions would also help determine to whom a particular responsibility belongs.

7. Standardized and thorough job descriptions: For most employees, the responsibilities of each worker are not clear. Sometimes there is a disagreement over the responsibilities of each department. What exactly are the roles and responsibilities of each department within Air & Sea and each operator? This should be clarified for everybody in the organization to rid all the unnecessary conflicts that may result in slowed-down service and unnecessary hold ups.

8. High specialization of work and the covering-risks procedure: Very specific customer requirements or processes are not documented and cross-trained sufficiently to cover sick leave or vacation periods. The competency matrix or flexibility percentage is helping to understand and emphasize on the importance of cross-training the staff to bene-

fit everyone and provide stability within the department. Documenting and drawing down processes and creating standards and instructions significantly helps to take over someone else's tasks and duties, but cross-training should be increased. It is really necessary to have experts or equally competent staff that are not so vulnerable to changes in the configuration of the department. After all, the target should be a stable service level from the customer's point of view.

## **6 Conclusion and recommendations**

The aim of this thesis was to find ways to improve and develop the Customs & Forwarding department at Itella Logistics as a part of the Itella iLean –project, and to offer recommendations to the management for improvement. The main steps studied in this thesis were to identify the current state of the processes using Value Stream Mapping and DILO-tools. During these sessions, many areas for improvement were found and process and lead times were calculated. The second study calculated the overall flexibility of the department to be able to monitor the stability of the service level within.

Above is described the first steps of Itella Logistics' Lean transformation, the first Kaizen –opportunities, and the current state of department flexibility for the Customs & Forwarding –department using Value Stream Mapping and Competency Matrixes. Many of the tools and areas for improvement may be further relevant to other departments at Itella Logistics' Air & Sea. The basic principles of Lean philosophy were also explained, as they will be the primary tools for this transformation to be successful.

The issue raised by management on how many shipments one operator can handle in one day was found problematic, due to the complexity and variety of shipments going through the Customs & Forwarding department. For the scope of this project, there was only a limited time available for timing the processes within the department, which meant that the results received are not accurate. During the DILO –sessions it became clear that there is an extremely wide variety of shipments that the department handles, which all have multiple variables that effect the duration of each process. For example, the export clearance for Itella Posti measured 17 min per shipment, which meant that one operator could do 32 in one day. However, some shipments from Itella Posti take less time than that and therefore it is possible for one operator to handle 60-

80 of these more simple shipments (one commodity code) in one day. More thorough and large-scale research would provide more accurate results, even with the calculated average only, but still would not be reliable, as the number of shipments varies according to the day of week and even time of year. The question is if this is a reliable Key Performance Indicator for the Customs & Forwarding department, or is this just another way to see the fluctuations in the economic climate. To answer this, more thorough research is in order.

To find out the overall flexibility and to help in the organization of the department, a special competency matrix was created and filled up by the operators in order to measure the flexibility of the department and the competencies of each employee. The whole of Air & Sea scored a flexibility rate of 44% and the Customs & Forwarding – department scored 68,2%. The Customs & Forwarding department has only seven operators, which makes a difference in the flexibility percentage already if two of them are absent. These results would encourage the cross-training of the staff within the department.

By aiming to up the flexibility- and competency percentages through cross-training, the risk of the service level drastically falling will not be as dangerous as it is now. The change in the flexibility percentage currently drops dangerously close to 42,9% if two operators are absent.

Some improvements for the tool itself were discovered during the project: To make the tool more accurate, the cells could be sorted by using a numerical scale according to the level of expertise. Instead of the employees simply ticking the boxes if they can perform the task, a scale could be designed to illustrate the level of expertise in that particular task. For example, expertise on making an import clearance could be on a scale of 0-5, and the bigger the number gives a bigger weight in the department flexibility percentage. Changes like these will make the tool more accurate and more department-specific.

This table can be modified and improved in order for it to serve as a management tool. If desired, the tool's competency matrix could serve as a map to rate employees according to their capabilities and level of expertise, including previous work experience. It is possible that some employees may have suitable work experience and thereby be

competent to work in other departments in the Air & Sea as well. In Lean -philosophy, unused human talent is identified as waste. The management can also use the competency matrix to help them forecast the staffing required when setting budgets for the future. For example, if there is a tendency to invest in Air Freight, it can see if there are already competent people working within the Air & Sea to be moved into Air Freight if there is expected growth in the business.

Continuous improvement – the essence of Lean philosophy requires massive effort in order it to be successful. Employees must be engaged to the Lean journey, which will make them understand the benefits from their perspective as well. Since the Lean transformation in Itella Logistics began, a series of areas of improvement, or even grievances, have been identified in each section of the Customs & Forwarding - department. Many are common with the whole Air & Sea department. Regardless, once the current state had been identified, most processes in the department have been mapped down and the Kaizen –opportunities identified, thus allowing for the most challenging part of any development project to begin. The iLean team should now start to mend and make the improvements and address the Kaizen –opportunities identified during the Value Stream Mapping and DILO –phases. Hopefully the Kaizen team has enough power and credibility, as well as the management’s full support to push the improvements forward. Since Itella Logistics’ Kaizen –team has already been assembled, the first step in the right direction has already been taken. Weekly meetings should be organized with the department managers to set up and design an agenda on how to start working on improvements and in what order. Lean organizations train and encourage their staff to engage in identifying areas for improvement and sources of waste and to find solutions to get rid of them instead of hiring outside consultants to do the job for them. A major part of Lean philosophy is to divide responsibility throughout the organization to all levels of staff in order to solve problems and find solutions to increase efficiency (Nicholas, 2011). It is important to utilize the experience, creativity, and knowledge of all employees in the company and not to obstruct it, as it has been identified as major waste. So far, Lean has been present only in the lives of the iLean team members, but how many people in the organization understand the essence of Lean or how it will affect or change the nature of his or her work? Perhaps a survey would be in order. The challenge in any development project lies in successful change management. Moreover, it needs leadership.

Employees in any organization anywhere are generally always resistant to change, or even fearful of major transformation. John P. Kotter (1996) identified some of the major issues that forestall any change effort from succeeding: inwardly focused cultures, bureaucracy, low level of trust, lack of teamwork, arrogant attitudes, and lack of leadership in middle management. These issues should be investigated and sufficient action should be taken to remove any obstacles in order for the transformation to succeed.

There are numerous development projects on going throughout the Itella organization for a major project like Lean transformation, and the emphasis should be in communicating the change vision effectively to the employees and empowering them to share the responsibility of making the change happen. "Behavior from important people that is inconsistent with the vision overwhelms other forms of communication" (Kotter, 1996 p.90). Right now it seems as if the whole project is at a stand-still and people are simply carrying on their tasks as always. Communicating the Lean principles and steps already completed by the iLean –team would keep iLean from getting buried under the hundred other development projects going on simultaneously.

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