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Tälle tutkimukselle oli tarve kohdeyrityksessä. Kohdeyritys toimii paperinlaminointi ja -painatus alalla. Yritys on yksi markkinoiden johtavia toimijoita. Heillä on tehtaita ympäri Eurooppaa ja myös Aasian maissa. Tämän tutkimuksen kohdetehdas toimii Suomessa. Tutkimuksen aiheena oli hallintatyökalu toimitusketjulle kohdeyrityksessä. Tutkimuksen tavoitteena oli selvittää olisiko yrityksen työntekijöille hyötyä tällaisesta hallintatyökalusta ja mitä sen pitäisi sisältää.

Tutkimuksen teoreettinen viitekehys koostuu toimitusketjun hallinnasta, prosessin valvonnasta tehtaassa ja laadunvalvonnasta. Teoreettinen viitekehys sisältää aiempaa materiaalia aiheista, jonka pohjalta luotiin kysymykset haastatteluita varten. Tutkimus on laadullinen tutkimus ja haastattelut ovat teemahaastatteluita. Haastattelut ovat kohdeyrityksen työntekijöitä, jotka kaikki ovat eri työtehtävissä.

Tutkimuksessa tuli ilmi kuinka hyödyllinen tämä hallintatyökalu olisi, jos se otetaan käyttöön. Haastatteluiden kautta selvisi tärkeimpiä ominaisuuksia mitä tämän uuden hallintatyökalun tulisi sisältää. Tulosten perusteella saatiin luotua kokonaiskuva tutkimuksen hyödyistä ja yrityksen ongelmakohdista.

ABSTRACT

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The target company had a need to conduct a research. The company operates in the paper laminating and printing industry. The company is one of the leading operators in the market. They have factories all over Europe and in Asia. The target factory of this thesis is located in Finland. The subject of the study was a management tool for the supply chain in the target company. The aim of the study was to find out if the company's employees would benefit from such a management tool and what it should contain.

The theoretical framework of the study consists of supply chain management, process monitoring at the factory and quality assurance. It includes a previous material on topics which create questions for the interviews. The research is a qualitative research and the interviews were conducted as theme interviews. The interviewees were employees of the target company.

The study showed how useful this management tool would be if it were to be used. Through the interviews, came to a result that the most important features that this new management tool should contain. Based on the results, an overall understanding of the benefits of the tool and the problem areas of the company were created.

Keywords supply chain, process monitoring, quality control

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1 INTRODUCTION

The target company had a need to conduct a research on the supply chain overview and its usefulness. This thesis investigates whether the target company should use a control tool that would provide a supply chain overview. It would be able to monitor the entire manufacturing process from receiving an order to the transmission stage through one program. Thus, it would be possible to detect any errors faster during the process and to correct the situation faster than what is currently being done. Also, in this thesis there's going to be a chapter on the key things that are going to be included in the supply chain overview. In a supply chain, there are a lot of problems with communication and that is why a supply chain overview will help the process speed if there are any problems in the production and then there is not such a big responsibility for communication, but it does not want to turn it off.

The biggest problems are always found too late and if they could be monitored faster / more carefully to avoid negative situations with customers. The purpose of this thesis is to study whether the supply chain overview could help with these situations.

This thesis is going to include a theoretical section and an empirical study. The theoretical section contains earlier research about supply chain management, process monitoring at the factory and quality assurance and these forms the theoretical reference framework. The empirical section contains the introduction of the qualitative research method, selecting interview questions and validity and reliability of the research. After that come the research results and conclusions.

1.1 Background

This target company is a leading, international producer of technical laminates and protective packaging materials. They specialize in the production of fiber based, intelligent and multi laminate products. For markets they diverse as energy saving facings and construction membranes to barrier packaging applications. This thesis focuses on the factory which operates in Finland. Later, if this thesis is useful the company can use it on all other factories. They production facilities are in Finland, Germany, The Netherlands, Poland,

UK, Russia and China. The target factory is this company's best producing factory in Europe. Main customers come from Germany, France, UK and The Nordic countries.

1.2 Need

The target company wants to develop all the time and that is why they make development plans almost monthly. In the target factory, they have a need for supply chain overview which means total control of the production process. They should have a better control of the whole process because now there are lot of mistakes in the production process.

Supply chain overview is the perfect help tool to everyone who is working on the production process. Can this research help the target company build the perfect monitoring tool to its employees?

1.3 The research problem and the research method

There are many issues in the target company in the product phase. Many things can go wrong and therefore the tracking tool could be a great help, as the error could be found immediately. Currently finding a mistake takes hours, if not days.

How does the supply chain overview helps to monitor product in process?

Possible sub-questions:

- What features it should contain?
- What added value does supply chain overview bring to the company?
- How difficult would the supply chain overview be to the users?

Qualitative method of study refers which the research collects non-numerical data. Such studies have no right or wrong answers. When applying qualitative research methods, the emphasis is put on the natural setting and the points of views of the research participants. Additionally, special consideration is given to the researcher as person. He or she is not

an independent observer in a white coat – a picture that is often drawn when natural scientists are depicted. Rather, in qualitative research self-reflection about one's own attitude and position and role in society is vital. (Qualitative Research 2018.)

A theme-centered interview aims to decode manifest as well as defended and latent meanings of communication. The theme-centered interview offers interview partners the opportunity to develop their special point of view in detail. More strongly than in a group discussion, the focus is on the individual person and his or her experiences and opinions concerning the topic. An open conversation situation should be established during the interview. The interview starts with a short explanation of the topic of the study and a clarification of the interview. The interview partners are informed that they are not confronted with a prepared list of questions as they might have expected. Instead, they have the opportunity to unfold and to explain what is important for them in regard to the topic. The interview topic is held present by a formulated (and written) leading question (which is placed well legibly). (The "Theme-centered Interview" 2018.)

The research method is going to be qualitative interviews which include interviewing 4-5 employees of the target company. The interviews will be conducted as theme interviews. In this thesis, is going to use the qualitative research method because it is more suitable for this research. It will give more definite results on the subject. Theme interviews will provide an answer to the problem areas that occur in the theoretical framework.

2 SUPPLY CHAIN MANAGEMENT

No enterprise can succeed by itself. Competing in a complex global business environment requires an interdependent network of many organizations. That's why excellence in supply chain management is critical for success. (McKeller 2014, 1.) In this section, the concept of supply chain management is opened based on theory. This section will cover the following subsections through supply chain management: definition, objective, communication and vision & strategy.

In whatever way it is defined, the purpose of a chain of supply is to transform and transport whatever is required to meet customer's needs. The next chapter will offer a more detailed supply chain management definition.

2.1 Definition

Supply chain management is the management of the flow of goods and services. It involves storage of raw materials and the movement as you can see in Figure 1. In a supply chain, there can be interconnected or interlinked networks. Also channels and node businesses combine in the provision of the products and services that in the end needs a customer in the supply chain.

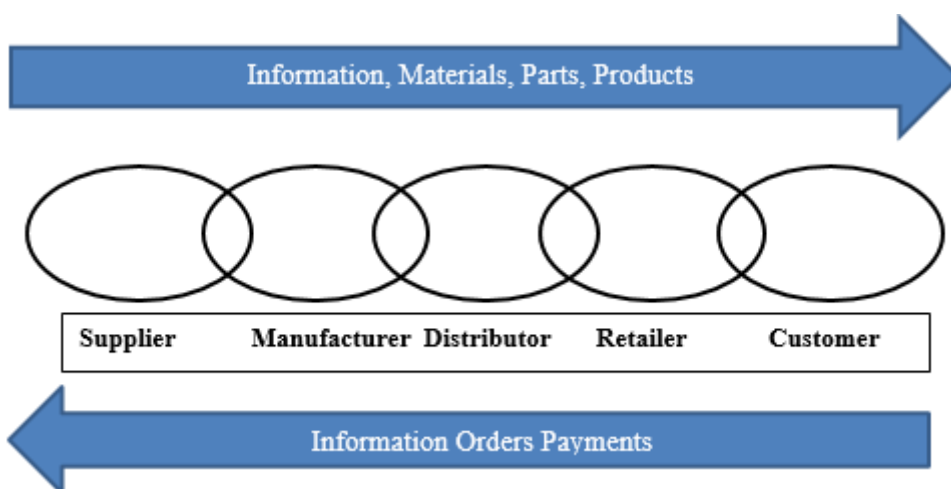


Figure 1. Basic linear supply chain model. (McKeller 2014, 4.)

The term supply chain management has existed for at least twenty years. Its definition varies from company to another. Because of the different business functions retailers, carriers and manufacturers perform and the types of companies with which they deal, the supply chain and extended companies for each of these three industries look very different. (Kuglin 1998, 3-4.)

Supply chain management involves being both proactive and responsive in managing the two-way movement, coordination, and control of products, services and information from raw material through to the end user. This coordination, control and integration within the supply chain should center on a total cost analysis perspective that considers the values added throughout the chain. Maximizing value and cost effectiveness of one node in the chain at a time is not the strategic, global way of conducting supply chain management, instead of a full beginning to end perspective on the chain should be adopted. Supply chain management typically involves logistics, purchasing, operations, and market channels as the core functions internally and several different entities externally (suppliers, customers and many more). (Hult 2014, 22-23.)

In The target company management policy aims to manufacture products of consistent quality, suitable for the planned end use, which meet customer's requirements. They development activities are based on customized innovations. Openness and efficiency characterize the internal and external flow of information. The company works closely with their customers and suppliers to establish long-term relationships and cooperation based on mutual benefits. (Management Policy 2017).

2.2 Objective

Supply chain management consists of all parties including manufacturer, marketer, suppliers, transporters, warehouses, retailers and even customers, directly or indirectly involved in fulfillment of a customer. The main objectives are to improve the overall organization performance and customer satisfaction by improving product or service delivery to consumer. (Objectives of Supply Chain Management 2017.)

Supply chain profitability is the difference between the amount paid by consumer to purchase the product and the cost incurred by organization to produce and supply the product

to the customer at the right time. Appropriate management of the flow of information, product or funds is a key to supply chain success. (Objectives of Supply Chain Management 2017.)

In the target company the supply chain consists of sales, invoicing, quality control and the various groups of senior executives. In production, it consists of production planning, day masters/supervisors and then production workers, all working together to produce the right rotation. In the supply chain, it is important for office employees to communicate with production employees to avoid mistakes.

2.3 Communication

As mentioned in the previous chapter, communication is a very important part of the supply chain. Communication ensures that are avoided mistakes and that the process does not slow down. Communication can be one of the most important tools, though it may not be as valued as physical tools. In company orientation, the importance of communication is already highlighted as. It is already a central element in the training of a new employee.

In the target company they use Skype, email etc. as a daily communication method. However, face to face communication is the primary tool and sometimes it is not used enough and information cannot be forwarded to the right people.

Communication and training can be a powerful stimulus to personal development at the workplace, as well as achieving improvements for the organization. This may be useful in the selection of the appropriate method of communication. (Oakland 2014, 390.)

Principals of communication:

- *Verbal communication* either between individuals or groups, using direct or indirect methods, such as public address and other broadcasting systems and recordings.

- *Written communication* in the form of notices, bulletins, information sheets, reports, e-mail and recommendations.
- *Visual communication* such as posters, films, video, internet/intranet, exhibitions, demonstrations, displays and other promotional features. Some of these also call for verbal and written communication.
- *Example*, through the way people conduct themselves and adhere to established working codes and procedures, through their effectiveness as communicators and ability to “sell” good practices. (Oakland 2014, 390.)

2.4 Vision and Strategy

The target company's mission is to contribute to global resource efficiency by developing and delivering energy and material efficient solutions. Their vision is to be the leading source of innovative, sustainable multi-layer laminates and protective packaging solutions. (Vision – Strategy 2017.)

The target company differentiates itself from the competitors with

- problem solving approach,
- high quality products and services,
- excellent customer experience, and
- multi-plant network for delivery back-up. (Vision – Strategy 2017.)

The vision of the company is very clear and determined. It highlights the most important things the target company seeks for as can be seen in Figure 2. The vision also shows that the company want to focus on product quality and customer service quality.

Supply chain strategies are required to manage the integration of these activities through improved supply chain relationships, to achieve a competitive or co-operative advantage. Integrating the supply chain requires an organization to synchronize not only its own activities but also the activities of external organizations that either supply or receive outputs from the apparel supply chains the term from concept to consumer and in heavy industry and manufacturing industry from mother earth to mother earth illustrates the full

cycle from extraction, conversion, through to customers, consumption and recycling. (Hines 2013, 6.)

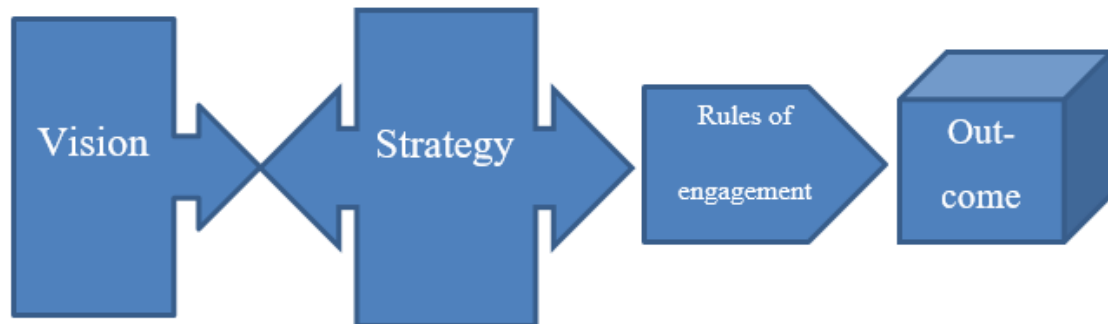


Figure 2. A simple figure of vision and strategy.

The target company's strategy focuses on the functionality and quality of the various factories. The target company of this thesis focuses on laminating and printing on different grades of paper. Supply chain strategies are crucial to the success of most business organizations. Organizational decisions relating to the design and structure of supply chains determine supply chain strategies. (Hines 2013, 35.)

Supply chain overview should help also on strategic perspective because it should be a major control tool. It should facilitate daily work. In the target company things have been strategically managed, but there are still small things to develop.

3 PROCESS MONITORING AT THE FACTORY

The aim of the paper processing plant is to sell the production line machines as efficiently as possible. That is why it is very important that every product is monitored well to avoid mistakes as shown in Figure 3. The task of production is to take everything out of the machine and at the same time to manufacture quality. Production process is controlled from many different sectors, but the main responsibility for quality lies at the machine employees. The quality of the product is monitored according to the instructions which are up-to-date and automatic measuring instruments from the track: humidity, layer thicknesses or weights, or both.

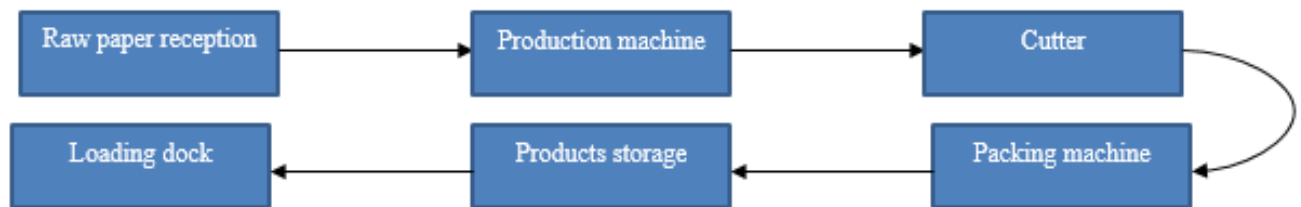


Figure 3. Simple production cycle.

3.1 Production and manufacturing

Paper processing is, of course, much smaller than papermaking itself. One paper - or board machine feeds ten refiners. (Seppälä 2002, 27.) On the target factory they have three laminators, three printing presses and other machines, However, the main products come from laminator and printing press.

The quality of the product is generated by a processing machine, and in practice it can only be answered by the machine crew and, above all, by the machine operator. This fact cannot be changed by transferring responsibility to the rest of the organization. The quality is monitored according to the instructions of automatic measuring devices.

Computer displays typically show cross sections, averages, length profiles, histories, etc. The potential for obtaining measurement results in the desired format is, thanks to current information technology, rapidly growing. If necessary, the laboratory will immediately test some critical values to make additional adjustments and confirmations. But most of

all, the machine workers must see and hear what is going on all the time. Nothing replaces a skilled person in paper-making. By far, most of the errors in paper pulp are not detected in the measurements, but the faults that can be seen with the eye, such as wrinkles and creases, line extensions etc.

3.2 Product development

Quality starts from the right product design. The raw materials and their properties must be selected so that the desired properties can be achieved reproducibly. In principle, the standard raw materials manufactured and the quality standards guaranteed by the manufacturer should be used with decomposition. (Seppälä 2002, 25.)

Good product development ensures the right approach. If basic work is handled well then there is always the opportunity for product development. The right kind of a cycle is an excellent way of working in product development. Figure 4 shows the normal course of product development.



Figure 4. The Deming cycle. (Evans 2008, 644.)

If the plant is discontinuing product development, sales will decline in a few years, so product development must be on a continuous basis, even if there are problems. New raw materials are also coming on to the market all the time, the suitability of which is to be tested. The quality of the competitors must be monitored. The product developer combines the needs of the customer and the possibilities of their own. If needed, he will help

the customer to understand the new technical possibilities that will lead to machine investments after testing. (Seppälä 2002, 26.)

This new management tool could also be deployed in product development in the sense that it could better control sample driveways as is done weekly at the factory. It could control, for example, what materials have been run earlier and whether similar products have been before.

3.3 Risks

There are many risks in production and those are managed by day-to-day work and professional staff. But there are always risks that cannot be controlled and human errors. When using old machines, there are also machine defects and errors that cannot be predicted. With this management tool, you can avoid daily errors / risks of what is happening in production, such as plastic quantities or cutting errors etc.

4 QUALITY ASSURANCE

The quality of goods and services produced has been monitored, either directly or indirectly for a long time in the past. Furthermore, there is a framework of the following eight attributes that may be used to define quality: performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. (Amitava 1998, 2-5.)

In the target company, quality is the most important thing. If the quality is defective then it means that the product cannot be sent to the customer or it must be reported to the customer. However, they are very sensitive food products that the customers manufacture, so there are certain standards in quality that must be followed.

Judgmental perspective definition of quality, often used by consumers, is that it is synonymous with superiority or excellence. Quality is both absolute and universally recognizable, a mark of uncompromising standards and high achievement. As such, it cannot be defined precisely – you just know it when you see it. It is often loosely related to comparison of features and characteristics of products and promulgated by marketing efforts aimed at developing quality as an image variable in the minds of consumers. (Evans 2008, 13.)

Product-based perspective definition of quality, is that it is a function of a specific, measurable variable and that differences in quality reflect differences in quantity of some product attribute, such as in the number of stitches per inch on a shirt or in the number of cylinders in an engine. This assessment implies that higher levels or amounts of product characteristics are equivalent to higher quality. (Evans 2008, 13.)

User-based perspective definition of quality, is based on the presumption that quality is determined by what customer wants. Individuals have different wants and needs and, hence, different quality standards, which leads to a user-based definition: Quality is defined as fitness for intended use, or how well the product performs its intended function. (Evans 2008, 13.)

4.1 Quality management

An organization that believes that the traditional quality control techniques and the way they have always been used will resolve their quality problems may be misguided. Traditionally quality has been regarded as the responsibility of a quality department, and still it has not yet been recognized in some organizations that many quality problems originate in the commercial, engineering, service or administrative areas. (Oakland 2014, 31.)

Quality management is far more than shifting the responsibility of detection of problems from the customer to the producer. It requires a comprehensive approach that must first be recognized and then implemented if the rewards are to be realized as shown in Figure 5. (Oakland 2014, 31.)

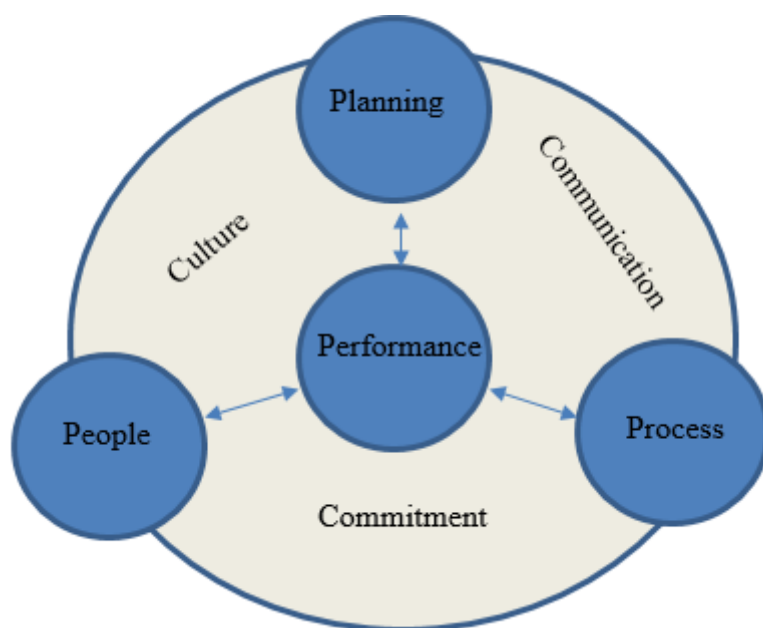


Figure 5. The framework for total quality management. (Oakland 2014, 28.)

Quality management is one of the key issues at the target company. The target factory has a quality manager, a quality engineer and a laboratory superior and they all have main responsibility of the quality. The quality manager is in charge of quality management and the quality engineer helps with that task. Laboratory superior oversees laboratory and its employees.

4.2 Quality control

Quality control may generally be defined as a system that is used to maintain a desired level of quality in a product or service. This task maybe achieved through different measures such as planning, design, use of proper equipment and procedures, inspection, and taking corrective action in case a deviation is observed between the product, service, or process output and a specified standard. (Amitava 1998, 9.)

In the target company, the main responsibility for quality control is on the production employees and the laboratory employees. The production employees monitor the quality in process and the laboratory employees check the product quality after the production. After that if there are any problems detected the supervisors send or take of the products which are defective.

Collecting attribute data is usually easier than collecting variable data because the assessment can usually be done more quickly by a simple inspection or count, whereas variable data requires the use of some type of a measuring instrument. (Evans 2008, 698.)

This monitoring tool will also help the employees in the production because they can also seek if there have been problems before on this same product. The laboratory employees can also use this monitoring tool in the daily work.

4.3 Actions

Organizations create value by delivering their products and/or services to customers. Everything they do in that whole chain of events is a process. So, to perform well in the eyes of the customers and the stakeholders, all organizations need very good process management – underperformance is primarily caused by poor processes and/or their interaction with people and technology. (Oakland 2014, 199.)

Basic control mechanism, which is carried out by every member of the workforce. The first person who detects a problem is empowered to break away from routine duties, investigate and correct the problem immediately, document the incident, and then return to their routine. (Evans 2008, 352.)

The target company needs this monitoring tool on daily work because it helps solving problems quickly and the error is detected earlier. Quality control will help to respond better with this tool. Actions can be done faster when the error is detected earlier than before using this supply chain overview tool (however, the target company's customers are the most important).

The three basic functions of quality circles and problem-solving teams are identifying, analyzing, and solving quality and productivity problems as shown in Figure 6. (Evans 2008, 270.) In the target company, the main responsibility lies with the quality manager and the production manager. the following Figure 6 describes the solution to the problem.

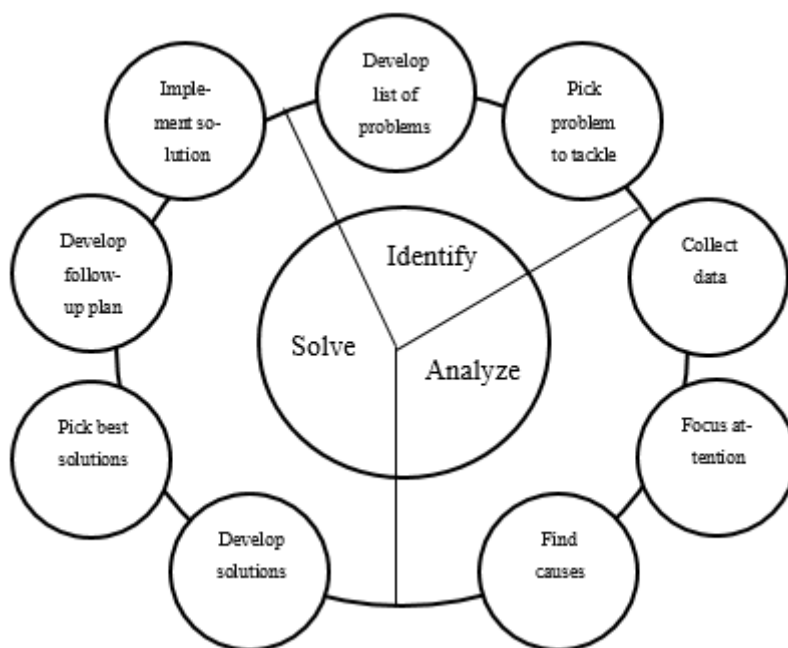


Figure 6. Problem-solving functions of teams. (Evans 2008, 271.)

5 EMPIRICAL SECTION

In this chapter the discussed theories are applied into practice by using the selected research methods. The primary purpose of this chapter is to tell how this research was applied in practice and the ways how the data was collected to complete the research. The latter part of this chapter is focused on the interviews which were made in the target company. More detailed information regarding the outcome of this research will be found later in this chapter when the data gathered is analyzed. After analyzing the data from interviews, the reliability as well as the validity of the research will be discussed.

5.1 Qualitative research method

In this thesis, qualitative research method will be utilized by conducting interviews in the target company. The qualitative research method is a broad methodological approach that encompasses many research methods. Qualitative research methods examine the why and how of decision making, not just what, where, when, or "who", and have a strong basis in the field of sociology to understand government and social programs. Qualitative research method is popular among political science, social work, and special education and education researchers (The rise and relevance of qualitative research 2018). That is why qualitative research method will be used.

Qualitative research is conducted through individual interviews through the target company. There are five people interviewed and the same questions are asked from all of them. All people who are interviewed are working in different assignments. Work assignments include production planner, material production team leader, group supply chain manager, the person responsible for the development of supply chain and foreman (production superior). They have been chosen because they all work in different positions at different levels of the organization.

5.2 Interview questions

The interview questions are based on the theoretical framework. They seek answers to the main problems that the supply chain overview could help with in the future. Each research question leads to the research problems and attempts to solve the problem.

The interview questions will be divided as background information, supply chain management, process monitoring at the factory, quality assurance and supply chain overview as shown in Appendix 2.

Each interview is written clean, then it is analyzed using the theoretical framework and answers to the research questions. Then the questions are summarized and conclusions are drawn from them. The answers also show the validity and reliability of the research.

5.3 Validity and reliability of the research

Validity refers to the credibility or believability of the research. Are the findings genuine? Is hand strength a valid measure of intelligence? Almost certainly the answer is "No, it is not." (Reliability and Validity 2018.)

Reliability refers to the repeatability of findings. If the study were to be done a second time, would it yield the same results? If so, the data are reliable. If more than one person is observing behavior or some event, all observers should agree on what is being recorded in order to claim that the data are reliable. Reliability also applies to individual measures. (Reliability and Validity 2018.)

In this research will be manifested through qualitative research as well as validity and reliability. The validity is evident from the fact that the interviewees are all at a significant workstation, so the results are credible. Reliability is emerging that interviews should be the same results if the study would re-run because likely the same problems would arise.

6 RESEARCH RESULTS

In this chapter, the answers from these interviews are explained. The interviewees are anonymous, but those interviewed operate in the target company in various job assignments.

6.1 Analyzing the interview questions

The interviews were conducted as theme interviews for people in different jobs in the target company. The job positions were group supply chain manager, production planner, material production team leader, the person responsible for development on the supply chain and a foreman (production superior).

The interview questions were divided into groups based on the theoretical framework. They were supply chain management, process monitoring at the factory and quality assurance. Everyone was asked the same questions. The questions could have been more precise, because the answers were a little extensive.

The interviews made it possible to find many problems in the target company, but also many positive things. The next chapter will open up the results of the interviews.

6.2 The results of the interviews

This chapter examines the questions and the answers to them. The following chapter summarizes these.

6.2.1 Background information of the interviewees

- Job title
 - a. Group supply chain manager
 - b. Material production team leader
 - c. Production planner
 - d. The person responsible for development on the supply chain
 - e. Foreman (production superior)
- Job description

- a. Coordinating supply chain issues for the target company mills
 - b. Production manager, information retrieval and forecasting and inventory levels
 - c. Scheduling of the production machines, updating the driving program and tracking the stock of paper
 - d. All issues related to the supply chain
 - e. Responsible for two production machines and their staff, solving problems, recycling of defective products
- How long have you been at the company?
 - a. 6 years
 - b. 2 years
 - c. 21 years
 - d. 25 years
 - e. 21 years
 - Earlier assignments on the company?
 - a. Production planner and supply chain manager
 - b. Invoice handler and sales coordinator
 - c. Cutting machine attendant and production machine operator
 - d. Sales, production planner, production planning manager, customer service manager, logistics and project manager
 - e. Cutting machine attendant, production machine operator and shift Foreman

6.2.2 Supply chain management results

- What are the strengths of the company's supply chain?
 - a. The distance to the customers, the requirements are high in the north and we can respond to it.
 - b. Cooperation with suppliers, responsiveness and developing good concepts for customers
 - c. Professionalism and team spirit
 - d. Well-defined processes, good responsibilities and competent staff
 - e. Serve the customer well and be flexible, try to see their point of view and try to meet the customer's wishes

- What improvements would you like to see in the supply chain?
 - a. Customer-oriented concept, as bulk goods are currently being manufactured more and of course in improving service quality and focusing more on customer needs
 - b. The information flow between the departments, the flexibility of the areas involved and the ability to adapt
 - c. There is currently nothing
 - d. Realistic transparency and material management at the group level should be developed
 - e. Designing more quality considerations, more accurate tracking of successive runs, lack of raw paper and small stock so paper management should be better
- What kind of development measures have been in the supply chain?
 - a. A lot of projects, customer service improvement project, customer service standardization and truck terminal system (Raptor)
 - b. Customer service improvement project and a lot of projects
 - c. Truck terminal system (Raptor)
 - d. Customer service standardization, truck terminal system (Raptor) and a lot of different projects
 - e. Truck terminal system (Raptor)
- How do you see the current supply chain management?
 - a. Strong organization, management is difficult because it is difficult to track what's going on elsewhere
 - b. Fragmented (information flow and task division), clearer roles and better people involved and organizational structure inadequate
 - c. New supervisor on production planning, knowledge level is not currently sufficient, orientation needs to get better and there is no fill-in employees in the design
 - d. Staff changed a lot in the near future, no one has a long background in the supply chain and no good tool for anyone to see the situation and this supply chain overview would help in this situation
 - e. Communication works and can handle troublesome situations
- What are the strengths and weaknesses of day-to-day leadership?

- a. Strength is a reaction time, the management team should have more meetings at the factory level, the weakness is that it goes too pragmatic, specifies what the discussions are going through (more precisely) and the small things are ignored
- b. Strength all physically on site, supply chain meeting has been good and POKO application is good when its properly done
- c. Production meeting is good, Supply Chain's meeting does not give any to the production planning, it should be developed for production planning and production planning should go more often in the production of a meeting
- d. A lot of good, for example, a production efficiency perspective, old ways to control, too much guidance, go according to old formulas (routines) and tools should support so that working would be more effective
- e. Strength: know the working methods and people who work in different tasks, weaknesses that time is not enough for day-to-day management and lack of time is a very big challenge

6.2.3 Process monitoring at the factory results

- How does the current production process work?
 - a. Efficient production process, efficient, shorter delivery times and more out of the machines than before
 - b. Lately improved, the things of the previous day are always going through immediately on the next day and following the driving pace differently than before
 - c. Working and getting better all the time, the machines are old, surprises always come and when overload comes one stop is too much
 - d. It works as planned
 - e. It gets better all the time, back what it was a few years ago, runs longer periods of the same stuff and is run with better quality
- How is the company currently managing the production process control?
 - a. Indicators (OEE, quality monitoring), direct control has decreased and indicators increased and daily management plays a big role

- b. Production planning and machine employees with great responsibility and especially when testing orders
 - c. the machine employer is responsible for the product, the most important person in quality and the production planning responsibility is that the driving program goes as planned
 - d. Production machines are measured, production planning sees realized driving and this is a very difficult way
 - e. Production planning is the main responsibility, planning the program and reacting to it and in case of a mistake POKO will be made
- How does the supply chain work when an error is detected in production?
 - a. With POKO responding, production workers help and ensure that defective goods are not delivered to the customer
 - b. POKO will be opened, after which it will be handled in a morning meeting, after which the information will be to persons who need it, then treated it
 - c. POKO will be opened, after which it will be handled in a morning meeting, after which the information will be to persons who need it, then treated it
 - d. The error should be resolved quickly and efficiently
 - e. POKO will be opened, after which it will be handled in a morning meeting, after which the information will be to persons who need it, then treated it
 - How does production work when an error is detected during the process?
 - a. Production estimate of quality adequacy
 - b. I do not know very well except that production workers are doing POKO
 - c. If driving on so will be corrected while driving. If it is bad, then the interruption and the machine employer can react if necessary
 - d. According to working methods
 - e. If driving on so will be corrected while driving. If it is bad, then the interruption and the machine employer can react if necessary if the driving program is not sensible. If bad quality is born then production will make POKO and it will be taken care of in the morning meal,
 - What are the risks between supply chain and production?
 - a. Communication, does the production understand what supply chain means and vice versa, item errors, data gaps and errors

- b. production employees are more interested in efficiency, while supply chains focus more on customer needs, cannot always think about how much stuff gets out and it also has a risk if the production employees deviate from the planning. Production planning must be respected
- c. Operator messages are important for viewing and communicating
- d. The production and supply chain interface is very narrow (only production planning) and production requires good instructions
- e. Communication, if machine failures are not reported to the supply chain

6.2.4 Quality assurance results

- By what means is the quality currently being controlled?
 - a. Certain features (grams of weight etc) are measured by the machine, the quality department performs random checks, for which the item is frequency testing, at certain intervals the products must also be measured more accurately and the input material is not checked (only by visually)
 - b. Under strict supervision, after-treatment is very accurate, corrective measures are taken to ensure that no errors will occur in the future, preventing machine repairs before a particular product runs and test runs are closely monitored by a technical person
 - c. lab, properly designed, main responsibility with machine employees, production planning is responsibility for product information correctly (cutting tips, raw materials etc)
 - d. Visual, standardized quality etc.
 - e. The main responsibility lies with the machine employees, they test every finished roller, meters are tested etc, sampling of each product and more accurate runs are tested in the lab immediately
- How to react when there are deviations in quality?
 - a. The answer was raised in the previous question
 - b. Through POKO, after which the decision is made whether to send or resend to the customer and according to the customer's requirements mistakes are held with the quality engineer and sales
 - c. If it is detected, it will be stopped
 - d. The answer was raised in the previous question

- e. If quality deviations have already arisen, it is studied during the day and examining the customer's needs and whether or not the decision is made
- What measures are taken when the quality level is not on sufficient level?
 - a. Trying to fix the bug and get back to standards
 - b. According to the customer's requirements mistakes are held with the quality engineer and sales
 - c. Investigating where there is a fault and making changes to remedy the situation
 - d. Correcting the situation
 - e. The answer was raised in the previous question

6.2.5 Supply chain overview results

- What would The benefit on The supply chain overview be?
 - a. Very big in his day-to-day management, get information right away, how the inventory developed, etc. and work would be easier
 - b. Reduces the risk that the customer gets the bad stuff, facilitate the production planning level (history), save time in customer service and search for data in one place
 - c. A unified package
 - d. Extremely useful. What is currently being treated is very short-sighted, week-level or day-level. This is the key to everything and reduce the manual work. Transparency (everyone knows what the situation is), can handle any problems in good time without having to tell the customer. If the problem is detected 2 weeks earlier, it will be reacted in time and anticipation would be a big change
 - e. To clarify the claims and if wants to know before the ride whether a corresponding driven
- What would be the most important features of a new tracking tool (supply chain overview)?
 - a. As easy to use as possible and a more accurate monitoring of the year's capacity

- b. The why to retrieve information (customer name, product name, quality, material, etc.)
 - c. Review product history and link to POKO's old products
 - d. It would be for everyone when it is so easy, then for different qualities, eg production planning transparency and there must be all critical check-points in the process that are alarming
 - e. Would be able to search for information as a customer name
- What disadvantage effects could come from a new tracking tool?
 - a. Nothing as long as the program is searching for the correct information
 - b. One program more, the introduction of new people to all tools and we see that again we need to learn more programs
 - c. Nothing
 - d. It may instantly appear to increase the workload and "encryption" is no longer available
 - e. Nothing
- Would a new tracking tool make your daily work easier?
 - a. Yes. time saving and the information would be wider.
 - b. Yes. save time in search and replace some programs
 - c. Yes. surely it would be easier. Especially in the case if your fill-in another production planner
 - d. Yes
 - e. I hope so. Seek better to focus on your own work

6.3 A summary of all responses

This chapter contains a summary of the interviewees answers. The answers have been combined to provide a common line of results as shown in Figure 7 and Figure 8.

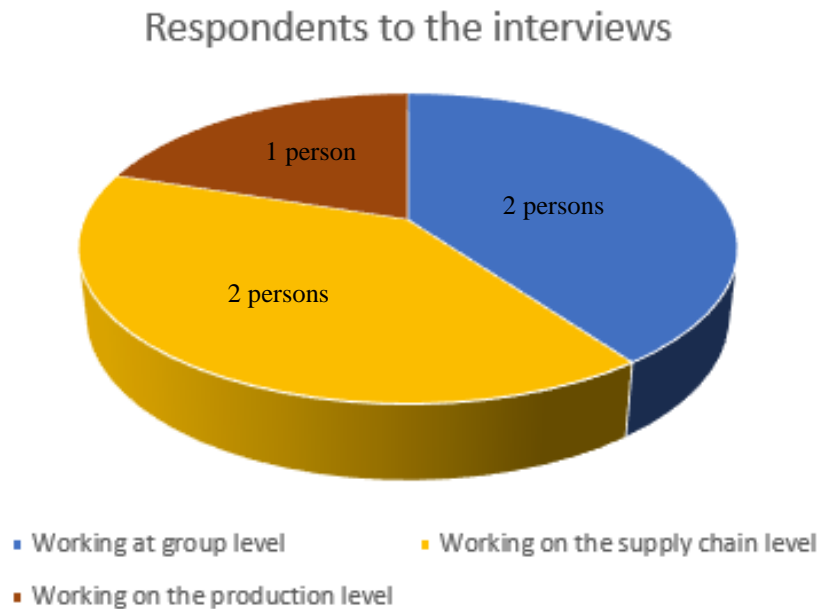


Figure 7. Interviewed work area presented with a pie chart.

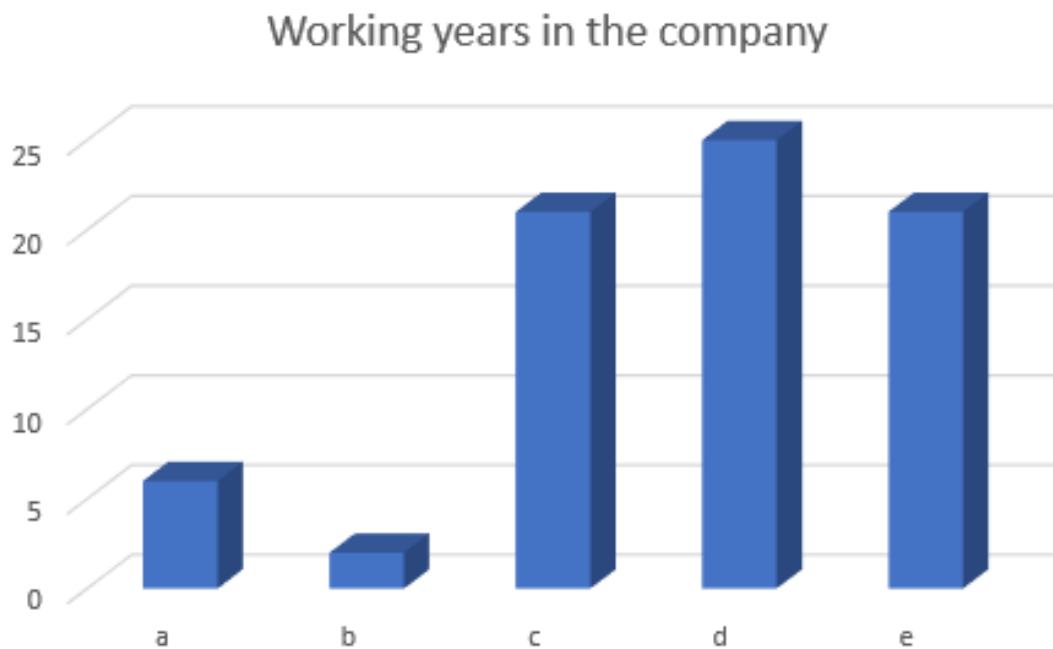


Figure 8. Interviewed working years in the target company.

6.3.1 Summary of supply chain management

The company's strengths in supply chain management are considered professionalism, product quality, customer service and well-defined processes. However, there are improvements ideas for the supply chain management. Improvements could be more a customer-oriented concept, service quality, information flow between the departments and realistic transparency. The current supply chain management is somewhat confusing and scattered. Information flow and task division could be clearer, employees changed a lot in the near past future and maybe that is why communication should work better. The strengths and weaknesses of day-to-day management were divided as follows:

- + Reaction time
- + All physically on site
- + Supply chain meeting
- + Production meeting
- + Production efficiency
- + Working methods
- Management team meeting
- Supply chain meeting does not give anything to the production planning
- Old ways to control
- Control tools should be more effective
- Lack of time

6.3.2 Summary of process monitoring at the factory

The current production process is getting better all the time. The target company has shorter delivery times than before, production machines produce more finished goods than before and the problem matters are going through faster than before. However, the machines are old and there are always surprises. Is not always know what is wrong and it takes time to find out the problem.

The target company has many indicators (OEE, quality monitoring, etc.) which control the production process. Currently managing the production process depends a lot on the production planners and production employees. The machine employees are responsible for the product and production planners' responsibility is that the driving program works as planned.

Supply chain employees act on errors by using a POKO application. It helps in solving mistakes that there have in the production process. POKO will be opened by production employees and production supervisors handle it in a morning meeting on the next day. Sales coordinators together with production supervisors decide whether the product is adequate for the customer.

The biggest risks between supply chain and production are communication, item errors, data gaps and if machine failures are not reported to the supply chain. The production and supply chain interface is very narrow meaning that only production planning is there between them. Production requires good instructions for every product so that the product features are right. On this responsible belongs to production planning and item creators. One of the risks are that production employees are more interested in efficiency, while supply chain focuses more on customer's needs. The product may be damaged if the speed of machine is too high. The strengths and weaknesses of process monitoring at the factory:

- + A functioning production process
- + Indicators (OEE, quality monitoring, etc.)
- + POKO application
- + Teamwork
- + Production machines produce more finished goods than before
- + The problem matters are going through faster than before
- Big responsibility for machine personnel
- Communication
- Item errors
- Data gaps
- If machine failures are not reported to the supply chain
- The production and supply chain interface is very narrow
- Better instructions.

6.3.3 Summary of quality assurance

Quality control is under strict supervision. Certain features (grams of weight etc) are measured by the machine employees. The quality lab performs random checks, such as frequency testing. Certain products must also be measured more accurately. The biggest

problem with quality may be that the raw material that is received at the factory is left untested. In quality, it is also important that production planning is properly designed. The main responsibility for quality is machine employees. If there are deviations on the quality POKO report are made by the production employees. The strengths and weaknesses of quality assurance:

- + Strict supervision
- + Lab performs random checks
- + POKO application
- + Quality standards are high
- Raw material that is received at the factory is left untested
- Responsiveness
- The main responsibility for quality is machine employees.

If the quality level is not on a sufficient level, immediate investigations are started. The quality manager holds the meeting with the laboratory, the quality engineer and the production manager. The problem is corrected in order to get back to the standards. Machine operator can also make right corrections by adjusting the formula on the process as shown in Figure 9.

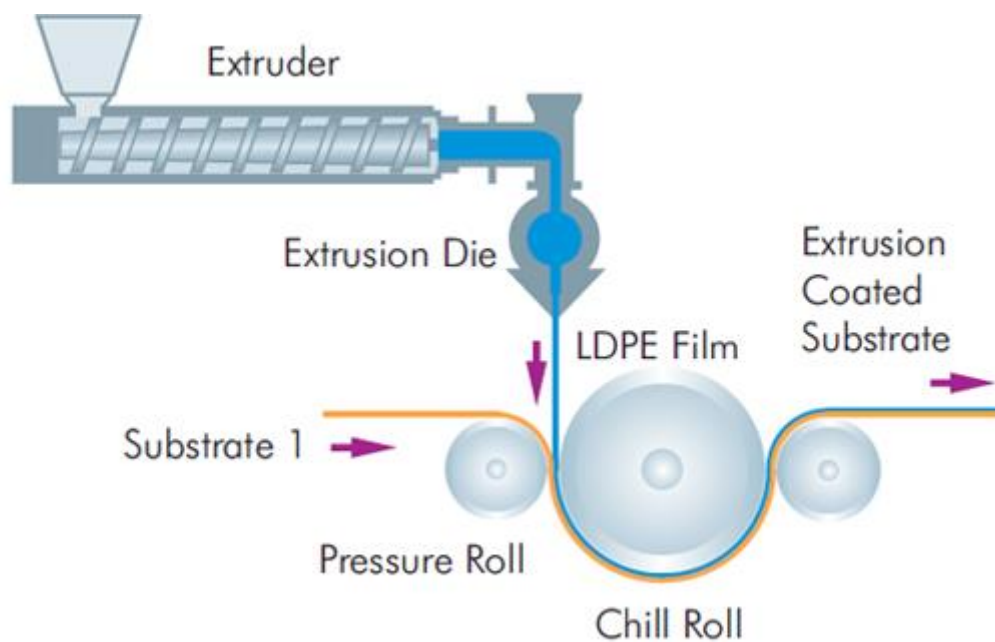


Figure 9. Extrusion lamination process. (Extrusion coating & lamination 2018.)

6.3.4 Summary of supply chain overview benefits

The supply chain overview would help on day-to-day management, information flow, inventory checking and facilitate the production planning level (history). It helps lower the risk that the customer gets damaged products and saves time in customer service. Data search would be in one place and it reduces the manual work. What is currently being treated is very short-sighted on a week-level or daily-level. This is the key to everything that working would be easier and more efficient.

Following is a list of the most important features of a new supply chain overview:

- Easy to use
- Accurate monitoring of the year's capacity
- Information search (customer name, product name, quality, material, etc.)
- Review product history
- Link to POKO's old products
- It would be for everyone
- Transparency
- Critical checkpoints
- It would be possible to look at the entire production stage of the product

Disadvantage effects that could come from supply chain overview:

- Search for wrong information
- One program more
- It may instantly appear to increase the workload
- "Encryption" is no longer available

7 CONCLUSIONS

The goal with this thesis was to answer the research questions; *How the supply chain overview helps to monitor product in process, what features it should contain, what an added value supply chain overview brings to the company and how difficult the supply chain overview would be to its users.* The study showed that supply chain overview monitoring tool would be a great step up to monitoring the production process. A supply chain overview would save time and the employees would be able to work more efficiently. So, added value would be time saving, more effective working methods and collecting data. If you would find everything in one place and monitor the manufacturing process of the product, it would be easy for the users to use the program. However, this can only be seen when the supply chain overview is in use.

In the interviews, it became clear what features this supply chain overview should contain. Searching for information was one of the most important features it should contain. For example, if you want to search with the customer's name, product name, quality of the material, etc. it would be able to locate information much quicker than before. Finding the product history by searching the product name or customer name could help in daily work. To see how the product was run earlier and whether it had any problems (link to old products POKO's). Can monitor the whole production process and if there appear any problems critical checkpoints would alarm. Of course, also management level accurate monitoring of the year's capacity.

In my opinion, this supply chain overview would help everybody who work in the target company. It would facilitate working methods and speed up in problem solving situations. It would be a perfect tool for situations where you need to look for data quickly. Today, when all is managed by different systems, customer's requirements are at a higher level, and precisely this supply chain overview would be a complete management tool for it. In a summary, I would recommend creating this supply chain overview for the company as it would solve a lot of problems that the target company currently has.

This research topic was very interesting. It was interesting to charm out this study as I have been in many different position at the company and still, new things became apparent. The research was challenging in that sense that there was no previous material on the control tool for the theoretical section.

7.1 Reliability and validity of the research

The interviewees are professionals in their own work and they know well the problem areas in the company. What comes to the reliability of this thesis, I believe that it is quite reliable. This thesis was made to investigate whether such management tool is valuable and whether it can help in day-to-day work. This answer achieved through individual interviews. Validity is good when the research target group and questions are correctly framed and I think this was the case. In my opinion, the research reached its goals.

7.2 Future research suggestions

In the future when this management tool has been implemented in practice it can be extended to all factories. A further study could have made on how it works on a group level (usability, reliability, etc).

Future research topics could be:

- Supply chain overview in production
- Supply chain overview in group level
- Supply chain overviews usability at the whole organization level.

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APPENDIX 1

1. Taustatiedot

1.1 Työnimike

1.2 Työnkuvaus

1.3 Kuinka kauan olet ollut kyseisessä yrityksessä töissä?

1.4 Aikaisemmat työtehtävät kyseisessä yrityksessä?

2. Mitkä ovat yrityksen vahvuudet toimitusketjussa (supply chain)?

2.1 Mitä parannuksia haluaisit nähdä toimitusketjussa?

2.2 Minkälaisia kehitys toimenpiteitä on ollut toimitusketjussa?

2.3 Minkälaisena näet nykyisen toimitusketjun hallinnan?

2.4 Mitkä ovat päivittäisen johtamisen vahvuudet ja heikkoudet?

3. Millaisena näet nykyisen tuotantoprosessin toimivuuden?

3.1 Miten yrityksessä hallitaan tällä hetkellä tuotantoprosessin valvontaa?

3.2 Miten toimitusketjussa toimitaan, kun havaitaan virhe tuotannossa?

3.3 Miten tuotannossa toimitaan, kun havaitaan virhe prosessin aikana?

3.4 Mitä riskejä on toimitusketjun ja tuotannon välillä?

4. Millä keinoin tällä hetkellä valvotaan laatua?

4.1 Miten ja millä tavalla reagoidaan, kun laadussa on poikkeamia?

4.2 Mitä toimenpiteitä tehdään, kun laaduntaso ei ole riittävällä tasolla?

5. Mitä hyötyä olisi tarkemmasta seuranta työkalusta (supply chain overview)?

5.1 Mitkä olisivat tärkeimmät ominaisuudet uudelle seuranta työkalulle?

5.2 Mitä haitta vaikutuksia saattaisi tulla uudesta seuranta työkalusta?

5.3 Helpottaisiko uusi seuranta työkalu sinun päivittäistä työskentelyä?

5.3.1 Jos niin miten?

Kiitos haastattelusta.

APPENDIX 2

1. Background information

1.1 Job title

1.2 Job description

1.3 How long have you been on the company?

1.4 Earlier assignments on the company?

2. SUPPLY CHAIN MANAGEMENT

2.1 What are the strengths of the company's supply chain?

2.2 What improvements would you like to see in the supply chain?

2.3 What kind of development measures have been in the supply chain?

2.4 How do you see the current supply chain management?

2.5 What are the strengths and weaknesses of day-to-day leadership?

3. PROCESS MONITORING AT THE FACTORY

3.1 How does the current production process work?

3.2 How is the company currently managing the production process control?

3.3 How the supply chain works when an error is detected in production?

3.4 How production works when an error is detected during the process?

3.5 What are the risks between supply chain and production?

4. QUALITY ASSURANCE

4.1 By what means is the quality currently being controlled?

4.2 How to react when there are deviations in quality?

4.3 What measures are being taken when the quality level is not at a sufficient level?

5. SUPPLY CHAIN OVERVIEW

5.1 What benefit would be on the supply chain overview?

5.2 What would be the most important features of a new tracking tool (supply chain overview)?

5.3 What disadvantage effects could come from a new tracking tool?

5.4 Would it make a new tracking tool easier for your daily work?