Quality Control: Analysing Damage Reports and Customer Complaints

Case: Company X

Lahti University of Applied Sciences Ltd
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TIAINEN, EMMI JULIA: Quality Control: Analysing Damage
                              Reports and Customer Complaints
                              Case: Company X

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ABSTRACT

Managing quality has always been a crucial factor in a company's success. However, now with technology developing so fast, customers are becoming more demanding, competition is becoming more intense, and businesses need to achieve quality in other levels. They need to focus on continual improvement of products, service, processes, and people to prevent problems before they occur and to provide the best quality for their customers. Quality is the key factor to achieving competitive advantage in the market. That means meeting customers' requirements and satisfying customers' needs.

The thesis studies the importance of quality management and quality improvements in service industries, especially in logistics, while performing a quality control for the case company X. The final goal is to find out the quality level of the case company's service performance in transportation and to see if it is necessary to implement a further quality improvement program.

The thesis research approach is deductive and quantitative methods are used. The data collected and analysed in the study is secondary data. In the theoretical part, the researcher collected the data from literature, articles and web pages to study quality, quality management and quality improvements. For the empirical part, secondary data was provided for the researcher from the case company's data base. The data analyzed in this thesis, is the case company's customer complaints and damage reports.

The results provided from the data analyses and studies made in the theoretical part were gathered together, and presented by using Six Sigma and the PDCA cycle methods. The findings show that the quality control results came out positive and the case company is in their target level. There is no necessity for immediate actions such as quality improvement programs. With this valuable information that the study results provide, the case company can use for further research, create possible improvement plans or repeat the control by using this research as a base for a new one.

Key words: customer complaint, damage report, logistics, quality, quality control, quality improvement, quality management, service

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TIIVISTELMÄ

Laadun johtaminen on aina ollut tärkeä osa yrityksen menestystä, mutta nopeasti kehittyvä teknologia, vaativammat asiakkaat sekä intensiivisempi kilpailu, painostavat yrityksiä parantamaan laadun tasoa. Yrityksissä pitää keskittyä parantamaan jatkuvasti tuotteita, palveluita, prosesseja sekä ihmisiä, jotta voidaan ehkäistä ongelmia ja tarjota parasta laatua asiakkaille. Laatu on avaintekijä kilpailuedun saavuttamiseen markkinoilla, joka tarkoittaa asiakkaiden vaatimuksien täyttämistä ja tarpeiden tyydyttämistä.

Tämä opinnäytetyö tutkii laatujohtamisen ja laadun parantamisen tärkeyttä palvelualalla erityisesti logistiikassa. Tämän ohella suoritetaan laatukontrolli case yritykselle. Lopullinen tavoite on selvittää yrityksen kuljetusjärjestelmän toiminnan laatutaso ja onko tarvetta edistää suunnitelmaa laadun parantamiseksi.

Tämä opinnäytetyö on deduktiivinen ja käytetty tutkimusmenetelmä on kvantitatiivinen. Kerätty ja analysoitu tieto on sekundääristä tietoa, jota teoreettisessa osuudessa tutkija keräsi kirjallisuudesta, artikkeleista ja internet sivustoilta tutkiakseen laatua, laatujohtamista sekä laadun parannusta. Empiirisessä osuudessa tutkija sai sekundäärisen tiedon case yrityksen tietokannasta. Analysoitu tieto tässä opinnäytetyössä on case yrityksen asiakasreklamaatiot ja vaurioilmoitukset.

Tiedon analysoinnista saadut tulokset ja tehdyt havainnot teoreettisessa tutkimuksessa ovat esitelty Six Sigma ja PDCA menetelmää käyttäen. Laatukontrollista saadut tulokset ovat positiivia suhteessa case yrityksen asettamiin tavoitteisiin, joten välittömiin toimenpiteisiin kuten laadun parantamiseen ei ole tarvetta. Tutkimuksen tuloksista saatu tieto on tarpeellista, jota case yritys voi käyttää myöhempiin tutkimuksiin sekä mahdollisiin parannussuunnitelmien ja kontrollien laatimiseen.

Asiasanat: Asiakasreklamaatio, laatu, laatujohtaminen, laatukontrolli, laadun parantaminen, logistiikka, palvelu, vaurioilmoitus

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1 INTRODUCTION

This chapter introduces the background of the thesis. It provides the general idea of this research and its objectives. Used research method and chosen data collection method are explained and theoretical frameworks and limitations presented.

1.1 Background

Logistics represents all the activities that ensure the availability and the right quantity of the products to the right customers at the right time. These activities happen between production and consumption. The main factors in logistics are customer service, transportation, inventory management and order processing. All these factors are very important factors that reflect directly to customer satisfaction and a company's outcome.

- *Customer service* is based on managing the flow of goods and service to the end customers. The best way to build a good customer service where the company meets with the customer's needs can be achieved with the seven rights (7Rs); right product, customer, place, condition, quantity, time and cost.
- *Transportation* is needed to move the product between different stages of the process to suppliers, distributors, retailers and end customers.
- *Inventory management* is about the capability to respond to demand with right inventory levels.
- *Order processing* includes all the activities in the order cycle such as collecting, checking and transmitting order information. (Lai and Cheng 2009, 4.)

As a result of globalization logistics has become a crucial part of companies' business activities. Nowadays logistics skills of a company can define their position in the market. Consumers need their products fast and companies have to be alert and ensure the availability. They have to come with a good logistics and transportation system so they can deliver their

products fast, on time, in a good condition and cost efficiently to the end-customers. Therefore, the key to competitive advantage in the market is responding to end-customers better than competition. (Harrison & Van Hoek 2011, xv.)

It is important for companies that provide logistics services to continuously develop their services, searching new and better ways to serve their customers, invest in the newest technology, understand customer needs and meet with customer expectations. These factors are very significant for logistics companies to gain customer value and satisfaction. If these companies do not pay real attention to these factors easily other companies in that market take their place as they are more concentrated on customer needs. A company's reputation and competitive advantage is based on quality, reliability, delivery and price. The most important of these competitive factors is quality, that is, meeting customer requirements. Communication between customers and suppliers is the key to total quality performance. (Oakland 2014, 12.)

All activities that a company does to provide better service for their customers is part of a company's quality management and as a result, the company gains competitive advantage on the market, in other words, customer loyalty (Hülsmann & Scholz-Reiter & Windt 2011, 17). Quality management should be integrated into the strategy of an organization because its activities lead to achieving the company's mission and objectives (Oakland 2014, 14). Quality management includes quality control and assurance, and with these functions companies develop their services and ensures the quality with many different activities, programs and tools that this research will examine more closely in the theoretical part.

One of the biggest international trade products are vehicles. There are countries that have giant automobile industries and export vehicles and parts all over the world such as Japan and Korea. However, countries such as Finland have a small, almost non-existent, vehicle production but the demand is very big. In 2014, production of cars only reached 45,000

passenger vehicles (Autoalan tiedotuskeskus 2015). Vehicles, both new and used, are imported to Finland to many different retailers and individuals.

1.2   Thesis Objectives and Research Questions

The purpose of the thesis is to perform a quality control for the case company by analysing their data of customer complaints and damage reports. The aim is to check the quality of the service performance based on a number of damages caused by the case company during transportation and to find any possible cases to improve. While analysing the collected data, the researcher is examining the causes of complaints and damage reports.

The final objective of the research is to create a report of the causes of customer complaints and damage reports. The results of data analyses will show if the causes are occasional or frequent. By these results, the researcher comes to a conclusion about any possible cases to be improved and suggest possible quality improvement programs.

The case company will receive valuable information regarding their service performance and see if customer complaints are exceeding their established percentage limit or remaining below it. In long term, the case company can use the information to create possible improvement plans or repeat the control to be able to decrease customer complaints and damage reports.

The goal of the research question is to answer the research problem by giving the main idea of what the research is about. In this study the research question is:

- Does Case Company X need to implement a quality improvement program?

To answer the main research question the researcher needs sub-questions to support it. The following two sub-questions are theoretical based:

- Why is quality management in the service industry important?
- Why do companies need continuous quality improvement?

The following three sub-questions are based on Case Company X data analysis:

- Are causes of customer complaints and damage reports occasional or frequent?
- Are there any causes that need further research?
- Is the level of quality in service performance good based on analyzed data?

1.3   Research Methods and Data Collection

The first step when starting a research is to decide which research approach to use. The decision is made between two approaches: deductive and inductive. Inductive reasoning relies on empirical verification so it creates a new theory based on data collected by interviews and observations. It operates from the specific to the general. In deductive reasoning a theory already exists and the rules are tested against the observations. Contrary to inductive reasoning, deductive operates from the general to the specific. However, these two approaches are not that different but more likely complementary and both are used in most research works. (Adams & Khan & Raeside 2014, 10.) The author in this research is using deductive approach because the problem is found by analysing secondary data, and to improve the process the author needs both empirical verification and existing theories.

Quantitative and qualitative research are the main research methods used to achieve the best answers to the research questions. The method is chosen by the type of the information needed that best serves the goals of

the study. Researchers can also use both of the methods if needed. (Adams et. al. 2014, 6.) Qualitative research describes reality as experienced and social relations which is different than in quantitative research where results are based on numerical data and can be shown graphically or in tabular form. Quantitative research is based on the logical-positive paradigm and utilizes experimental research methodologies. Qualitative research uses interpretive methodological approaches based on theoretical principles such as social interactionism and phenomenology. (Best & Khan 2003, 240.)

In this research the quantitative method is used. Quantitative method examines the relationship between and among variables, and answers to the research questions by surveys and experiments. When data is collected, it is controlled via statistical analysis, providing measures and observation for testing theory. (Creswell 2014,155.) In this research the results are obtained by using statistical analysis and then compared to existing theory.

When right methods are chosen for the research it is easy to determine how to collect the data. Data is defined as facts that the researcher presents from the study's environment. In other words, is information that is gathered for the research and helps achieve the researcher aims and answer the research question. After collecting data, it is edited by researcher and analysed by meaning reducing the data collected and developing summaries. (Blumberg & Cooper & Schindler 2008, 75.) The researcher can use primary data such as interviews, observation and surveys that are collected by researchers themselves or secondary data that is collected by someone else and are available from books, articles and web (Adams et. al. 2014, 92, 104).

In this research the author chose to use secondary data that the case company provided for the researcher. The secondary data is collected from documents, tables and files that the case company provided for the researcher. The main data that the researcher used was excel files that the case company gave directly to the researcher from their software

system. This secondary data source creates a solid data base to achieve valid results.

1.4   Scope and Demarcations

This study concentrates on the case company's data analysis, behaviour and information gathered inside the company so it is very individual and can't be compared to similar situation with different companies. Also the study concentrates on logistics industry so it might not be applicable for every industry. The knowledge of the author is limited because it is based on her basic studies of international business, her interest on the topic and information gathered during the study.

This version of the thesis is limited. The Case Company X Chapter is deleted completely and the empirical research part, Chapter 3, contains only basic information about the topic and the data analysis sub-chapters are deleted. There is also information deleted from the introduction and conclusion chapters.

1.5   Theoretical Framework

The aim of this study is to perform a quality control of the case company's service performance by analysing the data of customer complaints and damage reports. This research is the first step for the case company's quality improvement process where the data is analysed and depending on results of this study the company can take the research further.

With this study the case company will find possible cases to improve and stay updated on the level of the service performance. Models that the researcher has explained in theoretical part, and implements them after with the empirical research results, are Six Sigma and PDCA cycle.

Six Sigma's basic idea is to reduce dispersion of processes in a company and create value by defining, measuring, analysing, improving and controlling (Laamanen & Tinnilä 2009, 26). The DMAIC, Define-Measure-

Analyse-Improve-Control, framework is appropriate for problem solving and it is used as quality improvement project to achieve major quality improvements. The PDCA cycle is used for problem identification and solution. The aim with this process is to identify the root cause and develop countermeasures by summarizing hypothesis, experiment and evaluation. (Kerber & Dreckshage 2011,168.)

These two quality improvement methods support the researcher in this study to direct the process to the right direction and help to achieve the results needed by analysing the data and finding causes for possible problems.

1.6   Thesis Structure

This thesis is divided into two main parts: the theoretical and empirical part. First the author presents the theoretical base and then supports it with empirical part. The following figure, Figure 1 on page 9, demonstrates the structure of the thesis.

The thesis is started with an introduction that gives an overall idea of the research and objectives, and gives the background for the study. Following chapter is the theoretical part of the study and starts with defining quality and quality of service and continues with exploring a deeper meaning of quality management. The researcher explains why quality management and continuous improvement are very important for service providing companies especially in logistics field.

Chapter 1	• Introduction
Chapter 2	• Quality management
Chapter 3	• Case Company
Chapter 4	• Quality Control Analysis
Chapter 5	• Conclusion
Chapter 6	• Summary
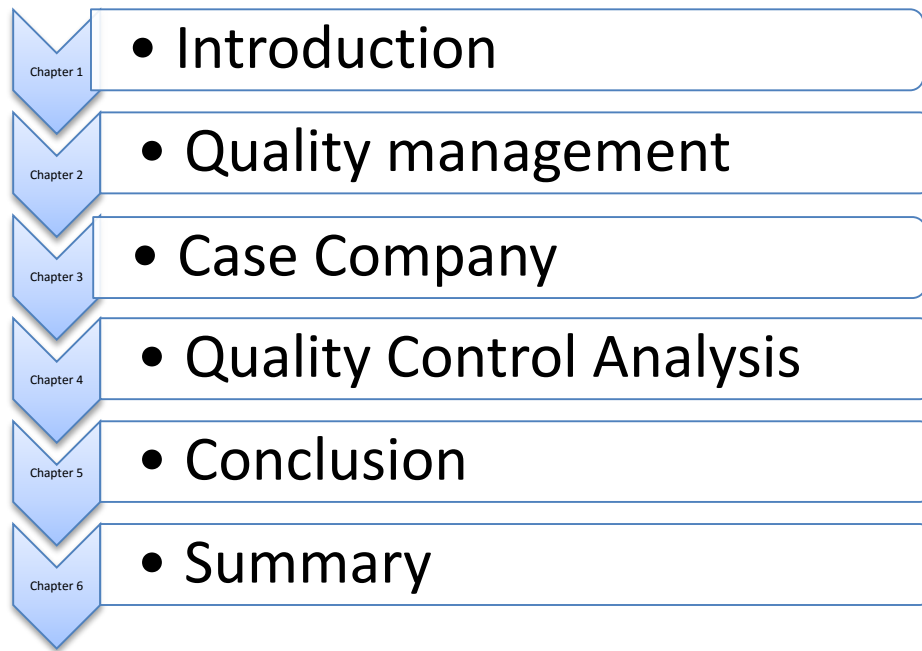
FIGURE 1. Thesis structure

After the theoretical part the author introduces the case company and then the empirical research and analysis, the Chapter 4, which is based on information gathered from the case company's data. The Chapter 5 is the conclusion part. The conclusion chapter contains results of empirical research and answers to the research question, and presents suggestions for a future research. The last chapter of this thesis, the Chapter 6, summaries the research and presents all the main points.

2   QUALITY MANAGEMENT

This section concentrates on quality management in service industries, specifically in logistics services. The researcher defines quality and quality of service, and explores importance of quality management and improvement for a company. Programs such as Six Sigma and tools that supports a company in quality improvement are presented.

2.1   Defining Quality

It is difficult to define exactly what quality is because it has several definitions, or quality dimensions and perspectives. Quality includes meeting or exceeding customer expectations meaning that a product or a service satisfies customer needs. Quality is related to products, services, people, processes and environments, and the state of quality can change all the time depending what is considered quality now and later for example tomorrow. Goetsch and Davis (2006, 5) define quality as: "Quality is a dynamic state associated with products, services, people, processes, and environments that meets or exceed expectations."

The quality dimensions are product or service based. Several authors propose different quality measures but one of the most known is Garvin (Foster 2010, 30) who gathered five most used definitions of quality, which are transcendent, product-based, user-based, manufacturing-based or value-based. *Transcendent* means that the quality is intuitively understood such as beauty or love. *Product-based* quality is found in the characters of a product. *User-based* means that the customer is satisfied to the product that has good quality. In *manufacturing-based* a product has good quality if it corresponds to design specifications. *Value-based* means that a product is providing good value for the price, so it has good quality. (Foster 2010, 30.)

The quality of products is normally related to technical specifications of a product but also companies use strategies of image to increase the quality of a product. A company adds this imaginative value for their customer by

using such as fashion and status aspects. (Grönroos 2015, 93.) In services, customer involvement is very high, so they have more quality aspects than products. For example, a consumer using a blender evaluates the product by technical and design features but does not think about the person who packed the product in the factory. However, in a restaurant the customer evaluates the service not only based on food but also how they were attended, how much time the order took place and how was the environment. For a business that delivers service as its final product, the quality of the service is more fundamental than just an added value as in manufacturing industries.

2.1.1 Quality of Service

Different perspectives of quality are created by functional differences that are fulfilled organizationally. Employees from different industries or different functions in an organization have singular priorities; engineers are interested in mathematical problem-solving skills, marketing has its attention in satisfying the customer and delivering the value to the customer and financial in the risks of investments but also the potential rewards resulting from those investments. (Foster 2010, 34.) Quality cannot be defined too narrowly because of the variety of perspective. However, in the end in businesses providing services quality walks hand in hand with customer satisfaction. The essential is that the service meet customer needs and expectations. Quality has to be defined in the same way customers do and if not, all that the business has done for building their service can turn out to be a bad investment. (Grönroos 2015, 95.)

Grönroos (2015, 96) explains that there are two basic dimensions for quality of a service perceived by customers. These two dimensions answer to the questions *what* and *how. What* is that customers receive with an interaction of a service and it is called *a technical quality of the outcome. How* customer receive the service is called *a functional quality of the process.* The Figure 2 below shows these dimensions that creates the total perceived quality.
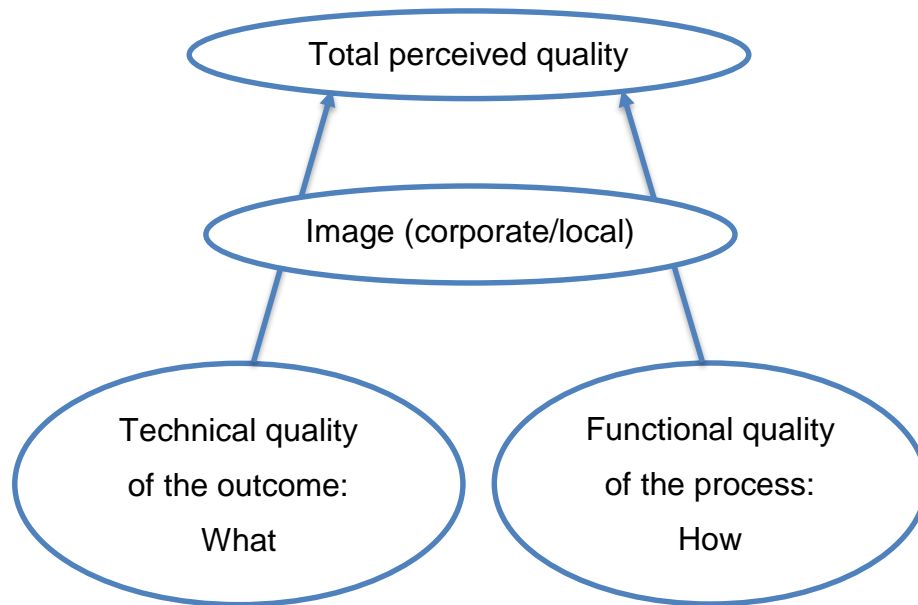
FIGURE 2. Two service quality dimensions

Technical quality of the outcome means the result that the customer finally gets after the service interaction, in other words the service production process. Many defines this as the quality of the service but it is one part of the total perceived quality. Functional quality of the process completes it with explaining how the service was provided and how the service encounters were taken care of. *Image and/or local image* affects to the total perceived quality as expectations of a service. Customers usually know who provides service they are looking for and have some image of that. For the service is important to keep up with that image because it can affect to final opinion of perceived quality. If the customer has already the image of a good service, small mistakes may be forgiven. If customer is unsure what to expect a small mistake can affect negatively to the final opinion. (Grönroos 2015, 96.)

To measure quality performance of a business there are five service quality dimensions that are most commonly used. Warkentin (2014) presents Parasuraman, Zeithamel and Berry's (PZ&B) service quality model, SERVQUAL and explains the five dimensions as presented in Table 2 below.

TABLE 1. SERVQUAL dimensions (Warkentin 2014, 74)

DIMENSION	DESCRIPTION
TANGIBLES	Appeal of facilities, equipment, personnel and communication materials
RELIABILITY	Ability to perform the promised service from the first time accurately and dependably
RESPONSIVENESS	Willingness to help customers and respond to their requests, and give prompt service
ASSURANCE	Knowledge and courtesy of employees, behaviour will give customers confidence and inspire them
EMPATHY	Understanding customers' problems and performs in their best interests and give caring and individualized attention

However, the model cannot be used to measure an entire situation without applicable adjustments such as different perspectives. These five dimensions are used to measure how customer perceive the quality of a service among comparison between customer expectations and experiences. (Grönroos 2015, 102.)

For the companies that provide services it is very important concentrate on satisfying customer expectations and their needs. The origin of a service is caused by consumer demand and its recognition. It is crucial feature for a service company to provide best service to their customer because otherwise their place will be taken by other companies that provides

activities that are more concentrated on customer expectations. As mentioned before quality is ever-changing state and therefore, companies need to be improve their services all the time. Companies have to manage properly the interactions among people, technology, inputs, processes, and systems to provide outstanding services and products for their customers (Foster 2010, 46). Throughout, managing all these features, companies need quality management not only to ensure service quality but also develop variety of processes to achieve it.

2.2   Quality Management

To achieve customer satisfaction, businesses have to improve their services all the time. Managing quality has always been a crucial factor in a company's success. However, companies were mostly focused on quality stability and finding causes of defects and fixing them by management department. Employees were passive in decision making and did not participate to develop ideas about quality improvements. This is traditional view of quality. However, now when technology is changing fast, customers has become more demanding and competition have become more intense, businesses are achieving quality in other level that focus on continual improvement of products, processes, and people to prevent problems before they occur.

Differing from traditional view of quality, employees are empowered to develop ideas and participate on decision-making. In total quality the customer defines the quality. For example, in service industry, their final product is their service that is caused by customer demand. If customers are satisfied with the service, the business gets the competitive advantage in their market and it will be successful. Therefore, nowadays when customers' awareness of service quality is high, technology and trends are changing fast, businesses have to be continually developing their service, use newest technology, improve strategies, listen their customers, predict changes and prevent defects. (Oakland 2014, 3.)

One way to categorize quality management is the *three spheres of quality.* These three spheres are quality control, quality assurance and quality management. They are shown in the Figure 3.

FIGURE 3. Three Spheres of Quality

As seen in the Figure 3 above these three spheres overlap. Different activities of quality happen within these procedures. They are not strong techniques to manage quality alone but together they support each other. (Foster 2010, 48.) Quality management controls the quality assurance and quality control functions. The Quality management strives, coordinates and execute the quality actions in an organization.

International Organization for Standardization (ISO), that establishes common worldwide standards, defines *quality control* as being: "the part of quality management focused on fulfilling quality requirements" (Barsalou 2016, 11). The control process includes the phase of analysis, relation and generalization. The analysis phase contains analysing fundamental pieces of a case, following relation that understand the relationship in this pieces and generalization phase recognize how to apply the results to the larger phenomenon of quality studies and use as a final inspection statistical process control (SPC). Quality control ensures that quality requirements are fulfilled by different activities such as developing and maintaining control charts, measuring process performance and acceptance sampling. (Fosters 2010, 48.)

Quality assurance is the "part of quality management focused on providing confidence that quality requirements will be fulfilled" (Barsalou 2016, 11). Quality assurance includes activities to guarantee the quality of product or a service and assures that quality related requirements are being met. It uses methods such as failure modes and effects analysis (FMEA), control plans and measurement system analysis (MSA). Its activities are design-related of products, services and processes for example process improvement, experimental design and reliability/durability product testing. (Fosters 2010, 48.)

Quality management bonds together the control and assurance activities. To the activities are involved managers, supervisors and employees to achieve most effective quality management. These activities can be following: planning for quality improvement, providing training and retraining or facilitating organizational communication. (Fosters 2010, 48.)

As mentioned, these three spheres must be integrated to achieve world class quality. Quality management ensures customer satisfaction, guides processes in a company to a right direction and makes sure that the product or a service that the company provides is what the customer wants and needs. Quality assurance keeps production systems working properly and quality control ensures that a product or a service fulfils standards with correct functions and without defects.

2.2.1   Quality Management in Logistics

Quality management is a long-term effort and includes hard work but it is never impossible to achieve top quality. Some companies only invest to quality improvement projects and then disappoint because the outcome was not as planned. Quality management takes time and companies cannot wait changes in short term. Quality improvement includes training programs or introducing new systems to complement and guiding quality of service to a right direction. Developing quality needs continuous improvement, continuous attention by top management and every personnel in the company has to acknowledge the importance of service

quality to achieve the best possible results and high quality. (Grönroos 2015, 128.)

Essential factors of quality management in logistics service is deliver customer value, understand different aspects of their logistics activities and efficiently manage them to fulfil customer and market requirements in a cost-efficient manner. The ultimate purpose of any logistics system is to satisfy customers. For logistics firms, quality is based on customer service, information flow, maintenance, administration and storage. From customers' perspective the level of reliability and logistics costs measures the quality of a service. Therefore, a logistics company has to understand every aspect of quality from different parties of logistics activities and whereby develop a quality management mechanism that serve common quality goal and support improvement efforts in logistics activities. (Lai & Cheng 2009, 112.)

To prevent defects and satisfy customers continuously, logistics companies have to be improving process performance. Achieving total quality, based on customer satisfaction in cost-efficiently way, logistics companies implement activities such as logistics information management, order fulfilment and processing, warehouse management and carrier selection. Other essential activity is customer service that includes following elements:

- *Pre-transaction*: written customer service policy, organisation structure and accessibility
- *Transaction:* order cycle time, inventory availability and order status information
- *Post-transaction:* product tracing/warranty, availability of spares, and customer complaints and claims. (Christopher 2011, 31.)

Pre-transaction is preparing to serve customers that includes different activities such as searching for new prospects, planning how to approach them, negotiating for a deal and developing existing relationships with customers. Transaction is when the exchange of service or a product

happen between buyer and seller and it is crucial time to show the quality of a service. If the customers are satisfied to the service, they will come back. Post-transaction includes all activities after a transaction between buyer and seller. (Christopher 2011, 31.) This is used to reduce customer dissatisfaction. A company handles customer complaints, responds customers' questions and follows customers' behaviour for example situations why customers decide change to another brand. Post-transaction activities can be related to quality improvement because how well a company is focused on customer needs and satisfying them by listening them, the quality of a service increases.

The principle activities that direct a company to achieve quality by right decision-making and logistic activities are following:

- Training, empowerment and involvement of employees
- Finding key problems and focus them and customer satisfaction
- Analysing and processing data for systemic improvement of activities and service outcome. (Lai & Cheng 2009, 112.)

For example, analysing and processing customer complaints, some key problems can be found. Focusing on possible problems and find a way to fix them improve company's activities and service outcome, finally affecting service quality. In customer complaints in transport service can appear cases that many customers have complained about delivered products that are handled badly and as a result somehow broken. From delivery number they can see origin, destination, persons handling the product between the factory or a shop to the final customer. With all this information the problem can be solved, right improvement processes implemented and finally reduce defects and increase quality.

A firm that provides logistics services have to fulfil some dimensions of service quality for logistics activities. The dimensions of service quality are presented in the following table.

TABLE 2. The dimensions of service quality for logistics activities (Lai & Cheng 2009, 120)

DIMENSION	A FIRM HAS TO CONSIDER, IF…
TIME	The time that customer is willing to wait is not exceeded
TIMELINESS	Logistics service is performed when promised
COMPLETENESS	All the items in the order are included
COURTESY	Employees' performance with customers is cheerfully
CONSISTENSY	Logistics services are delivered at the same way and time to the customers
ACCESSIBILITY AND CONVENIENCE	It is easy to get their logistics service
ACCURACY	Is the logistics service performed right from the first time
RESPONSIVENESS	Personnel are reacting quickly and have excellent problem resolving skills

These dimensions are part of quality management that improves company's logistics activities. The target of all these dimensions is to achieve the best service with highest quality as possible for their customers. Actually, the only significant objective for ensuring continuously increasing service is customer satisfaction. (Lai & Cheng 2009, 120.) As Gönroos (2015, 157) states, "customers look for value. However, more value does not necessary require new services but better service, meaning that all existing customer contacts are managed as value-supporting service for customers".

2.3 Quality Improvement

Company's quality performance has to be increasing continuously because customer's quality expectations are increasing constantly. Quality improvement is part of quality control that involves activities and techniques to achieve and maintain quality of a product or a service. Quality improvement requires time and resources, also total involvement of employees and employers is needed to make it truly effective. To achieve quality improvements, organizations have to make fundamental changes by using effective management techniques. Therefore, directing company to right actions towards quality improvement there are some key points that have to be taken into account. (Oakland 2014, 14.)

As mentioned before, *customer focus* is in top of the all key points, to be close to the customer and listening to them is eternal commitment to a company to achieve quality improvement. *Continuous improvement* is about process and results improvement, measure results continuously and revising processes, programmes and strategic plans to keep updating them and prevent defects. *Prevention focus* aim is to seek failures and avoid poor quality in services and products. To prevent these to happen a company manage to avoid losses of returns and deliver quality to customers. (Lai & Cheng 2009, 117.)

Employee involvement especially in logistics is very important because if every employee works with the same value and aims to same quality of a service, the high total perceived quality of a service can be achieved. Training, team building and providing work-life enhancement to encourage employees to work together towards the common goal. *Management commitment* is necessary. It is important to understand fundamental changes and based on them execute actions to really achieve quality improvement. The team and individual efforts have to be recognized and rewarded. *Fact-based decision making* includes reliable information, data and analysis that are used to evaluate situation and make decisions based on them. To see what keeps the customers or what makes them go away can be measured by surveys and benchmarking but however, these

results have to be complement with statistical information, data and market changes. (Lai & Cheng 2009, 117.)

To achieve continuous quality improvement, companies performs quality controls and implement quality improvement programs. Two methods that can be used individually or in the same project are Six Sigma and Deming's Plan-Do-Check-Act (PDCA) cycle.

2.3.1   Six Sigma

Six Sigma is one of the most used quality improvement project that combines quality tools and statistical methods to achieve major quality improvements. There are five phases in Six Sigma using DMAIC. These phases are define, measure, analyse, improve and control. Every phase includes actions which results leads to the next phase. These phases need data collection, analyses, quality tools, evaluation and right decision making. (Barsalou 2016, 118.)

Define comes first in a Six Sigma project. The main objective of this phase is to describe the problem. The team for the project is gathered and they work closely with members of management. All together they have to define project's goal and the scope to keep the project and members going the right direction. It is also important that the project is considered on the view of the customer so customer's main interests are included to analysis and decision making. (Barsalou 2016, 119.)

Measure phase is used to evaluate the problem. The team will plan the process line and understand the problem better. They gather all tools and devices that will be used during the project to find the root cause of the problem, and when implementing actions and improvements. Capability of the process is measured to understand possible outcomes and impacts of the project before improvements are made. (Barsalou 2016, 120.)

Analyze phase begins when all important data is collected. The team analyzes the data by using different statistical methods such as regression and analysis of variance. Based on project the team uses suitable

statistical methods supported with quality tools to make root cause analysis and find the root cause of the problem. These quality tools could be such as Scatter and Pareto diagram that can be created with a function of a spreadsheet program, and process decision program chart to map possible outcomes that leads from problem statement. (Barsalou 2016, 120.)

Two final phases are improve and control. *Improve* phase is to implement the correct actions and improvements after defining the root cause and analysing different improvement possibilities. However, these actions are not implemented during the Six Sigma project but their functions are evaluated to see the potential improvements and side effects. *Control* is the final phase where the implemented improvements are controlled and the functioning ensured. Control plans have to be updated and other programs implemented to prevent failures. (Barsalou 2016, 121.)

2.3.2 Plan-Do-Check-Act

The Deming's Plan-Do-Check-Act cycle is used individually or part of quality controls and quality improvement programs. When performing quality control or quality improvement program, PDCA cycle is used to detect, prevent and correction of problems. When it is used part of quality improvement program such as Six Sigma for example in analyse phase, it gives a structure for a Root Cause Analysis. PDCA gives RCA three cycle structure; immediate actions, the actual investigation and corrective actions. Figure 4, on the next page, shows the basic principles of improvement of the PDCA cycle.

The first step is plan, where the problem is identified, it is studied and a plan is formed to solve the problem. In the second component 'do', root causes of a problem are identified. The check stage is the third part, where the improvement is checked to ensure the effectiveness of the solution. If it is not working as planned and maybe the root cause for the problem was incorrectly identified, it is necessary to go back to earlier stages to analyse the problem again. (Lai & Cheng 2009, 124.)
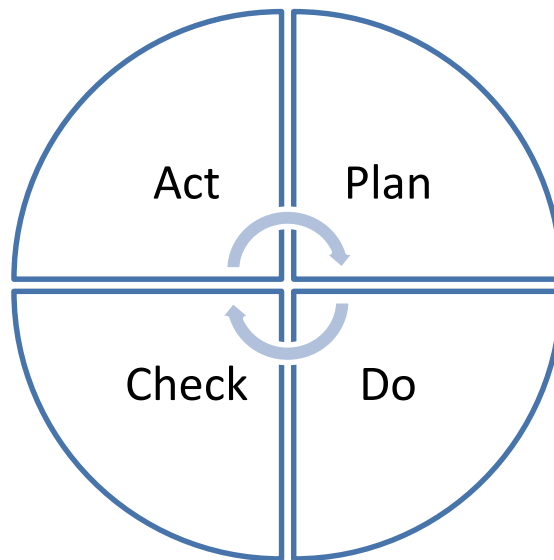
FIGURE 4. The Deming's PDCA cycle

The fourth and final stage is act, when the solution is stated effective, employees should identify other areas where these improvements would be implemented as well. The PDCA cycle is to encourage both managers and employees to continuously plan improvements, implement them, check the effectiveness and find other processes where to implement them. (Lai & Cheng 2009, 124.)

Using PDCA cycle in Root Cause Analysis gives it a structure, as mentioned before. The first cycle is for immediate actions that should be start when a quality failure is discovered. Determination of a possible problem is done and right person or team is formed to plan the next actions and procedure. The next cycle of PDCA is the investigation where the data is analysed and the problem is described. After there is enough information gathered, hypothesis done and results of analysis are empirically evaluated, the root cause is finally confirmed. Normally this cycle is repeated to be sure that the results are reliable. Quality tools can be implemented to support the results and listing potential causes of a problem. (Barsalou 2016, 110.)

The final cycle includes planning of final actions and improvements, and implement them. The effectiveness of actions is evaluated and next actions are taken based on results. If the results were stated no effective, determination of a problem of effectiveness and new actions are made. Once confirmed that the results were effective, the final step to seek continuously new implement improvements and further improvement opportunities. (Barsalou 2016, 110.)

2.3.3 Statistical Support in Quality Improvement

Statistics includes collecting, analysing and organizing data. Choosing correct statistical analysis depends on nature of the data collected and which one is the final question looking the answer for. The two types of data are quantitative and qualitative. Quantitative is continuous data that can be measured on scale with no limits to the potential value and qualitative is attribute data that consist on items of some particular category and that can be counted. (Barsalou 2016, 95.)

Handling data correctly is important to get the best and most reliable results as possible. Handling data in objects is known as data frames that contains rows with observations and measurements of study, and columns with values of different variables. To create data frames, spreadsheets such as Excel are used to enter and edit the data, and using different functions enables order the data. For example, Excel function Pivot Table allows to extract the significance from a data set and it is one of most powerful features especially when analysing large data base. (Crawley 2014, 24.)

When data is analysed and are in order in data frames, to keep analysing it, different tools and methods are needed to support the data. In quality field there is different quality tools to support the data and used for root cause analysis. The classic seven quality tools are effective techniques and analysis to find potential causes of problems. These quality tools include flowcharts, Ishikawa diagrams, Pareto diagrams, scatter diagrams, histograms, check sheets and run charts. For example, Scatter Diagram

analyses relationship between two variables. Histogram displays distribution of a set of data that shows the frequency of occurrences and measures them. (Barsalou 2016, 57.)

There are different statistical methods for a field of quality when analysing data such as statistical process control (SPC) and process performance and capability studies. These help to monitor processes and find early warnings for possible failures. Process performance and capability studies shows the level of performance and if it is not acceptable, improvement should be implemented. (Barsalou 2016, 95.)

The Malcolm Baldrige criteria states that data and analysis support a variety of company purposes, such as planning, reviewing company performance, improving operations, and comparing company performance with competitors or with "best practices" benchmarks (Foster 2010, 198). Therefore, both collecting new data and filing data of company's actions is important to support continuous improvements in performance and quality of a service or a product.

3 QUALITY CONTROL ANALYSIS

The researcher collected the data used in the thesis from data base of Case Company X. This chapter explains the reason for the empirical research.

3.1 Empirical Research Design

As mentioned in the first chapter there are two research methods whereby achieve right research results and in this study quantitative research method is used. The quantitative research method is used because the data analysed is secondary data collected from the case company X files and no qualitative data is collected during the analysis. The secondary data collected is reliable because it was given straight from the company's database for the researcher. However, some differences in numbers can appear according to the absence of the information in some sections. Interviews, observations and surveys are not needed to get the results required in this research.

This thesis empirical research is made for the case company X where the data of damage reports and customer complaints are analysed. The aim of analysing this data is to measure the quality of the service performance in their transportation system, find possible problems and cases to improve. The data used is from the time starting on June 2015 and ending on April 2016. The data is collected from the software used to file damage reports and customer complaints. The researcher used Excel spreadsheet and its functions as Pivot Table to organize and to extract the significance of the large data base.

3.2 Damage Reports and Customer Complaints

Damage report is a notification of loss or damage to the carrier when loading or unloading the cargo. In this report the loss or damage has to be described, the probable cause and the situation of damaged product presented. (Crowley 2016.)

When drivers or other persons make transport damage reports they also have to explain what happened or may have happened and note other details of the transport process such us leaving point, destination, time, date, and car brand and model and so on. However, in this research it is not necessary to focus to all of them that closely.

Customer complaint is an expression of dissatisfaction of a product or service. Reason for dissatisfaction can be a damaged product, a misunderstanding or an unreasonable expectation of a product or a service. A customer complaint is made oral or in writing and the way, that the complaint is handled will affect customer satisfaction and long-term customer loyalty. (Ombudsman 2016.)

3.2.1   Data Analyses

Data analysis show readers the main observations of the results of data analysed. Different tables, diagrams and figures are used to present the results clearly and to see the contrast better. Each section has a small conclusion of the result.

The data of damage reports and customer complaints were analysed with Windows Excel by using different formulas and Pivot table to find out percentages of damage reports and customer complaints, damages occurred in case company X process, transport damages and reservations compared to the amount of new transported cars, and possible cases to be concerned about. The analyses also measure which damage types are more in common and researcher will find out if there are some particular cases to be concerned about or are they more likely occasional cases.

4 CONCLUSIONS

This part of thesis is to conclude the thesis by presenting the research results and following answers to the research questions based on the main research findings. Validity and reliability are discussed and suggestions for further research given.

4.1 Research Results

As mentioned in the introduction chapter, the purpose of this research is to perform a quality control for the case company by analysing their data of customer complaints and damage reports.

The case company needs the results of this data analysis to know the percentage of damages caused by its personnel, comparing to the total number of customer complaints and damage reports. This valuable information shows them the level of quality of their service performance and gives the alert if they need further research and furthermore, quality improvements. The case company also needs the information about most frequent causes occurred, which are the main problems that causes complaints and damage reports and see if there are any possible cases to improve.

The quality control that the case company is performing can be guided by using quality improvement program Six Sigma and the PDCA cycle which were explained in theoretical part of this thesis. To revise, Six Sigma includes five phases: define, measure, analyse, improve and control (DMAIC) and the PDCA cycle comes from Plan-Do-Check-Act and is used to detect, prevent and correction of problems. In this study Six Sigma gives the structure for the case company's quality control project and the PDCA cycle gives the structure for the researcher to support the analysis process and solve the problem.

First the researcher presents the process of Six Sigma implemented to the case company's quality control project including the results of data analysis provided by the researcher that is listed in the following tables,

Table 9 and Table 10, on pages 47-48. After the Six Sigma table, the PDCA cycle is presented as a problem-solving tool.

TABLE 3. Phases of Six Sigma in quality control project

PHASES OF SIX SIGMA	PROCESS OF QUALITY CONTROL PROJECT
1. Define	The head of customer service of the case company and the researcher starts the project. They define that the aim of this project is to find out the causes of customer complaints and damage reports and percentage of the number of damages caused by the case company. Based on this information, the quality level of service performance is provided and possible improvements defined. The scope of this project depends of the results of analysis part. If results are positive, there is no need to further implantation programs but negative results need further analysis and creation of improvement plan.
2. Measure	Project members decide to use data of customer complaints and damage reports from the period starting on June 2015 and ending on April 2016. The case company provides the data for the researcher from their database and the researcher organizes and analyses the data by using Excel spreadsheet and its functions and tools such as Pivot Table. Capability of this project after analysing the data and implementing possible improvement program is to prevent defects and improve quality of service performance.

TABLE 4. Phases of Six Sigma in quality control project

PHASES OF SIX SIGMA	PROCESS OF QUALITY CONTROL PROJECT
3. Analyse	The researcher analysed the data by using Excel spreadsheet and quality tools such as histograms and used the PDCA cycle to support the analysis process. The results of the data analysis are following: • Total number of customer complaints caused by the case company is low comparing to total amount of new transported cars. • Total number of damage reports caused by the case company, in other words transport damages, is low comparing to total amount of new transported cars. • Damages caused by the case company are occasional. • All damages caused by the case company comparing to total amount of new transported cars is low so the quality level of service performance is good.
4. Improve	Not needed. As mentioned in define phase before, there is no need for further actions if data analysis results are positive.
5. Control	Not needed. The only control process of this project is to repeat the same or improved research every year to see the quality level of the service performance.

The researcher used the Six Sigma table above to guide the process of quality control project and present the research results. As mentioned in analyse phase, the researcher used the PDCA cycle to support the analysing and problem solving process. The following figure shows the improvement of problem solving process as PDCA cycle.
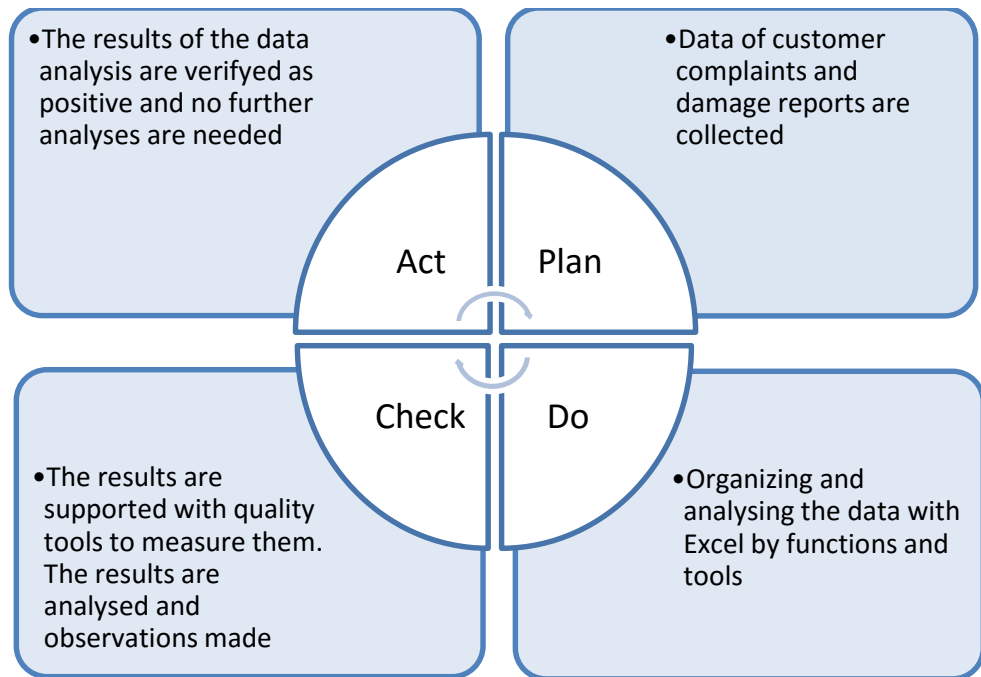
FIGURE 5. Problem solving process as PDCA cycle

As seen in the Figure 14 above, the cycle's first step is *plan*. Is the step, where the researcher collected all the data needed from the case company and cut all the information not necessary for the study and organized the information needed in Excel spreadsheet.

The next step *do,* is where analysing the data happens. The researcher uses Excel functions and tool such as Pivot Table to get the significant data from the large data base. The researcher summarizes all the data to excel tables.

Third step *check,* is where the data is analysed. Tables made in excel are supported by using quality tools mainly histogram and pies to measure the results and make observations. The researcher stated that only a small percentage of customer complaints and damage reports of total amount of new transported cars is caused by the case company.

In the final step is *act,* the researcher states that the results are good, in other words positive so immediate actions for quality improvements are not necessary. The quality level of service performance of the case

company is good based on the percentage of customer complaints and damage reports comparing to new transported cars.

If the results would have been negative, further research would have needed, immediate actions and implementation of quality improvement programs planned and executed in the near future to prevent defects and quality failures.

4.2   Answers to Research Questions

This sub-chapter provides answers to the research questions that were stated in the introduction chapter. The five sub-questions are answered first as they help to answer to the main research question: **Does Case Company X need to implement a quality improvement program?** In following table, the two sub-questions based on theoretical part are answered first and after that, the three sub-questions based on Company X data analysis.

TABLE 5. Answers to the sub-questions based on theoretical part

Sub-questions	Answers
Why is quality management in the service industry important?	The final object always is customer satisfaction. When a company can satisfy customer needs, it gives competitive advantage in the market. A company that provides service of high level of quality for their customers, they ensure continuously increasing service and customer loyalty. In other words, is the key to company's success.
Why do companies need continuous quality improvement?	If companies do not improve their quality performance, companies that are more concentrated on customer expectations will take their place.

	Achieving the top high quality in their service, they ensure their place in the market. Companies have to focus on continual improvement of products and service, processes and people to prevent problems before they occur.

To summaries the answers that the Table 11 provides, quality management is crucial part when achieving company's success. Company's main goal must be customer satisfaction to achieve competitive advantage in the market. If companies do not improve their quality in their product, service, process and people, other competitions will take their place. Continuous improvement prevents problems before they occur, keep companies updated or ahead on customer's quality expectations and guides to achieve the high level of quality by different programs and quality tools.

TABLE 6. Answers to the sub-questions based on Company X data analysis

Sub-questions	Answers
Are causes of customer complaints and damage reports caused by the case company occasional or frequent?	Occasional. The number of damages comparing to the total number of new transported cars is very low. Some damages such as scratches, dint or rub were more frequent than the others but as mentioned, comparing to the total number is practically non-existent.
Are there any causes that need further research?	No.

	Yes. Comparing the both to the total number of new transported cars, the percentage of customer complaints caused by the case company and damage reports caused by the case company is low.
Is the level of quality in service performance good based on analyzed data?	

As Table 12 shows, damages caused by the case company that appear in customer complaints and damage reports are occasional. There were some damages and damage locations that were more frequent than the others but comparing to the total number of new transported cars the percentage is very low. Therefore, there is no cases that were suspicious and would need further research.

Based on analyzed data, the quality level of their service performance in transportation is good. The case company have set a target percentage that received customer complaints cannot cross and results show that they have not.

After answering to these five sub-questions presented in Table 11 and Table 12, the main research question is answered.

TABLE 7. Answer to the main research question

The main research question	Answer
Does Case Company X need to implement a quality improvement program?	No, it is not necessary. Based on data analyzed the causes of damage reports and customer complaints are occasional, there is no damages that are suspicious so further research of causes is not needed nor cases to improve that need immediate actions that could prevent defects.

After answering to the five research sub-questions and evaluating them the answer to the main research question was found. Based on answers of sub-questions, the researcher states that it is not necessary for the case company X to implement a quality improvement program because there are no rare causes or locations that appear too frequently and would need further research or immediate actions that could prevent defects. Also the quality level of the service preformation is good, based on the percentage of customer reclamations and damage reports comparing to the total number of transported cars which are low.

The company is well on target; they do not have a high percentage of customer complaints or damage reports to be worried about. Obviously, continuous quality improvements are necessary and new improvements are needed but for this case it is not necessary immediately. However, it is essential to perform a similar or improved quality control frequently. The researcher will go through more closely suggestions for further research in the sub-chapter 5.4.

4.3   Validity and Reliability

This thesis consists of a theoretical and empirical part. The data collected for this study to both theoretical and empirical part is secondary data. For the theoretical part the secondary data is collected from relating literature, articles and web pages. The secondary data collected for the empirical part is provided straight from the case company's data base and software. The data was given to the researcher by the member of the company. The data collected was organized and analysed twice by the researcher in Excel spreadsheet with functions and tools. If the analysis was executed again, it would give same results. Therefore, the study is reliable.

The aim of this thesis is to answer to the main research question. Based on the information gathered and results of data analysis examined, the research were able to answer first to the five research sub-questions by which the answer to the main research question was found. The

researcher states that the thesis goal was met and therefore, the study is valid.

4.4   Suggestions for Further Research

The results of this research came out positive and showed, that Company X quality level in service preformation is good based on data analysed of customer complaints and damage reports. The researcher stated that there is no need to take immediate actions or implement a quality improvement program because strange problems did not appear and the percentage of damages comparing to the new transported cars is low.

However, it is never too much to perform more quality improvement programs. A company can always improve their products, services, processes, knowledge and people. Nevertheless, these following suggestions are still about customer complaints and damage reports. First, as the researcher already mentioned earlier, it is suggested perform similar quality control frequently. The case company can use this research as a base for the next quality control.

Second, even though the percentage of customer complaints did not reach upper limit, the company can always do better. So how the company could reduce customer complaints and damage reports too? To reduce customer complaints as well damage reports, the company could perform a further research of exact locations of the damages. Although, the number of the damages caused by the case company is low, they could clarify the root cause of the damage to inform employees to pay attention and be even more careful in those situation.

Also, there could be organized a meeting where employees are informed of these damages, emphasizes that with the help of all employees and managers they can reduce damages and with that, improve quality of the service. For sure it is obvious for the employees of the case company but there is no harm to empower employees sometimes even more. This could

be other further research, to find out if empowerment of employees in long-term could reduce damage reports and customer complaints.

The last suggestion for further research could be a program where a quality control system is implemented. This kind of system can be implemented with software that registers all the information of customer complaints and damage reports. This process would replace studies similar to this research because the results that the researcher has provided now for the case company, they could have them with quality control system. This system provides a report in a particular time period and alerts of strange changes when further research or improvements are necessary to prevent failures and keep the level of quality optimal.

5   SUMMARY

The aim of the thesis was to perform a quality control for the case company X. The quality control was performed by analysing data of customer complaints and damage reports. The final objective after providing the results from data analysis was to know the company's quality level of service performance in transportation and to find out if implementation of quality improvement program is necessary.

As the researcher was performing a quality control for the case company, the theoretical part introduced definitions of quality, quality management and quality improvement. The importance of these factors for a company is explained to understand the reason for the study. To be able to analyse data results and answer to the main research question studies of quality management and improvements are required.

Before the empirical research chapter, the case company was briefly introduced. The empirical part begins explaining customer complaints and damage reports, and concepts that the case company use in this field that appear in data analysis. The rest of the empirical part is presenting the results of data analysis. The secondary data collected for the analysis was provided for the researcher by a member of case company X from their data base.

By using both theoretical data collected from literature, articles and internet sources and empirical research results of data analysis, the main research question, through sub-questions, was answered. Therefore, it can be stated that the study reached its objectives.

The findings of this study showed that case company X' quality level of service performance in transportation is good and there were no cases that need immediate actions or further research. Therefore, the researcher states that it is not necessary implement quality improvement program that would prevent and reduce already low number of damages in customer complaints and damage reports caused by case company X.

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