



Functionality study of the dispatching area

Case Valio

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Abstract

The client of this study, Valio Oy, is a Finnish food company that mainly processes and markets dairy products. The need for the study came from Valio Jyväskylä warehouse that was willing to know if there are things to change to make their operating more functional.

The aim for this study was to evaluate the dispatching process of Valio Jyväskylä warehouse and to see how the current operating methods work. The purpose of the study was to investigate the current state of the operations to find the downfalls of the dispatching process. After understanding the current issues, the goal was to make the operating more functional through improvement suggestions.

The theoretical part of the study was created first, and it included theory about themes related to the study. In theory research methods, projects and processes and warehouse management.

Research data about the current state was collected by creating a questionnaire for the employees of the company. In addition to this, observation by the researcher was committed and data from the company was utilized. As the result of the questionnaire, it could be stated that there were issues that made dispatching in the warehouse more challenging for the employees. These specific issues were mentioned by great portion of the respondents. The top three issues to be picked for further inspection were lack of space, communication in a team and a chance for enabling earlier used method of working in pairs.

Based on the results of the current state analysis, suggestions for improvement were presented in a form of an action plan. The suggestions were related to saving space in the warehouse and creating a better teamwork routine to ensure more functional operating.

The company is free to use these ideas to develop their operations or to further research the topic and the themes close to it.

Keywords/tags (subjects)

Warehousing, intralogistics, dispatching, functionality study, warehouse process

Miscellaneous (Confidential information)

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1 Introduction

Well-planned and smoothly flowing processes are often seen as companies' key to success. In addition to this, well-functioning operations support the employees' work when there are as few errors and useless phases in the process as possible.

The employer of this study, Valio Jyväskylä had been discussing about the dispatching process of their warehouse and they were willing to know if there is something that could be improved or changed to make the process more functional. The aim of this study was to evaluate the dispatching process of Valio Jyväskylä warehouse and to see how the current operating methods work. Therefore, the things that this study was aiming to find answers to were the possible challenges in the dispatching process and the ideas that could help with solving the challenges. The focus of the study was on the dispatching process so other warehouse processes such as picking were not involved in this study.

The current state of the operations was investigated by creating a questionnaire and observing the parts of the process. The target of this thesis was to create clear picture about the present situation and based on the results of the observation and the questionnaire to create an action plan that suggests acts that could change the dispatching process to a better direction.

1.1 About Valio

Valio is a Finnish company focused on producing dairy products. The company was founded in 1905 by 4300 farmers, and it has remained as a farmer-owned company ever since. Valio's profits are paid to the farmers that are dedicated to their work. This is how Valio ensures the best quality and locality for their production. Valio employs around 29 000 people from which around 4000 people are employed in Valio facilities and even 25 000 people employed are working on dairy farms. (We are Valio, n.d.).

Today Valio is seen as a market leader and the number one food exporter in Finland. Milk from the dairy farms is transported to the twelve production plants around Finland where the products are produced. Valio plays a key role on international markets since their products can already be found

in approximately 60 countries around the globe and they have multiple supporting subcompanies in Sweden, Russia, the USA, China and the Baltics. (We are Valio, n.d.).

Despite the fact that the Covid-19 pandemic has affected nearly every field of industry, in 2020 Valio's turnover increased 1,2% from previous year, resulting it to be 1808 million euros with the profit of 37 million euros. The pandemic caused a situation where people stayed at home instead of going to hotels, restaurants etc. which resulted in decreased HoReCa (Hotel, Restaurants, Catering) sales and increased retail sales. Valio was able to respond to these changes on a satisfactory level due to an adaptive production capacity. (Valio Board of Directors' Reports and Financial Statements, 2020).

1.2 Valio Jyväskylä factory

Valio established Jyväskylä milk production plant back in 1941 and it has been operating in the current facilities since 1980. Jyväskylä plant specializes in different kinds of special milks and protein drinks production and there are over 90 different items in production. These products are not only delivered all over Finland but also abroad to countries such as Spain, Sweden and Poland. In the beginning of 21st century Valio invested in Jyväskylä factory through renewal of the production equipment, establishing a new special milk production process and creating an automated picking system. Valio Jyväskylä plant produced 150 million liters of mostly milk products in 2016. The milk processing plant together with dairy farms employ over 1500 people and serve needs of around 1,8 million customers. (Valio, 2019).

2 Research methods

Planned and goal-oriented research with its various stages is a creative process. This includes familiarization with the topic and preparation of a plan, implementation of the research and preparation of a research report. There are many types of research in practice. Researchers differ from each other on how they actually act while doing research. (Hirsjärvi et al., 2007, p. 63). In this chapter, different research methods and ways of committing research are gone through on a basic level.

2.1 Qualitative research method

“Qualitative research is the “Mother” of all research because it produces answers to “what” questions.” (Kananen 2011, p. 37).

In qualitative research method researcher collects data that is non-numeric and can be collected by using for example interviews or surveys. When it comes to qualitative research, it is more flexible compared to quantitative research and enables the researcher to receive thorough information. (Bryman and Bell, 2011).

People ask questions and interpret things from the perspective they choose at any given time and with the understanding they have. The same thing can always be described in many ways. In qualitative research, the most important point of view depends on what we are interested in and what information we need in practice. The starting point in qualitative research is to describe ordinary life. This includes the idea that reality is diverse. However, in the study, it must be considered that reality cannot be arbitrarily fragmented. At the same time, events shape each other, and it is possible to find multilateral relationships. (Hirsjärvi et al., 2007, pp. 156-157).

Qualitative research seeks to study the subject as comprehensively as possible. It is important for the researcher to consider values because values shape how we try to understand the phenomena we study. Objectivity is not possible to achieve in the traditional sense because the researcher and what is known are related to each other. We can only get conditional explanations limited to some time and place. It is generally stated that a qualitative study seeks to find or reveal facts rather than to verify already existing and proven claims. (Hirsjärvi et al., 2007, pp. 156-157).

Typical features of a qualitative research

Qualitative research is comprehensive data acquisition, and the material is compiled under real and natural circumstances. Therefore people are preferred as a source of data collection. It is natural that a researcher relies more on their own observations and discussions with their acquaintances than on the information collected through usage of measuring instruments. Nevertheless, in qualitative research many researchers also use forms and tests to help obtain additional information. The target group for the research, for example for the discussions, tests, forms etc. is

selected appropriately instead of only using random sampling method. Every research has their own target group, and every case is treated unique, and the material is interpreted accordingly. This kind of research must be executed flexibly and the plan can be modified if the circumstances require. The research plan takes shape as the research progresses. (Hirsjärvi et al., 2007, p. 160).

2.2 Quantitative research method

This method emphasizes universally applicable laws of cause and effect. Underlying this is the so-called realistic ontology, according to which reality is built on objectively observable facts. This way of thinking has been born out of a philosophical trend called logical positivism, which emphasized that all information comes from direct sensory perceptions and logical reasoning based on these observations. (Hirsjärvi et al., 2007, p. 135).

Quantitative research process begins with defining the problem being researched. After problem definition research questions are created in order to collect the right information that will support problem solving. The most typical method for collecting data in quantitative research is questionnaire. Choosing the right questions for the questionnaire requires knowledge about the existing theories. This also means that the phenomenon must be known well and the variables and the correlations between them are understood clearly. (Kananen 2011, p. 72).

Quantitative research scales

Quantitative research is used to gain answers related to numbers and percentages and it answers for example to questions such as “What?”, “How much?” and “Where?”. With quantitative research method it is possible to get understanding about the current situation but not the reasons that have led to it. (Heikkilä 2014). Therefore, while making a quantitative questionnaire it is important to format the questions in a suitable way. There are different scales to present the questions and they can be seen on the next page.

- Nominal scale: Units are classified as different scales, the order does not matter
 - For example, married/unmarried/divorced
- Ordinal scale: The units can be classified and arranged in order based on measurable element.
 - For example, Completely disagree/Partly disagree/Partly agree/Completely agree
- Interval scale: the increments of the values of the variable can be calculated. The scale does not have a specific zero so the zero can be chosen.
 - For example: (The staff was friendly) 1 2 3 4 (Unfriendly)
- Ratio scale: Fulfills the requirements of interval scale but in addition the scale has an absolute zero.
 - For example, monthly salary or age.
(Vilpas, n.d.).

The most used scales are Osgood Scale and Likert Scale. The Osgood scale is a 5 or 7 step scale, where the extremities of the scale are opposite adjectives. It is often used for example in company image research. (Heikkilä 2014, p. 54). Likert scale is discussed more on the following paragraph since it is used in the research of this thesis.

Likert Scale

The Likert scale is a scale used in opinion polls, where at one extreme you completely agree and at the other extreme you completely disagree. The respondent is presented claims and they answer with the option that matches best to their opinion. Often the Likert scale is four or five steps, but the scale can also have more or less than five values. When using a Likert scale, many things need to be considered, such as the number of values on the scale, word choices, and how to format the center of the scale. (Heikkilä 2014, p. 53). In figure 1, an example of Likert scale can be seen. The example is part of the questionnaire made for this thesis and is translated in English for this example.

	Completely disagree					Completely agree
	1	2	3	4	5	
Instructions are clear to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Everyone gives the same effort	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Figure 1 - An example of Likert scale question

2.3 Mixed research method

Mixing qualitative and quantitative research approaches in the same research is possible. Qualitative research forms often the basic foundation for the research work. When qualitative research focuses on improving overall knowledge about the phenomenon, for example through a survey, quantitative methods are needed to handle the data gathered by the surveys. This kind of a procedure is even a must if there are not previous research results or data on the phenomenon or if there are features that the researcher is not aware of. Using both approaches, qualitative and quantitative brings most likely more value to the research, if the researcher handles the use of the methods properly. Eventually, the research phenomenon and problem define the type of the approach being used. (Kananen 2011, p. 130).

Survey

Researcher creating a survey must have a very clear understanding about the objectives of the survey to form a survey that collects relevant information. Creating a good survey requires effort and time but the time spent for making the survey is worth it since when the survey objectives and research questions are well planned, they are connected to each other and support the work.

The objectives of the survey a statement, a reasonably high level of generality and abstraction of what the researcher is trying to find out through the survey. Previous mentioned can be concluded into one statement or they might demand multiple statements. (Punch 2003, p. 32-33).

Survey method is one of the most used ways to collect information for qualitative research. Survey has a long historical tradition and nowadays there are multiple types of surveys. For example, Gallup survey is one of the best-known ways to carry out a survey. The data collected through survey methods is usually gone through quantitatively. In this sense experimental research setups, structured interviews and surveys are similar to each other. (Hirsjärvi et al., 2007, pp. 188-189).

Observation

As the title says, in observation method the phenomenon is taken a look at, and observations are done by the researcher. Observation is suitable for situations where there is limited amount of information available about the phenomenon. Because the situation being observed is very authentic and based on real life events in their natural environment, observation is very beneficial method. There are multiple types of observation, depending for example whether the people being observed are aware about it or not (direct observation \neq disguised observation). If the things being observed are known beforehand, observation structure is planned, and the observation is called structured. Unstructured observation does not include any pre-activities when it comes to structure planning; the researcher just writes down as many notes as possible about the things they find relevant. (Kananen 2011, pp. 48-49).

Research Data

An economic and appropriate solution should be sought in the collection of research data. To solve every problem, it is not necessary to collect data all the way from the beginning. The value of the research does not increase or decrease depending on how the material was acquired. However, it is typical for the researcher to collect their data themselves for their research. This kind of data contains direct information about the phenomenon being researched and that is why it is called Primary data. As earlier said, it is also possible to use material compiled by others which is called Secondary data. (Hirsjärvi et al., 2007, pp. 181,184).

Sometimes it is possible to gain answers to some parts of the research questions only based on earlier materials but some of the problems must be solved by compiling more data by the researcher. In researcher's own work, ready materials are rarely suitable for use as they are. The data or statistics collected by others should be able to be adapted to researcher's own data. Others' materials can be modified, for example, by converting them to numeric form. All ready-made materials must be critically assessed, and their reliability weighed. This signifies source criticism. (Hirsjärvi et al., 2007, pp. 181,184).

2.4 Features of research questions

The key to solving research problem is creating the right research questions. The right kind of research questions open the phenomenon and tell what it contains and describe the way the parts are related to each other. (Kananen 2011, pp. 19-20). It is said that a good question is already the half of the answer. Traditionally it has been emphasized that the research problem and questions should be carefully formed before beginning to collect the material itself. However, when taking a look into today's qualitative research descriptions, it can be seen that this logical order is not the only way to do it anymore. (Hirsjärvi et al., 2007, 120).

2.5 Research questions and limitations of this study

The target for this thesis was to inspect the current state of dispatching operations at Valio Jyväskylä terminal and to see if there are parts of the process that cause challenges and make the process more complicated. Secondly, the goal is to see if there are any ways to improve the current operations and to tackle the possible challenges that come up during the research process. In addition, the evaluation of recently made changes is needed to see if they support the operating as they are or should they be modified. Valio Jyväskylä warehouse operations include also manually completed picking for some of the products. The method used for picking is pick by voice. Picking operations will not be taken into consideration which means that the whole focus of the research is on the dispatching area operations.

The research questions for this study are as follows:

1. How do the current dispatching operations work? Do they have any kind of challenges?
2. In what ways the operations can be improved to be more functional?

3 Projects and Processes

Companies' operations and activity are usually carried out through processes and projects. It could be said that everything in companies' operations is at least somehow related to processes and projects, regardless the field of business the company is operating at. Both, well managed projects, and processes are vital to success and although they often might seem similar to each other, there are distinct differences between these two. In this chapter, a deeper look is taken into these previously mentioned concepts.

The concepts "project" and "process" are sometimes mixed and the difference between them is not understood clearly. The main difference is the duration. Both of these are chains of events, but project always has to have an ending point when the goal has been reached. Process is a constant thing that just keeps going on. (Huotari and Salmikangas, n.d.). Figures 2 and 3 explain the process vs. project situation below.



Figure 2 - The difference between project and process. Adapted from (Huotari & Salmikangas, n.d.)

Project

- Project manager
- Appointed person
- Task
- Schedule bound to a specific calendar
- Project plan
- Performance is measured as deviation from the plan
- Linear, non-recurring



Process

- Process owner
- Role
- Activity or phase
- Duration
- Process description
- Performance is measured as variation of the process
- Cyclical, recurring



Figure 3 - Project vs. Process. Adapted from (Laamanen & Tinnilä, 2009).

3.1 Project

Project is a well-organized set of tasks that is seldom repeated similar to as it used to be. It is defined and planned, limited in time and content and it is aimed at a specific situation-specific goal. For project it is natural that the target, duration and resources are determined in pre-hand. In addition, a project has a clear starting point and an ending point. Between the starting point and the ending point there are tasks and checkpoints. The tasks inside the project have been set targets as well. Projects are often carried out by a specific fixed-term project organization.

Project can often be said to be very challenging operating environment. It is not usually constant operating, but it goes step by step from defining the task via planning and execution to finishing the project and breaking out the fixed-term project organization. Project is very suitable to unique and challenging tasks in which knowledge from many different fields of study is combined. (Jalava and Keinonen 2008, p. 6).

Successful Project

A functioning project consists of diverse expertise. A well-functioning project involves several professionals in the field and the staff of the project team manages their own field extensively. A functioning project is based on a real need that may be related to the achievement of something known or the development of an activity. A project with good goals is properly limited in time, quality and resources. A well-planned project proceeds roughly according to plan and at best falls slightly short of schedule and cost estimate. In the implementation phase, the plan is an important tool. A well-implemented project is monitored throughout its life cycle. The project must receive feedback and the results of the project must always be evaluated. All available evaluation information must be used to help plan a new project. The elements of a well-planned project are inter alia:

- The project aims at a clear, comprehensible goal and milestones. The project is divided into smaller sub-assemblies, easily manageable subprojects or work tasks.
- Resources used in the project are properly allocated.
- Participants share common values and vision about the quality.
- Project is finished on time and within the budget without worsening quality.
- Project is finished when the product is ready.

(Jalava and Keinonen 2008, pp. 13-15).

3.2 Process

“Process is a set of logically related activities and resources needed to transform inputs to outputs.”
(Laamanen and Tinnilä 2009, p. 121).

Process can be said to be a chain of events that eventually creates value to the customer. Based on this thought the concept is quite clear; the chain of events has to be recognized and modeled and goals for actualizing and developing has to be set. (Laamanen and Tinnilä 2009, p. 10). These acts are related to process management which will be discussed on the next chapter.

Any kind of activity or modification can be illustrated as a process. On organizational level companies are interested in the processes that are straight related to success. These kind of processed are usually called “business”, “main” or “key” processes. In order to create successful results, it is crucial to have understanding about customers’ processes. Benefit for the customer is produced in the customer’s process and it is important to understand that the customer is usually cares only about its own processes. Customer needs are premised on the fact that customer is striving to commit its own process. (Laamanen and Tinnilä 2009, p. 121).

3.2.1 Process management

The basic idea of process management is that when an organization creates enough value to the customer (relative to the costs), an opportunity for financial success is established. Sometimes functional activity makes it difficult to create value or even prevents it totally. Usually this can be seen as errors in information flow in organization and untraditional approach is needed. (Laamanen and Tinnilä 2009, pp. 10-11)

Evaluating the customer value creation process in an organization can be usually done by modeling. It means that when better performance is wanted, changes in the actual ways of working has to be done. Through modeling the most critical aspects in order to create value are inspected. When the modeling is committed correctly the benefits can be following:

- Customer satisfaction increases and they are willing to buy the services also in the future.
- People understand the whole entity and their role in value creation better, which effects to their motivation and teamwork through the whole organization.

- Customers' needs are understood better ja their impact on development decisions is emphasized. This leads to better products and services and more effective delivery. (Laamanen and Tinnilä 2009, pp. 10-11).

Processes often talk about operational efficiency. Efficiency is defined in this context as a ratio: value / inputs. In addition to value, the pricing and quantity of product/services is limited by competition or the ability of payers to pay for products/services. Every leader in an organization asks himself or herself whether what they are going to produce is valuable enough to be put into action. Costs arise from doing something that uses resources or developing a readiness to do something (investment). Nowadays, the biggest expenses in organization in order to ensure efficient operations are related to Information Technology since IT is used to standardize and harmonize the processes of an organization. Usually, a stable process keeps the expenses lower compared to a process that is being renewed and changed all the time. One way to affect the expenses is to reduce the use of resources. From the process thinking point of view this means changing the process. What separates process management from other types of management is the fact the focus is targeted straight to the action. The process thinking does not ask to do more but in a different way. (Laamanen and Tinnilä 2009, pp. 11-12).

3.2.2 Risks related to Processes

The word risk means a possibility of a harmful event to happen. On an organizational level, risks can be divided into, for example, strategic and operational. Strategic risks relate to, among other things, the organization's position in the market, the activities of competitors, partnerships, technological development and social development. (Laamanen and Tinnilä 2009, p. 27).

Risk in processes can usually be said to be operational risks. Operational risks relate to, among other things, the organization's processes, products and services, operations, work methods, finances, reporting and power relations, authority, information security, personal security, and critical competencies. (Laamanen and Tinnilä 2009, p. 27).

Risks related to processes can be for example:

- Human error: An accident caused by human action. For example, system operator setting wrong quantity for production.
- Mechanical failure: Equipment breaks down and causes a stoppage.
- Process quality: The quality of the end product is too low. It may work under normal circumstances but fails in unordinary situations.
(Spacey, 2015.)

3.2.3 Warehouse processes

Since the aim of this study is to develop and evaluate the performance of the Valio Jyväskylä warehouse, it is important to be aware of the different processes that warehouse operations usually include. Some of the most usual warehouse processes will be described below.

When speaking about warehouses overall, it is clear that there are not two warehouses similar to each other. However, very often same warehouse operations play a key role as the key aspects of warehouse operating. Regardless the field of operation or the material being handled the basic foundation for the operations tends to be somewhat the same. (Walker, 2018).

Receiving

Warehouse processes often start with receiving the goods in the warehouse and adding them onto the system. Before the delivery it is important that the documentation has been carried out properly and the details of the shipment (e.g., weight, quantity etc.) are marked right on the carriage note. The cargo is unloaded by the personnel and the content of the shipment is checked in order to confirm that the company receives right amount of goods in right condition and that everything else is as expected. After unloading and inspecting the shipment, the next step will be put-away. (Lopienski, 2021).

Put-away

After receiving, the goods are ready to be put on their places. This step is called put-away. The employees will be using Warehouse Management System to accept the task to put the goods away.

The task is accepted either by reading a barcode or manually setting the details. The system gives the exact location where the goods will be located. The person committing put-away takes the goods to the place he is told to and confirms the process again by scanning a barcode of the storage location or manually setting the details after placing the goods on the location. After this the goods are on a right place and the put-away is finished. (Walker, 2018).

Picking

Picking is a warehouse process in which the specific goods that a customer has chosen to purchase are being picked from a fulfillment center and packed. It is extremely crucial to carry out this step carefully to ensure that the customer receives exactly the items they have ordered, and it can be said that picking is one of the most crucial factors in the process of order-fulfillment. To achieve satisfying picking accuracy high-tech equipment and trained personnel are used. (Lopienski, 2020).

There are multiple different picking strategies that are the most suitable for different situations. Choosing the right picking strategy can be based on for example the number of different items being picked; many different items in one order vs. same item on many orders.

The picking strategies can be divided into three different groups that are picker to goods, goods to picker and automated picking. Picker to goods means that the person picking himself goes around the warehouse and collects the items for the order until the order is finished. The picker is told what to pick by a paper list, voice commands, radio instructions or by vision glasses that show the route for the picker. Picker to goods minimizes the handling of the items since the goods move from shelf to dispatch with only one handling. It is also a good strategy for order that require fast actions. Picker to goods is still the most used strategy for picking although with many items and long travel distances it can get quite exhausting from the employee point of view. (Richards 2018, pp. 131-137).

Automated picking has become more usual due to the need for faster, more accurate and more productive operations. The situations with high volume of items are the situations where automated picking can have a high positive effect. There are many benefits and advantages when choosing to implement automated picking. Some of them are:

- Continuous performance and 24/7 operations
 - Labour and energy savings
 - Elimination of manual handling -> fewer human acts -> reduced number of accidents
 - Capability to deal with different environments (e.g., warehouses with refrigerated temperatures)
- (Richards 2018, pp. 139-140).

Dispatching

It is important to have the goods ready to be loaded at the right time. Dispatching means that the goods will be arranged for the carrier who loads the truck. The goods are prepared at the place of loading in a way that they are ready for the departure. Right timing for dispatching is crucial to ensure functional operating. Dispatching too early before the pick-up time may cause disorganized order of the goods or running out of space. On the other hand, late dispatching may delay the delivery since the shipment may not be able to leave on time. (Walker, 2018).

There are multiple ways to make dispatching process as functional as possible. Often the best end result is reached with proper preparation and when the process is planned together with different parties involved. Warehouse Management System eases the work since it contains a lot of data and provides guidance for the employees with their work tasks. The WMS is able to categorize all the deliveries based on for example the delivery route, customer or the priority of the delivery. This allows to organize the space utilization of the dispatch area to fit in the changing situations as well as possible. (Interlake Mecalux , 2020).

Value-Adding

Value-adding is a process in which some kind work is completed on product and the product is made ready for sale. The acts on the products can be for example producing the product itself, assembling, relabelling or some other way of modifying the product. Value-adding is not always simple; as an example when combining different components to create a new product can be exhausting due to the great number of changing components and the pressure of adding value. (Walker, 2018).

On a bigger scale the value-adding process can be inspected through Porter's Value chain (Figure 4). Porters value chain describes how the organizations create value. There are clear primary activities and support activities that the value chain consists of. The primary activities are inbound logistics,

operations, outbound logistics, marketing & sales and service. Each of these steps is related to creating the product and supporting the use of the product later on. These acts create value for the final product. The primary activities are supported by support activities that are Firm Infrastructure, Human Resource management, Technology Development and Procurement. As an example, Procurement supports not only Operations but also Marketing and Sales. (Porter 2008).

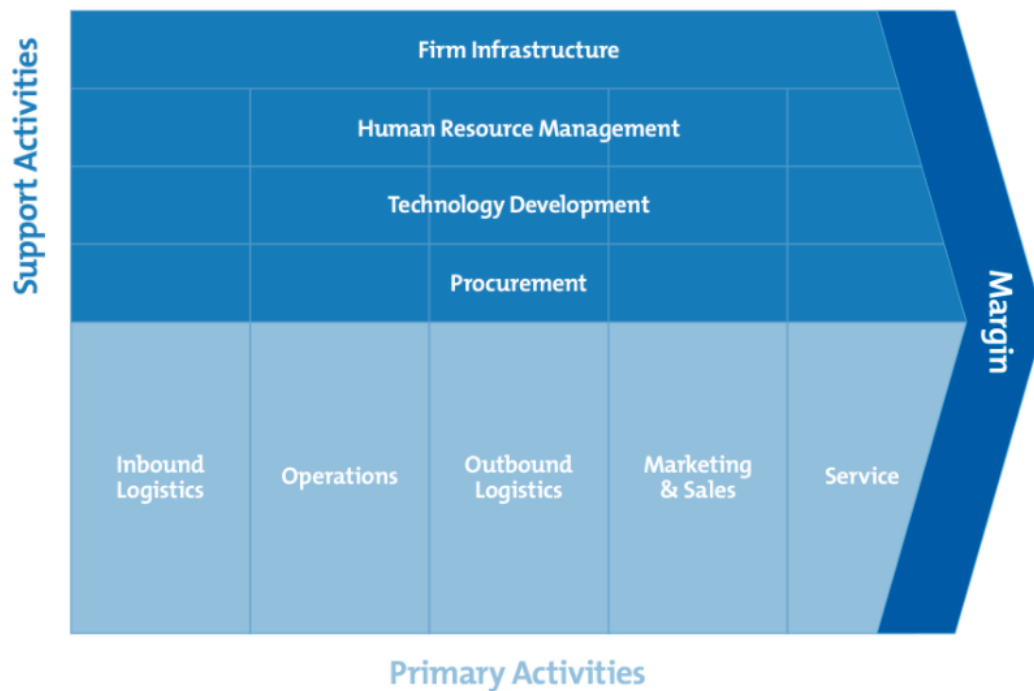


Figure 4 - Porter's Value Chain. Adapted from (Mind Tools Content Team, n.d.)

3.2.4 Regeneration and Elicitation in processes

Change can only improve performance if the action in the process takes place in a new way that produces better results. The only lasting competitive advantage is the ability to learn and evolve faster than competitors because any new value-creating organization brings to market is copied quickly. The decline in the value of items over time, as well as various insatiable needs, force companies to constantly develop their operations and products because remaining same in a changing world will lead to slow withering of the business. (Laamanen and Tinnilä 2009, pp. 39).

From the point of view of development, the simplest is to identify the problem and agree on improving measures. This is effective in solving simple problems, and many organizations are not

familiar with a different approach. However, this approach leads to a reactive approach and often the causes of the problem are not addressed. Because of this, the problems do not go away but they recur in different forms, and we learn to live with them. Improvement is always preceded by evaluation in some form such as testing, monitoring, self-assessment, or risk identification etc. (Laamanen and Tinnilä 2009, pp. 39-42).

4 Managing and Measuring Warehouse Performance

A well-managed warehouse operations can be said to be the key to success. Well planned and organized processes usually enable operating on the most efficient level. There are different tools to ensure efficient warehouse management and different indicators to see the pitfalls and tops in the chain of warehouse operations.

4.1 Enterprise Resource Planning

Enterprise Resource Planning (ERP) is a management system that includes company's financial, manufacturing and human resources all in one same system. In the system every field of the operations is located in its own module. (Schoenfeldt 2008, p. 183).

An ERP system is software that combines different features or programs into one tool for business use. The system is easy to use and saves time when you do not have to use several different programs during the working day. ERP software binds together and defines a large number of business processes and enables the communication between them. The ERP system eliminates duplicate data and unifies the data. At its simplest, an ERP system integrates multiple features into a single entity, making process and data delivery smoother throughout the organization. With good ERP software, you can manage small and medium-sized businesses, but also businesses in different industries. (Taimer 2018).

4.2 Warehouse Management System

Warehouse management system (WMS) is a platform that is used to control and manage the warehouse operations from the very beginning when the goods arrive until the very end when the goods will be delivered out of the warehouse. WMS creates a foundation for manufacturing

processes and supply chain since it contains information about all the raw material used in the manufacturing processes or final products that have been produced. Warehouse Management System aims to make sure that the products or materials flow through all the warehouse processes as effectively as possible and this way keep the costs at the minimum. This means that the common warehouse processes such as picking, put-away, receiving etc. are all usually based on actions committed through Warehouse Management System. WMS also enables the organization to inspect their inventory easily, not depending on the time or place. (O'Donnell, 2020).

It is usual to use WMS together with other management systems such as Enterprise Resource Planning (ERP), Transportation Management System (TMS) or other systems for managing inventory. Figure 5 shows the relations between these above-mentioned systems. (O'Donnell, 2020).

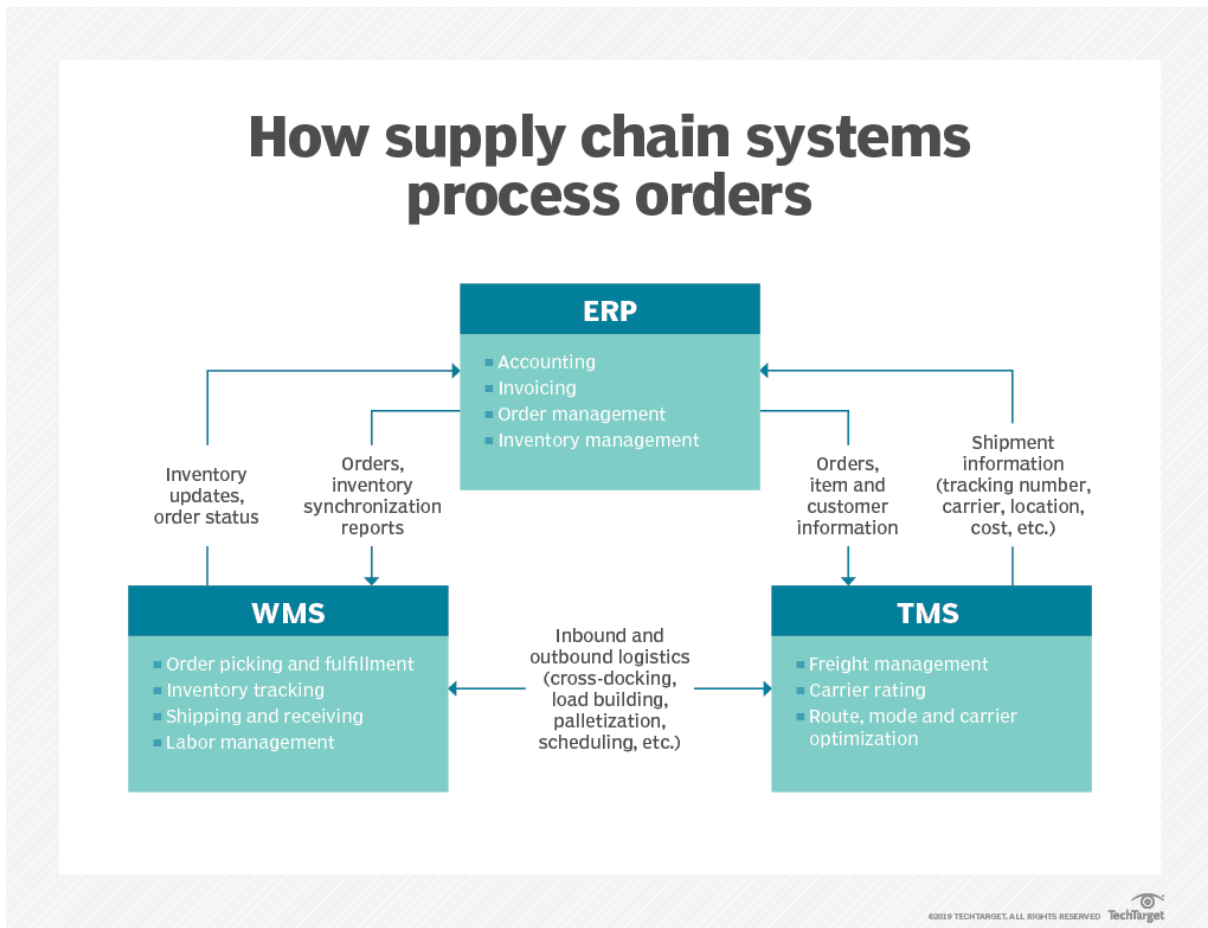


Figure 5 - Relations between management systems. Adapted from (O'Donnell, 2020).

Benefits of a Warehouse Management System

Functional warehouse management system is also much more than just data about the warehouse processes. WMS forms a foundation for an organization to customize their solutions to be suitable for them. At the same time, it connects company's employees and teams in different fields and enables transparent operations through the organization. When a right WMS is implemented, significant benefits are likely to occur. Some of the benefits are listed below.

- **Increased employee morale:** WMS enables effective task allocation which results in more independent employees. The employees are fully aware of their tasks and responsibilities, and which leads to better performance of employees.
- **Better relationships with customers and suppliers:** Efficient WMS shorten lead times for deliveries and enables more accurate orders for the end customer. From the supplier point of view, company's better readiness to receive the materials makes it smoother to deliver and move on to the next task.

- **Constant Improvement:** Constant improvement requires changes, and the WMS assists to implement changes in processes. Efficient WMS keeps the company up to date with new ideas that help with improvement and cost reduction. (Hitchings, n.d.).

4.3 Key Performance Indicators

Key Performance Indicators (KPI) are a group of indicators that are the most critical ones to ensure successful operating at the moment as well as in the future. Measuring the performance assists the company in converting the activities carried out daily to strategic targets. (Parmenter 2010, p. 4). According to Parmenter (2010), there are seven characteristics that constantly stand out when talking about KPIs. The characteristics are as follows:

1. Non-financial measures
2. Measured regularly (all the time, weekly etc.)
3. Effected actively by the management
4. Tell what actions the employees are required to do
5. Ties responsibility down to a team
6. Crucial effect for company success
7. Motivates to operate properly

4.3.1 The Fundamentals of Developing and Applying KPIs

When changes to the strategy are made, it is important to understand that poorly introduced and implemented change is most likely not going to work, no matter how great the idea is. (Parmenter 2010, p. 29). This means that the success of the change is based on well-planned introduction and comprehensive implementation. There are some key aspects that form the foundation for successful KPI usage. The key aspects and ways to use them in KPI development described below.

Transfer of Power to the Front Line

When aiming for performance improvement in an organization, the role of the employees is emphasized, especially the employees' that work in the "front line". The communication between the front line and the management must be effective to keep both parties up to date. It is important to have the commitment of the workers on a high level so that they act immediately to prevent

negative impacts on KPIs and the operations. The responsibility about choosing the best measures for performance can be given to the front-line teams themselves. (Parementer, 2010).

Measuring only the Necessities

Management of an organization should make the performance measurements and reports in a way that leads to action. The performance must be followed and reported regularly, the time period depending on the priority of the task. The reports usually must include the Crucial Success Factors (CSF) which are the areas that are vital for an organization to succeed. Every report done should be related to a Success Factor or Critical Success Factor and there should not be measures not linked to these. (Parementer, 2010).

Linkage of Performance measures to Strategy through the Critical Success Factors

It is crucial for a company to carefully define its mission, vision and values. These things should form the basis for the operation in a way that everyone working in the company is subconsciously supporting these factors through their work. It is important to create well-planned strategy based on company's mission, vision and value. There are specific requirements that a performance measure can be called KPI. As said, it has to be connected to at least one Critical Success Factor and more than one of company's Balanced Scorecard. In addition, the measure has to be linked to strategic targets of an organization. (Parementer, 2010).

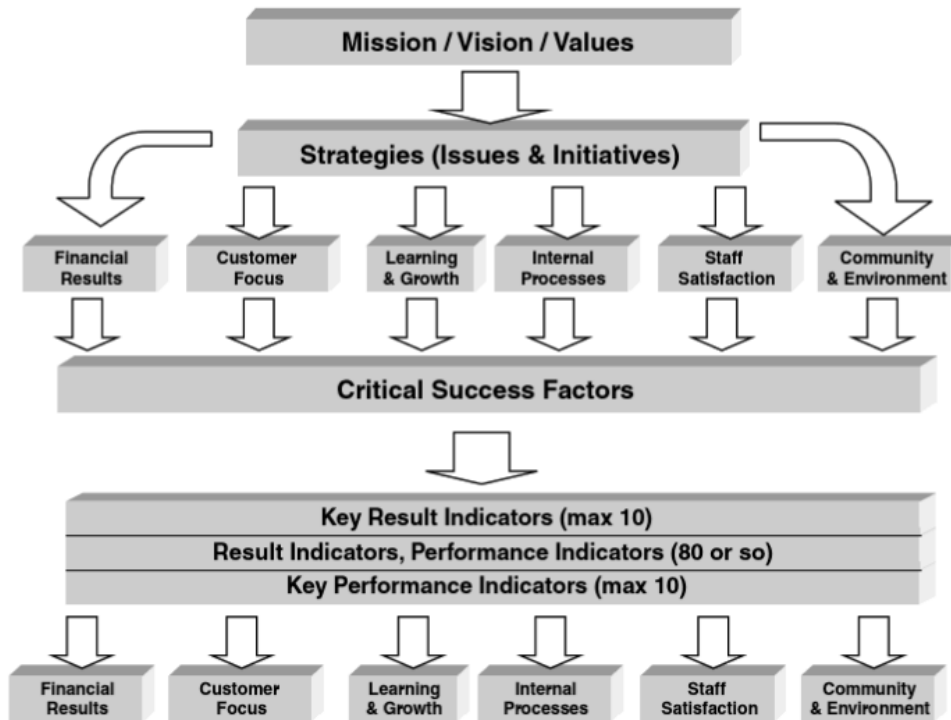


Figure 6 - The path from Mission/Vision to functional performance measures Adapted from (Parementer 2010)

4.3.2 Warehouse Performance measurement

The list of the reason why the performance must be measured in a warehouse is very long since there are many points of view that the operating has to be evaluated from. Measurements are done to for example to keep the customer satisfaction on a good level, ensure constant improvement, eliminate small threats before them expanding and to give the employees credit for a good success. (Richards 2018, p. 365).

According to Richards (2018), when measuring warehouse performance there are four areas that should be focused on:

- Reliability: order accuracy, deliveries on time, order fill rates
- Flexibility: The time between placing to orders (order cycle time)
- Cost: Productivity compared to working hours. Cost as a percentage of sales
- Asset utilization: Efficiency of space, equipment and workforce

Measuring warehouse performance is crucial in order to operate on the most efficient level and to see what are the weakest parts that need the most improvement. There is not any standard plan what should be measured in a warehouse since every warehouse is different and the most critical operations to ensure success vary depending for example field of business.

5 Current state of the operations

In Valio Jyväskylä warehouse terminal there are 13 doors that the departing loads are being dispatched to. The goods are dispatched in way that the driver can as easily as possible load the truck. The loads can be dispatched in different ways depending on their next destination. The routes that will be delivered straight to the customer are basic routes (Figure 7) and they are formed in a way that all the goods of one customer are combined in a one place and different customers are categorized next to each other based on their placement on the driver's route. Some of the loads will be delivered to other terminals where the orders of the load are separated based on the customer. In Valio Jyväskylä terminal, these so-called "combined routes" or "Y-routes" (Figure 8) must be only dispatched on a door together, not based on the customer.



Figure 7 - Basic route trolley. One customer per trolley



Figure 8 - Y-route trolleys. Multiple orders on same trolley.

The loads for every route consist of many different items from many different sources. There are also products of other companies that just go through Jyväskylä Valio terminal that the dispatchers are also responsible of. This means that the dispatcher forms the load combining many items with different quantity and size. The things that the loads consist of are:

- Items picked by the automated robot
- Items picked manually in Jyväskylä warehouse
- Milk trolleys and milk boxes picked by specific picker
- Items received from other Valio locations
- Deliveries of other suppliers being transported with Valio deliveries.
- Possible replenishment picks

In this chapter the current state of the dispatching process is researched. The aim is to see how the dispatching process works and if there are things that would require change. The research is carried out by using research methods observation and survey and the aim is to find answers to one of the research questions which is “How do the current dispatching operations work? Do they have any kind of challenges?”

5.1 The current state questionnaire and results

First, the questionnaire to understand the current state of the dispatching operations was created. The questionnaire was sent to 52 employees that work as dispatchers either full time or part-time. From the 52 people that received the questionnaire, the questioner received answers from 32 people. Based on these numbers the final answering percentage is around 62%. The questionnaire was carried out in Finnish to ensure that every warehouse dispatcher was given a chance to express their opinions and answer with their mother tongue. In this work the results and the questions will be discussed in English, but the original questionnaire can be found in the appendices.

5.1.1 The details of the responders

At the beginning of the questionnaire some details about the respondents were asked. The factors being asked were age of the dispatcher and work experience years in dispatching. These factors were asked to ensure the diversity in the survey. With employees of different age and different work experience it is possible to see all the sides of the big picture. The age distribution of the employees can be seen in figure 9 and work experience in years can be seen in figure 10.

How old are you?

The Answers

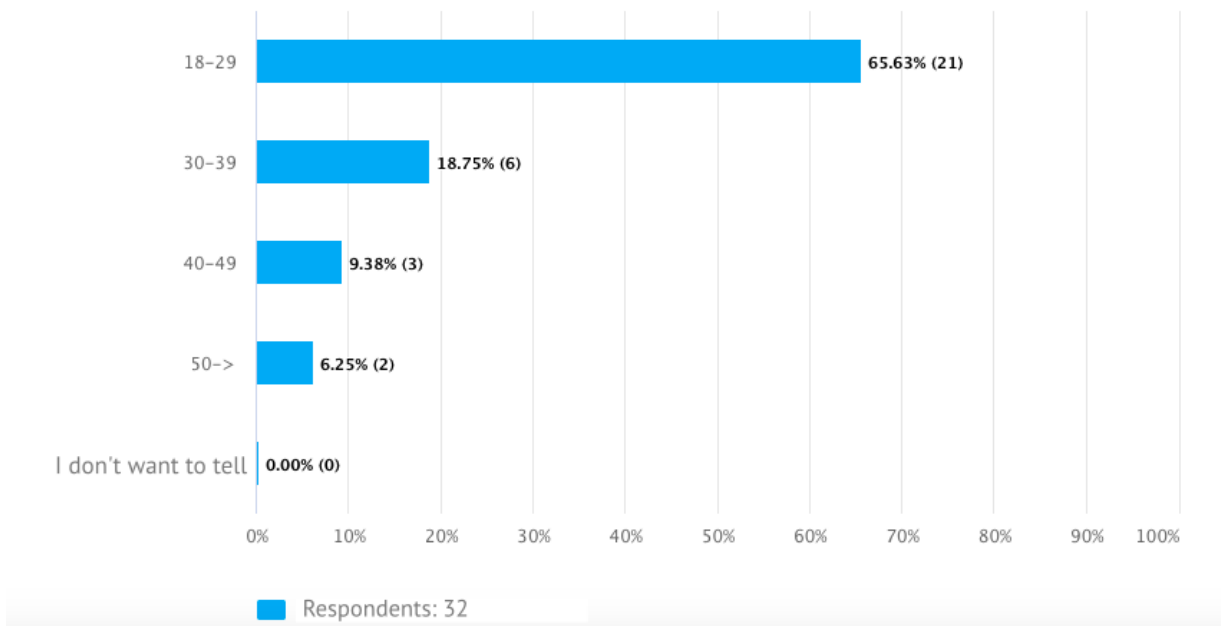


Figure 9 - Age distribution of the respondents

Dispatching experience in years?

The Answers

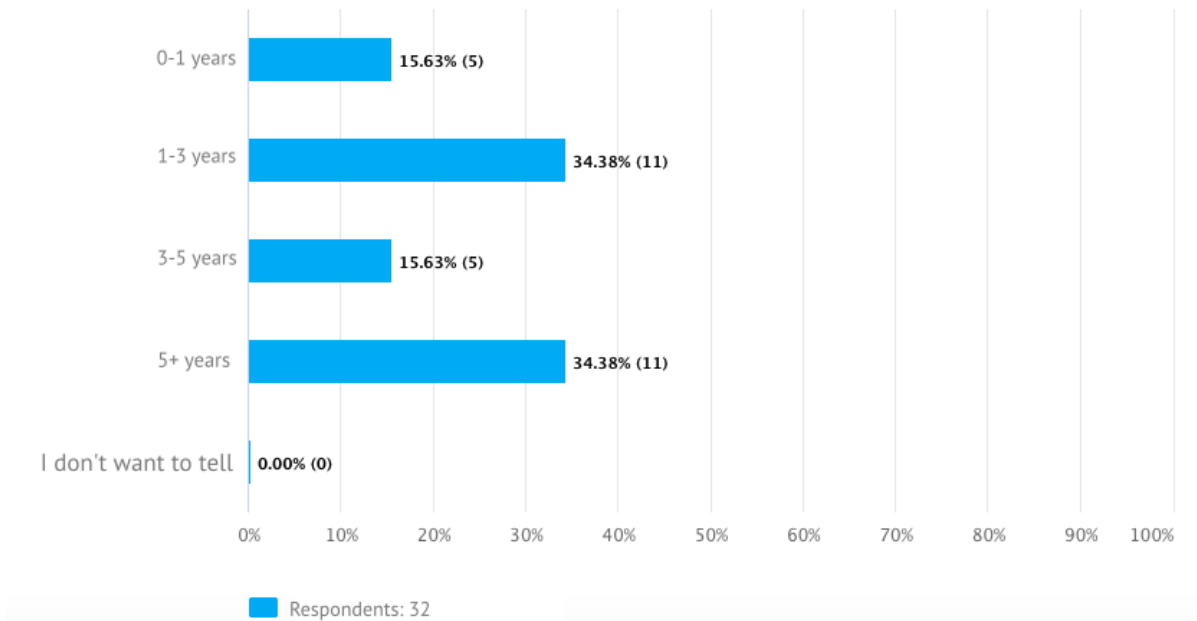


Figure 10 - Experience years distribution of the respondents

5.1.2 The challenges in the dispatching process

The first question regarding the state of operations was about the challenges in the process. The question was a multiple-choice question with a possibility to choose multiple answers. With 100% and 32 of 32 answers, lack of space was nominated to be the most challenging issue. In addition to this, Hurry was picked by 15 of 32 respondents, followed by Teamwork among the dispatchers which was chosen by 11 of 32 respondents. 7 respondents thought that Physical burden was also a challenge. The last option was “Something else, what?” and it included a possibility to describe on own words. Most of these answers were related to the order of the routes coming out from the automated robot picker.

Which is the most challenging part of the dispatching process?

Answers:

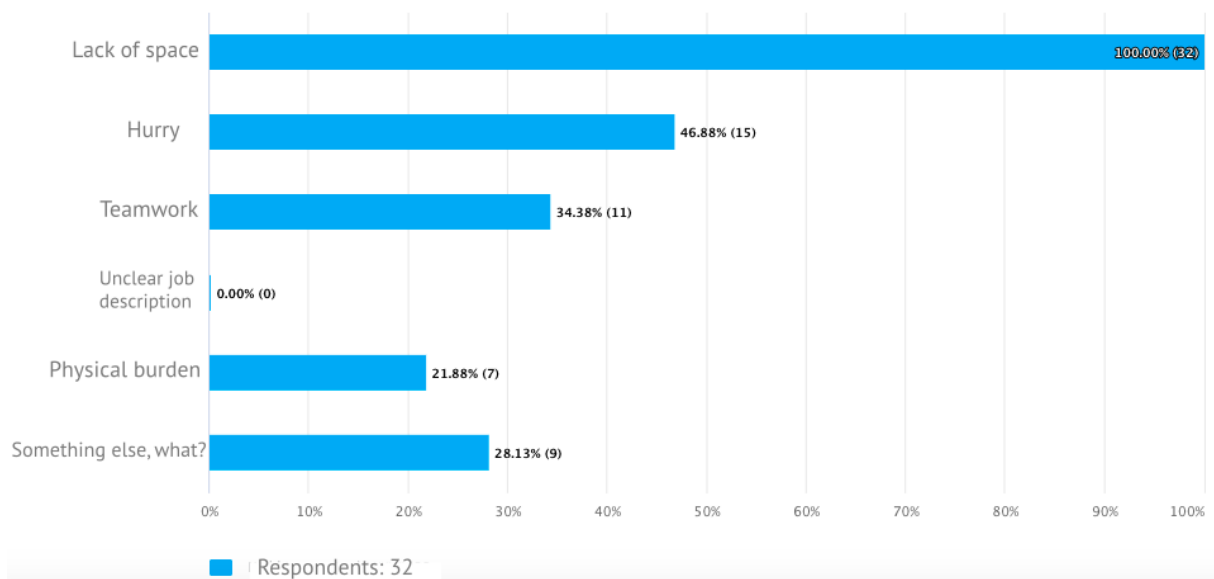


Figure 11 - The most challenging parts of the dispatching process

5.1.3 The most functioning parts of the dispatching process

The aim for this question was to see the parts of the process that work the best. The top three answers were:

- Completing your own route: chosen by 19 of 32 people (59,38%)
- teamwork among the dispatchers: chosen by 13 of 32 people (40,63%)
- clear work instructions: chosen by 12 of 32 (37,50%)

Most of the dispatchers think that completing their own route works the best. This confirms the fact that was mentioned in the questionnaire and has also been observed by the researcher; many employees concentrate heavily on their own routes. When some people concentrate only on their own routes, the process slows down. For example, if a person dispatching a route must bring all their goods to the terminal door by themselves, it is much slower compared to another person bringing the goods. In addition to this, the longer it takes to get the items from the robot, the longer it takes also for other routes to be completed.

Which is the most functioning part of the dispatching process?

Answers:

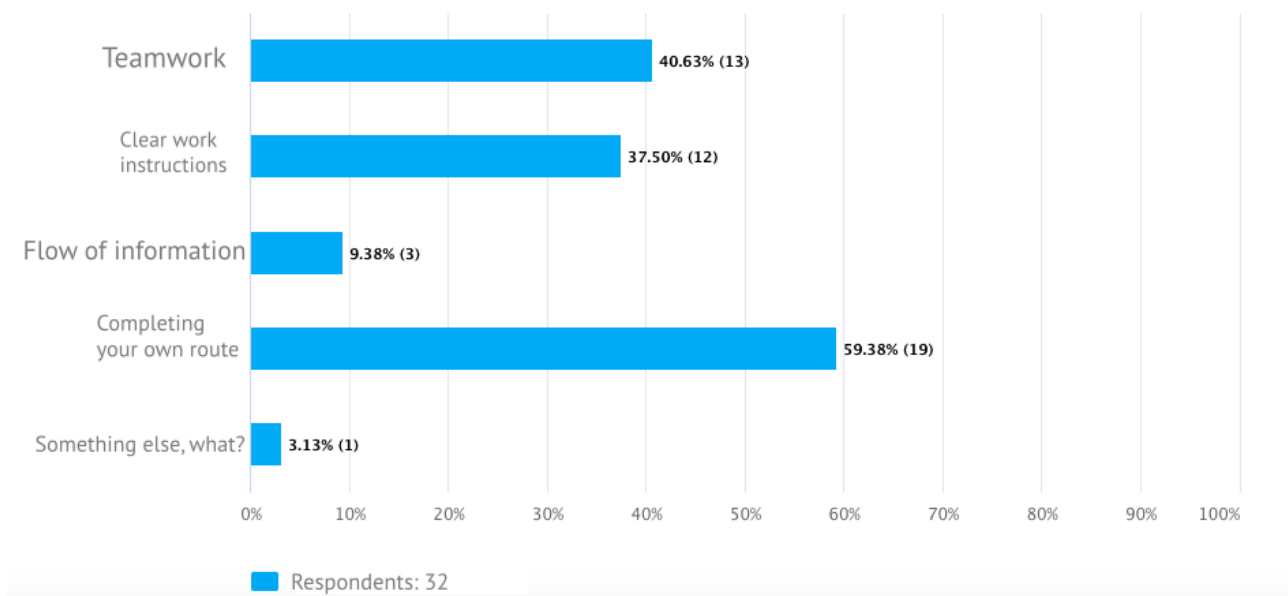


Figure 12 - The most functioning parts of the dispatching process.

5.1.4 Likert scale questions

In this question, the respondents had to answer to claims and choose number between 1-5. (1 = Completely disagree, 5 = Completely agree). The answers are translated to English also in this question to make it readable to non-finnish speakers too. The results of the questions can be found in figure 13.

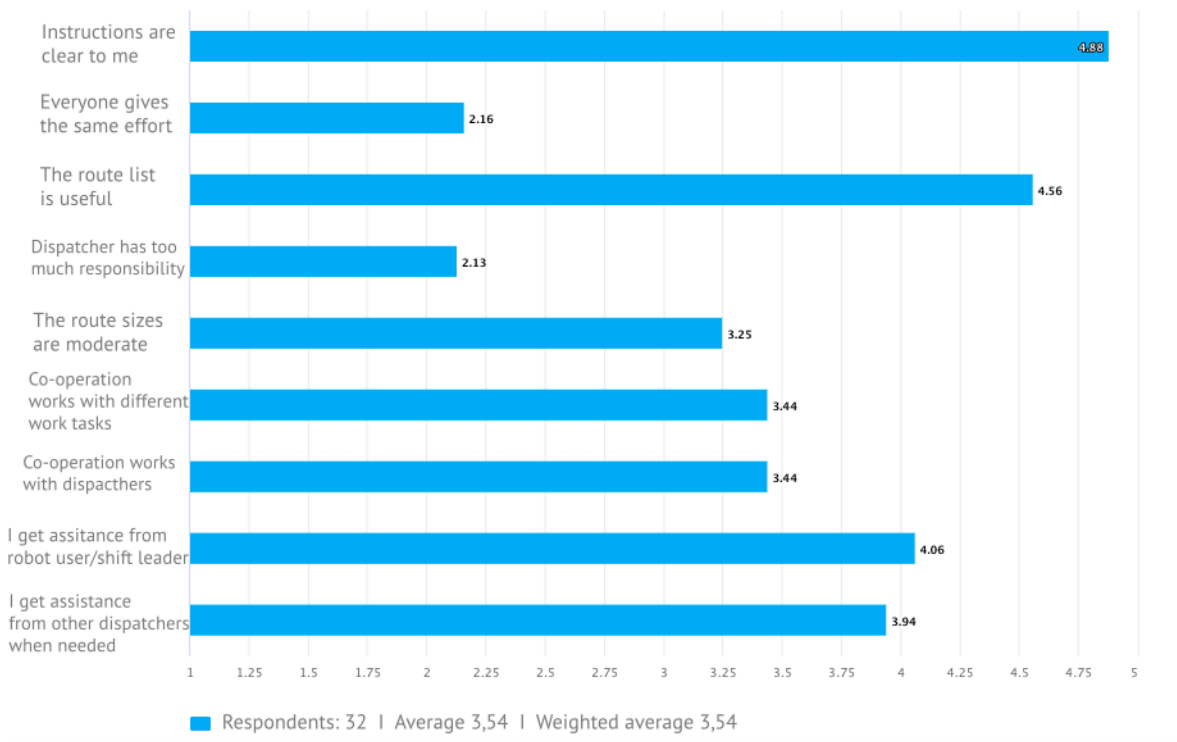


Figure 13 - The results of the Likert scale questions.

From these results it is observable that some of the answers are on satisfying level whereas other answers are lower than they should be. For example, the working instructions seem to be very clear to employees and the route list is seen to be very useful. The majority thinks that the dispatchers have moderate amount of responsibility so there is no need to take any actions regarding that.

The most critical answers that should be higher are based on working effort and teamwork. The value 2,16 for “Everyone gives same effort” is a proves that there are big differences on dispatchers’ work motivation. This reflects also to the claim “Co-operation works with dispatchers” which had a score of 3,44. It would be very good to get that value increased because there is room for improvement and the researcher has experienced it himself during his career at the warehouse.

5.1.5 Suggestions from the dispatchers

After the Likert scale questions there was a couple of open questions. First thing to be asked was employees' opinions about the procedures of the current dispatching process. The dispatchers were free to present suggestions that would make working more functional. This question received 16 answers from 32 respondents. The answers were mostly related to better communication/teamwork in a team, location of the routes on terminal doors, the route list and space utilization.

Some of the comments written by the employees are listed below. Separate comments are from separate people. The answers were translated to English by the questioner to make it possible for non-Finnish speakers to understand.

"The cooperation and situational awareness of the dispatchers should be improved to make the cooperation play. Especially for new the dispatchers. More emphasis should also be placed on communication. You can always ask another dispatcher if you can bring them stuff or help."

"The route list could be updated to make it easier to know if someone needs help. For example, check the box when you book a route that the next dispatcher knows to come to your aid and not book a new route from the list."

"I would add more employees at least initially. I would also consider a better release order for some routes and placement of routes at the doors."

"Where possible, efforts could be made to develop space solutions, e.g. for the location of "extra" trolleys coming from the mass tracks."

"Teachers should be selected more closely so that the so-called only best practices would be taught forward. For example, not all teachers teach helping others. In addition, adequate familiarization should be ensured before moving on to new work tasks, as almost invariably new (and even old) employees feel thrown into the deep end when they get their first shift in a new task."

5.1.6 Working in pairs

Earlier in 2021, a new kind of way for dispatching was tried at Valio Jyväskylä. In this new method, the routes were dispatched in pairs to reduce the workload on one employee by dividing the workload for two people. The method faced some challenges and practical issues which led to a situation where it is used more seldom now. In this question employees' opinion about working in pairs was asked.

The feedback about working in pairs was mainly positive and from the answers it can be concluded that most of the dispatchers thought the pair working to be a good change, but it would require little modifications. It was also said that working in pairs works on big routes with lots of goods, and that for smaller routes it is not necessary. The challenges with pair working were said to be the lack of personnel, different work motivation among the employees and working in pairs on routes that do not need it. Some of the comments by employees described below. The answers were translated to English by the questioner to make it easier for non-finnish speakers to understand.

“Does not work at the moment. Some people don't want to work in pairs, which leads to people needing help being skipped as well.”

“Lightens the workload with larger routes.”

“Works if the pair is someone who actually works. Sometimes there are a couple of people who don't seem to be doing the route at all.”

“It could have worked if there were enough workers.”

It can be concluded that pair working was seen to be very useful with some routes and employees thought that it really lightened the workload during the day. In addition to lightened workload, pair work also reduced the hurry when there were two people responsible for the route. It was also mentioned that the reduced hurry that is gained by working in pairs, possibly leads to a situation where the pair started to slow their pace and to have more “chat breaks”. With a little modification,

common work instructions and enough workforce this method might have some serious potential to be beneficial.

5.1.7 Common Feedback & Questionnaire conclusion

The last question of the survey was designed to be a part where an employee can write anything they feel like; feedback on the survey or on the operations, ideas related to the working methods etc. This question received many kinds of answers related to different parts of the warehouse operations but most of the comments were related to the common issues that came up earlier in the questionnaire such as lack of space and communication. In addition to these, some specific ideas about how to change the ways of working were told. As almost every company, also Valio has experienced the effects of Covid-19 pandemic that has limited the resources remarkably during the past two years. The lack of workforce was also mentioned to be one factor to cause more load on employees.

Questionnaire Conclusion

As an answer to the first research question “How do the current dispatching operations work? Do they have any kind of challenges?”, we can conclude that based on the survey there clearly are challenges with current operating methods. Employees’ answer to the survey were naturally diverse but there are some things that were repeated multiple times and should be taken into more specific inspection. It was presumable that the challenges that were mentioned the most through the questionnaire were close to the answers to the question 1 that inquired the challenges of the dispatching process. So, the aspects to be taken into inspection are:

1. lack of space
2. teamwork and communication in a dispatching team
3. The possibility of enabling pair working again.

6 Suggestions for improvement

The challenges that required change were nominated in the section 5. In this part of the thesis, the actions that are suggested to be taken into consideration are presented. This part answers to the second research question: “In what ways can the operations be improved to be more functional?”. The suggestions are presented roughly in an action plan and explained more precisely in the text. As the challenges, also the improvement suggestions are listed down in three categories that are related to 1. Lack of space, 2. Teamwork and communication in a dispatching team and 3. The possibility of enabling the pair working again. The action plan can be found on the following page.

Table 1 - Suggested action plan

Aspect	How to solve	Benefits
Lack of space	Creating a plan to locate products on the mass tracks. Defining a place for trolleys being emptied from the track.	Reduces useless movement of goods. Space on smaller terminal doors (1-8) can be utilized more efficiently. No need to look for specific goods when they are always on the same place.
Teamwork and communication	Creating updated common rules for the dispatching team as a reminder. Regarding to helping each other, committing mutual tasks, keeping the warehouse clean and in order.	Reminds the more experienced workers and educates new ones about the fact that the work is more than just finishing their own route. Understanding the big picture eases everyone's work.
Working in pairs	Enabling pair dispatching by defining the routes that require it and giving the first person to work with the route to choose if they need help or not.	Reduced workload on one employee. Shortens the time to finish a route. Partly solves to challenges with teamwork and helping other dispatchers.

Lack of Space

Lack of space is a challenging phenomenon since the space in the warehouse is limited and the best option might not be just to suggest expansion to the terminal since it requires a lot of time and capital to implement those changes. Therefore, smaller modifications are more relevant to current situation. The biggest changes that are suggested to be done are related to the placement of goods that are laying all around terminal floor and do not have a nominated destination yet.

If not including the size of current facilities, the biggest individual factor to cause lack of space is the placement of products produced in Valio Jyväskylä factory. The goods from production are lead either to the picking robot or on a mass track where they can be taken as whole trolleys when the product is needed in larger volumes. There are tens of different of products that are stored in a mass track. There are more products than tracks and some of the products have bigger demand than the others. This means that some products must be stored one after another on the mass track. This leads to a situation where one product is behind the other and the product in front of the other product must be taken out from the way and stored on terminal floor. Better planning and placement of trolleys on the track would help to prevent and minimize the times when some product must be taken out from the track to get the product needed.

It is obvious that for every product specific track cannot be defined due to big difference of production amounts. Some of the products are produced at very small amounts at one production time whereas products with biggest demand can pe produced multiple times more. Therefore, products with smaller volume must be stored one after each other on the tracks to use the tracks efficiently and not to keep them empty.

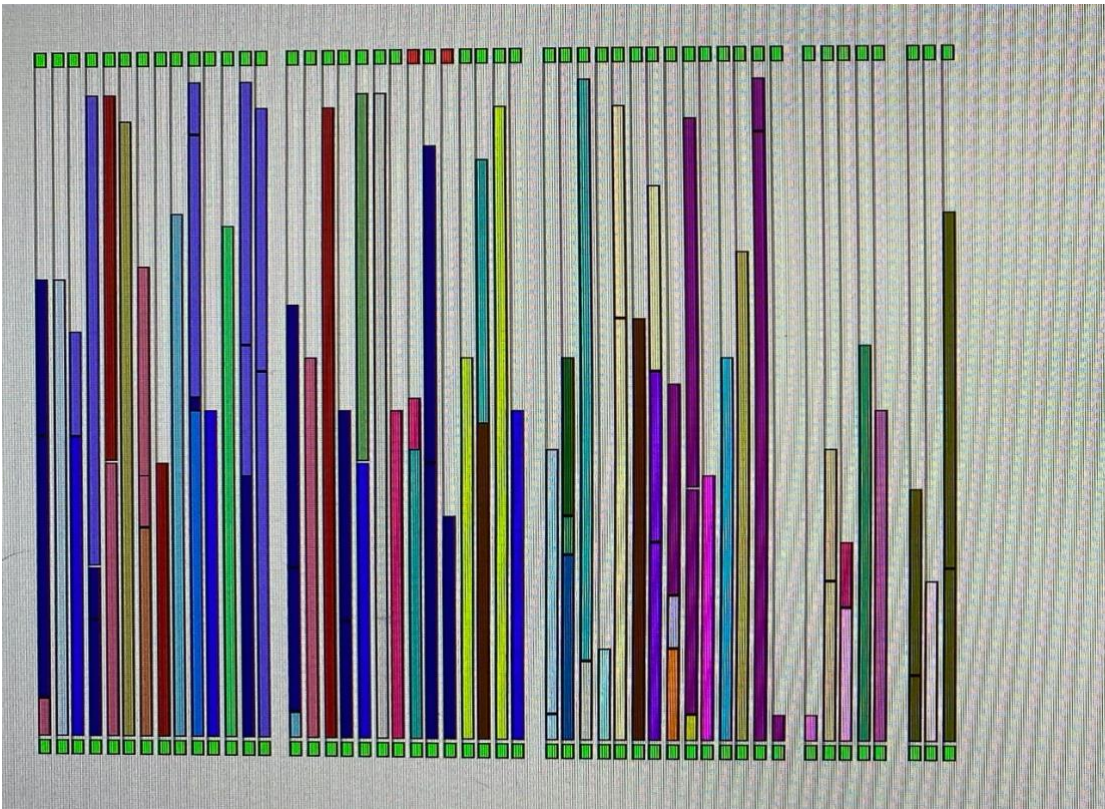


Figure 14 - The map of the mass track the produced items are stored at. Different colors mean different products.

Working in pairs

Based on the answers of the questionnaire dispatching in pairs was a very liked method. Therefore, it is relevant to suggest bringing it back to daily routines. Compared to the first version of the pair working, the new version requires some modification. The most crucial changes to be completed to pair dispatching are defining the routes that need two workers and giving employee a chance to choose if they want assistance from another employee or not. There must be a clear policy about the routes that are allowed to be done in pairs to make it work properly. Defining the routes that are allowed to be done in pairs is a must in order to ensure that it is not used on small routes that cause only wasted resources when dispatched in pairs.

The idea would be allowing the first person to start working with the route to choose if they want to do it alone or if they want help, since it is not useful to force everyone to work in pairs if they

rather manage everything by themselves. Working in pairs would also partly solve the challenge related to teamwork and helping each other.

Two employees working on every route that are big enough will relieve the stress and physical burden of the dispatchers. With two persons, the goods from the picking robot will be emptied faster which allows next routes from the robot to be available earlier. It must be taken into consideration that to work properly, working in pairs requires enough employees on the shift to be beneficial. In an usual situation, where there is same amount of employees in the shift as planned beforehand, the capacity to operate in pairs when needed should be sufficient.

Teamwork and communication

Teamwork and communication are also causing some challenges and could be on a better level. The suggestion about working in pairs will solve this problem partly as explained before. In addition to this, updated rules about how to work in a team could be useful to help employees to see the bigger picture and gaining a thought that help goes around and lightens everyone's workload. These rules could work as a reminder that reminds dispatchers to communicate with each other and also with people in other work tasks. It would also be good for new employees to see a concrete list of tasks that are part of their job.

7 Discussion

In this part the research questions and the answers that were gained during the research process are discussed. This part shortly summarizes what kind of information the has been received through the research.

How do the current dispatching operations work? Do they have any kind of challenges?

This research question was created to find out what the current situation in Valio Jyväskylä warehouse dispatching area is. The best way to see the big picture and understand the challenges was to create a questionnaire for the employees. There were some challenges that could be told by the earlier experience of the researcher and the results of the questionnaire also proved these to

be true. In total, there were eight questions in the questionnaire, including multiple choice, Likert scale and open questions. The questionnaire provided lots of useful information about the current situation in the warehouse and it could be seen that some things in the warehouse on a good level and there is no need for a change. However, multiple challenges came up several times in the results and the issues to be taken into more specific consideration were

1. Lack of space
2. Communication and teamwork
3. Enabling the pair working method.

In what ways can the operations be improved to be more functional?

The second research question was about the things that can be improved or changed to make the dispatching process smoother. This question was a lot associated with the first research question since the first question provided the information about the issues that cause the most challenges. Therefore, it was natural to focus on these three challenges that came up the most and were pointed out in the paragraph above.

So, after taking a look into issues and possibilities that there were, three ideas that could improve the operations were presented.

The suggestions were:

- Creating a plan to locate different produced items on different mass tracks to save space by eliminating useless movement of the goods. Defining a specific place for products that must be taken from the track.
- Enabling the earlier used pair working method, with little modifications.
- Creating a list of rules to support dispatching operations and mutual tasks related to them.

Objectivity and the ethical side

In each study, the researcher makes subjective choices based on research methods, research questions, methods of analysis, or method of reporting. The researcher must not allow his or her

own beliefs to influence the research process. This means that changing a researcher does not change the results of an objective study. Human error can also occur even to an experienced researcher, but intentional misrepresentation of results is strongly reprehensible. (Heikkilä 2014, p. 31).

The questions for this study were created to be independent so they did not try to lead the respondents to any direction. The same results and conclusions would come out with a separate researcher. The questionnaire was clearly voluntary, and it was answered anonymously in a way that the answers and respondents could not be connected to each other in any way. This was done to guarantee that the respondents would feel comfortable telling their opinions, without being judged or confronted based on their answers.

8 Conclusion

8.1 About the study

The aim of this study was to investigate the dispatching operations in Valio Jyväskylä warehouse and to find the parts of the process that cause the most challenges. For these challenges, certain development suggestions were proposed. The research was carried out by using research methods such as survey and observation.

The current situation in the warehouse was investigated through an online questionnaire that was sent to employees that work on the specific dispatching area. The questionnaire was included both multiple choice questions and open questions to get as much information from the employees as possible. As told, the response rate was great, the results were logical, and the respondents seemed to be rather unanimous with most of their answers. The other research question was related to improving the operations; was there any way to improve the operations? The answer to this question was based on the answers of the earlier questionnaire so the researcher had to come up with some improvement suggestions.

As the end result of the research, the researcher made an action plan that suggested the acts that could be taken into consideration to make the dispatching operations more functional in Valio

Jyväskylä warehouse. The action plan included three different suggestions that were related to 1. better space utilization, 2. communication and teamwork and 3. Enabling the pair working method.

These suggested acts would reduce the workload on one employee by sharing the physical burden, make more space to the warehouse by reducing the useless movement of the goods and this way make the working more functional and efficient.

8.2 Validity and reliability

Reliability

Reliability refers to the accuracy of the results. The results of the study must not be random and reliable research is required to be reproducible with similar results. This means that the result should be quite the same if the research was committed again. However, it must be considered that due to the diversity of the society the results might be different on different times. In addition, results may be random if the sample size is too small. For this reason, the number of people who will not respond must be considered already when planning the survey. The researcher must be accurate and critical throughout the study. There are many places for mistakes during the research, such as data collection or handling and interpreting the results. It is important to researcher to interpret the results correctly and not to make any own conclusions. (Heikkilä 2014, p. 30).

In this study the results for the questionnaire were received from 32 employees. The number of respondents was a pleasant surprise since the questionnaire was originally sent to 52 persons. With 20 “non-respondents” the answer percentage ended up being 62% from which it can be concluded that results created very realistic picture of the current state of the operations. In addition to this, I as a researcher had observed and experienced every challenge that came up multiple times in the questionnaire, so it was easy to agree and evaluate the results based on this.

Validity

The study should measure what was meant to be found out. If the research is not set specific goals, the wrong things are easily investigated. Validity simply means the absence of a systematic error.

Measurements made with a valid meter are, on average, correct. If the concepts to be measured are not defined precisely enough, the measurement results cannot be valid. Validity is important to ensure with well-planned data collection in advance, so the questions on the survey form should measure the right things. Precise definition of the universe, obtaining a representative sample and a high response rate also contribute to the implementation of a valid study. (Heikkilä 2014, pp. 29-30).

The aim for this study was to investigate the current situation in Valio Jyväskylä warehouse and to find the things that cause the most challenges and to see how the current operations methods respond to the requirements created by the work. The questionnaire gave very clear picture about the opinion of the employees and there was not huge variation in the results. The validity of the study was ensured by well-planned and relevant questions in the questionnaire and by choosing the right number of right employees as respondents. Answering the questionnaire was done via link sent as a message to employees' mobile device so it was easy to everyone to give their answers. This also enabled the high response rate of 62%.

8.3 Final thoughts about the study

This thesis project was something different compared to other projects that I have been part of during my studies. This time I was alone and had to do everything by myself without the help from my fellow student. Therefore, it was rather hard to think what to expect. At the beginning I was a bit lost and finishing this work seemed to be very distant thought. However, during the project I noticed that I started to understand things better and my knowledge and trust towards the project started to rise step by step.

Overall, it can be said that at the end of this project, my thoughts about this thesis turned very positive. I am satisfied with the results that I gained via the questionnaire, and I was very surprised by the fact that the employees were that eager to share their opinions with me. Sometimes it is difficult to get enough answers from the respondents to get reliable information, but in this study the response rate was surprisingly good and there was no need to beg people to give their answers. After sharing the questionnaire, during the first 24 hours I received around 80% of the answers. Based on the research results I managed to create couple of suggestions for improvement. The

suggestions for improvement were not major changes, but they do not have to be like that to be useful.

Naturally, just like every other project, this thesis did not become completed without challenges. One of the biggest challenges for me with this work was time. The most of my thesis writing time I have been working full time in shift that has required a lot of my resources. In addition to limited time, scheduling for different parts of the thesis was sometimes complicated and I could have managed to plan the work better.

For further follow-up suggestions it could be recommended to inspect the pair working method to ensure the that it works as should and that the resources are on a required level to ensure the method to be useful. In addition to this, a deeper look into aspect of space utilization might be needed at some point because in the future the production amounts and demand from customers are most likely to rise rather than decrease and the capacity of the warehouse cannot respond to this forever.

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Appendix 1. The questionnaire about current state of the operations

Lastauksen nykytilan kartoitus

Kyselyn tarkoituksena on selvittää työntekijöiden mielteitä ja mielipiteitä lastausalueen työskentelyn nykytilaan liittyen.

Ikä

- 18-29
- 30-39
- 40-49
- 50->
- En halua kertoa

Kokemusta lastaamisesta

- 0-1 vuotta
- 1-3 vuotta
- 3-5 vuotta
- 5+ vuotta
- En halua kertoa

Mikä tuottaa eniten haasteita lastausprosessissa?

- Tilan puute
- Kiire
- Lastaajien yhteistyö
- Epäselvä työnkuva
- Fyysinen rasitus
- Joku muu, mikä?

Mikäli vastasit edelliseen "Joku muu, mikä?", kerro lyhyesti ongelmasta.

Mikä toimii lastausprosessissa parhaiten?

- Lastaajien yhteistyö
- Selkeä työohjeistus
- Tiedonkulku
- Oman reitin valmiiksi saaminen
- Joku muu, mikä?

Mikäli vastasin edelliseen "Joku muu, mikä?", kerro lyhyesti tähän.

Vastaa seuraaviin väittämiin. 1=Täysin eri mieltä, 5=Täysin samaa mieltä.

	Täysin eri mieltä		Täysin samaa mieltä		
	1	2	3	4	5
Tiedän, miten työtä kuuluu tehdä.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Koen, että kaikki tekevät työtä samalla työpanoksella.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reittilistasta on hyötyä lastaamisessa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lastaajalla on liikaa vastuuta.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reitit ovat maltillisen kokoisia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteistyö toimii eri työtehtävien välillä. (UB, Lj, Rc. yms.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteistyö toimii lastaajien välillä.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saan tarvittaessa apua vuoro- ohjaukselta, robottikäyttäjältä yms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saan tarvittaessa apua muilta lastaajilta.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Mitä muutoksia tekisit nykyisiin lastauksen toimintatapoihin? Poistaisitko jotain tai lisäisitkö jotain? Voit perustella.

Mitä mieltä olet aiemmin tänä vuonna käyttöön otetusta parilastauksesta?

Yleisesti vapaa sana. Ideoita/palautetta toimintaan liittyen, jäikö kyselystä puuttumaan jotain oleellista? Yms.
