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Process Improvement of Claims Handling in Insurance Industry

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I hereby declare on my honours that I wrote this Master Thesis independently, and I used no other sources and aids than those indicated.

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Abstract: This master thesis focuses on the optimization of the claim handling process in the insurance industry. The research can be considered as a replicable roadmap for the insurance companies to improve their processes of the claim settlement. Based on the literature review, quantitative data obtained from the insurance company and the qualitative data gathered from the interviews, this thesis identifies key opportunities for improvement in the insurance industry with application of DMAIC methodology. The author analyses the main challenges occurring in the process to identify their roots and causes. Once the reasons of the challenges identified, the author develops the improvement proposal to improve three Kaizen events. Such improvement proposal would decrease the claim settlement time from 39 to 25 days and reduce the number of errors by 19%. To sustain the current level of process performance, the author offers various control tools, which can enable to keep the results of implemented projects for the long-term period.

Keywords: Insurance, claims, compensation, process, lean tools.

JEL Classification: G22, I13

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Introduction

The insurance sector is a comparatively old sphere of financial world. The modern roots of the industry are starting from 1654, and since that time the insurance industry was slowly adopting the image of modern science (Haueter, 2017). Nowadays, insurance is well-developed business, and it is presented all over the world. The more the society and science is developing, the more risks are occurring, giving the space for the growth of the insurance companies.

Today all the services are offered at the highest speed than ever before – bank transactions are happening in seconds; online shopping is even not leaving the house, phone calls by one click. The greater quality of the customer service is demanded by the consumers, heating up the competitive spirit on the market. The new trends and the latest technologies are forcing to implement the innovative approaches and changes in the insurance industry. The passive behaviour of the particular insurance companies toward the innovations, can lead to the loss of the competitive advantage, customers and market share.

For many years, Lean manufacturing technology was one of the main topics for dialogue among the companies. In the beginning, the Lean management was more appreciated among the manufacturers, particularly automotive; however, later different industries started to implement it on their field and felt its benefits. There are several studies which are addressing the applicability of lean management on the processes of the insurance company, providing the plans with solutions for improvement.

The primary motivation of the author to work on this topic for the master's thesis is, firstly, she is working with the insurance industry's processes every day by being employed in the company, which operates on insurance/reinsurance sector, therefore she sees the existence of the opportunities for improvement within the industry. Secondly, the author wanted to extend the knowledge about the process improvement tools and research the applicability of the lean tools on the processes of the insurance company.

This master thesis aims to determine the applicability of lean management on the health claims handling process of the insurance company. The contribution of the master thesis will be the determination of the main challenges and defects occurring in the process of the health claims settlement in the insurance company and identification of the lean and management tools suitable for the improvement of the process. The research of the master thesis can be considered as a replicable roadmap for the insurance companies to improve their processes of the claim settlement.

This master thesis is divided into three main parts: Theoretical outline, Methodology of the studies and Practical application.

- In the theory part of the master thesis, the author explains the principles of the insurance industry and the basis of lean management. This section begins with introduction to the insurance, risk management and uncertainty; later the author explains the main costs for the companies generated by the insurance contracts and how the insurance policy works; current challenges and trends in the insurance industry; then the author provides the explanation of lean management and the possible tools for application.

- The Methodology part of the thesis is dedicated to the introduction of the type of the research conducted, the sources and kinds of the data used, and the explanation of how the analyses were conducted in the practical part of the thesis.

- In the practical part of the thesis, Six Sigma approach was exercised for the purposes of identification of the causes of the challenges, measurement of the current process, analysis of the potential roots of the defects, implementation of the proposed improvements and control of the process so the improvements are sustained for the long-term period.

1. Insurance Industry: Frameworks and Terminology

For the better understanding of the mechanisms of the insurance sector, the author studied the scientific literature and the experts' researches to identify the standard claim settlement process in the insurance industry, leading trends and challenges. The most relevant components from the materials are studied in this chapter for their further application in the analysis.

1.1. Introduction to Insurance

According to the insurance glossary insurance is defined as:

"Economic device whereby the individual or business pays a cost (premium) in exchange for protection against financial loss. The agreement is a contract also known as an insurance policy." (Barron's Education Series, Inc., 2000)

The underlining principles and characteristics of the insurance industry are following (Committee on Insurance and Pension, 2008):

- *Pooling and risk reduction* – spreading the incurred loss among the entire group, so that the average loss is substituted for the happened loss.
- *Payment of accidental and unintentional losses* – insurance works with losses which are accidental by nature, meaning that the insurance company is responsible for all the unexpected and unforeseen risks.
- *Transferred risk* – the insurance policy transfers the risk from one party, Insured, to the other one, Insurance company, which has the stronger financial position and able to deal with the monetary value in case of the loss. The insurance is one of the most popular form of risk transferring.
- *Principle of indemnity* – the principle of the insurance policy is in case of the loss to put the Insurer to the same financial position as he or she was before suffering the loss. (Committee on Insurance and Pension, 2008).

Once the insurance policy is purchased by the person (later, Policyholder or Insured), the insurance company promises to the Insured the compensation in case of any financial loss covered by the conditions of the insurance policy. Insurance companies protect the assets of their customers (policyholders), as these policyholders transferred the risk, with which they may face, to the insurance companies. Insurance coverage providers act as financial intermediaries because they receive the premiums as the price for the insurance policy, and later they invest the collected funds from the sold insurance policies to the services they provide. In other words, the insurance providers promise the financial compensation to the Insured in consideration for an amount received in the form of "premium" (Insurance Information Institute, 2010).

One of the main goals of the existence of the insurance industry in the financial markets is to turn the uncertainty into certainty with respect to the cost of the loss. As it was mentioned before, the insurance industry is characterized by pooling and risk reduction; the insurance companies are working by "the law of large numbers". In case of the large homogeneous populations, the insurance company can estimate the

possibility of the losses and evaluate the costs of deaths or accidents. The frequency of the loss can be statistically predicted; however, the accuracy increases if the sample size of the policyholders increases (Greene, 1999).

1.2. Risk Management

From the moment, when a human opens the eyes in the morning and goes to work till the late night, when the person is back to bed and ready for sleep (and even perhaps afterwards), - he or she exposed to the risks of different degrees. The risk with which the person is bearing may be voluntary - speed on the highway, or beyond the control of the person - earthquake or volcano erosion (The Institute of Company Secretaries of India, 2018).

From the insurance company point of view, for the risk to be insured it should match with the following criteria:

1) The object to be covered by the insurance policy should have the degree of measurement and homogeneity to allow the evaluation and calculation of possible loss frequency and its severity (Greene, 1999).

2) The insured object should not be the subject for simultaneous destruction. For example, in case the flood occurs, and all the buildings in the flood area are insured by one insurer, then this loss may be considered as catastrophic to this insurance provider (Greene, 1999).

3) Insurance policy must precisely specify the circumstances of the insured risk - where the loss may occur, how it will be measured, what constitutes the loss etc. These all means that the risk must be some way to predetermine the possible loss and how great that loss is (Greene, 1999).

When the insurance policy is affected, the compensation is determined by the premium for the insurance policy bought and the risk accepted by the insurer. It is also essential to note that insurance has socially beneficial purposes, because at the end both the insured and the insurer have a common goal – mainly loss prevention, this all leads to the win-win situation (Committee on Insurance and Pension, 2008).

1.3. Uncertainty

One of the core concepts of the risk is uncertainty. The outcome of the given situation is almost always uncertain; for example, the weather forecast mismatch or auto accident – there is always uncertainty under these events.

In 1921, American economist, Frank Knight summarized the difference between the risk and uncertainty in the following way: “... *Uncertainty must be taken in a sense radically distinct from the familiar notion of Risk, from which it has never been properly separated. ... The essential fact is that "risk" means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomena depending on which of the two is really present and operating. It will appear that a measurable uncertainty, or "risk" proper, as we shall use the term, is so far different from*

an un-measurable one that it is not in effect an uncertainty at all." (The Institute of Company Secretaries of India, 2018)

1.4. Costs for the Insurance Companies Generated by the Insurance Contracts

Insurance contracts generate the costs which may directly or indirectly have an impact on the offer of optimal contracts for the insured and efficient risk allocation. The circumstances and the people's behavior determine the price for the insurance policy and the costs of operations of the insurance company.

The main costs which are associated with insurance contracts are listed and explained below:

1) Transaction costs – such costs reflect the expenses of distribution and servicing the contract to the policyholder. For example, the time spent on searching the customer, the efforts spent to attract the customer and make him buy the insurance policy from the particular insurance company (Outreville, 1998).

2) Adverse selection – the cost associated with the lack of accurate information. For example, the customer of the insurance company may know better which risks he is exposed the most. He will buy the health insurance policy knowing that he may have the diseases and later claim it to the insurance company. However, the insurance company does not have such information and sells the insurance company for regular price and expects to face average risks (Outreville, 1998).

3) Moral hazard problem – the costs associated with the behavior of the policyholder. For example, the person after the purchase of the car insurance policy may behave less accurately than without insurance. He may care less whether he locked his car or not, because he knows that in case the car will be stolen, he will be compensated by the insurance company (Outreville, 1998).

1.5. How does Insurance Work?

For the better understanding of the principles of the insurance, the author briefly explained the underlying mechanisms of the insurance industry. Insurance policy is the contract between the insurance company and the customer, which later becomes policyholder and in case of the happened claim, he becomes a claimant. The insurance policy specifies the type of risk insurance and what is exactly covered. Describing the mechanism on the example of the health insurance, most of the insurance policies have coverage for one year, and the premium is charged as per agreement – it can be a one-time payment for the whole year, or it may be paid on a monthly or quarterly basis (Insurance Europe, 2012).

In case the policyholder suffers a loss, which is binding by the insurance policy conditions, the loss is needed to be filed for the insurance company by the policyholder (Claimant). After reviewing the claim by the insurance company and medical partner, it can be accepted or rejected for the settlement, depending on insurance policy conditions, coverage limits and other factors. Usually, the health insurance practice is that the insurance company compensates the main part of the claim and the claimant himself pays the rest. The sum which is paid by the claimant is called "deductible" for the insurers.

The amount of the deductibles paid by the Insured depends on the price of the premium. The less the price of the premium, which customer pays for the purchase of the insurance policy, the more of the deductibles are paid by the Insured, therefore the policyholder assumes more out-of-pocket costs. The higher the price of the premium, the more insurance company can compensate and the less of the out-pocket-costs are paid by the insured (Insurance Europe, 2012).

1.6. Claims Handling Process in the Insurance Company

The interaction of the policyholder and the insurance company is almost at the minimum level until the Insured suffers the loss. This moment awakes the mind of the customer and creates the customer's perception about the services offered and the attitude towards to company. The customer service during the claims compensation process is the heartbeat of the insurance company and the critical moment when the overall customer's perception is formed (Crawford, 2007). It was highlighted by (Singh, 2012) that claims are the moment when the customer relationship for the insurance companies is defined, and later the customer's experience around the claim settlement process.

Once the loss happens, the policyholder requests the compensation for the claim as an exchange for the previously paid premium price. The insurance providers are aimed at the reducing the costs of the claims handlings and at the same time focusing on the effectiveness and efficiency of the claims processing to maximize the revenue of the company and deliver a value-added brand promise to the customers. The claims service is the opportunity for the insurance company to build the customer relationship, strengthen competitive position and retain the customers (Capgemini, 2011a). The speed of the claims' settlement, the accuracy of the process and its effectiveness are the primary factors for the controlling costs, risk management and the expectations of the portfolio underwriters (IBM, 2011).

Nowadays, the claims handling process is a challenge of the insurance company. The claims handling process is moving towards the modernization, efficiency and effectiveness, however at the same time the process is still slow and far from the modern way of operations as it involves all parts of the organization and affects the competitive position of the company on the market, the quality of the customer service, fraud management, cost control and IT infrastructure (TIBCO, 2011). But according to points highlighted by (Singh, 2012), certain inefficiencies are increasing the cost of claims handling and decrease the quality of customer service during the claim's compensation process.

Mostly the processes of the insurance companies are very similar to each other, as well as the principle of work with claims and their handling. The health insurance claims are divided into two types: cashless claims and reimbursement claims. The cashless claims are such claims, where the insurance company settles all the medical expenses with the hospital directly, not involving the insured person. The reimbursement claims are the such claims which are directly submitted by the policyholder with the request for the compensation. The reimbursement claims are the most difficult, as they require the direct interaction of the claimant and the insurance company, creating the

perception in the eyes of customer and building the customer relationship (Committee on Insurance and Pension, 2008).

The main focus of the author in this master's thesis is the process of settlement of reimbursement claims as they are the ones, which are creating the image of the insurance company on the market. The average process of health claims' handling in the insurance companies is designed in the following way:

Average algorithm of the claim settlement in the insurance company

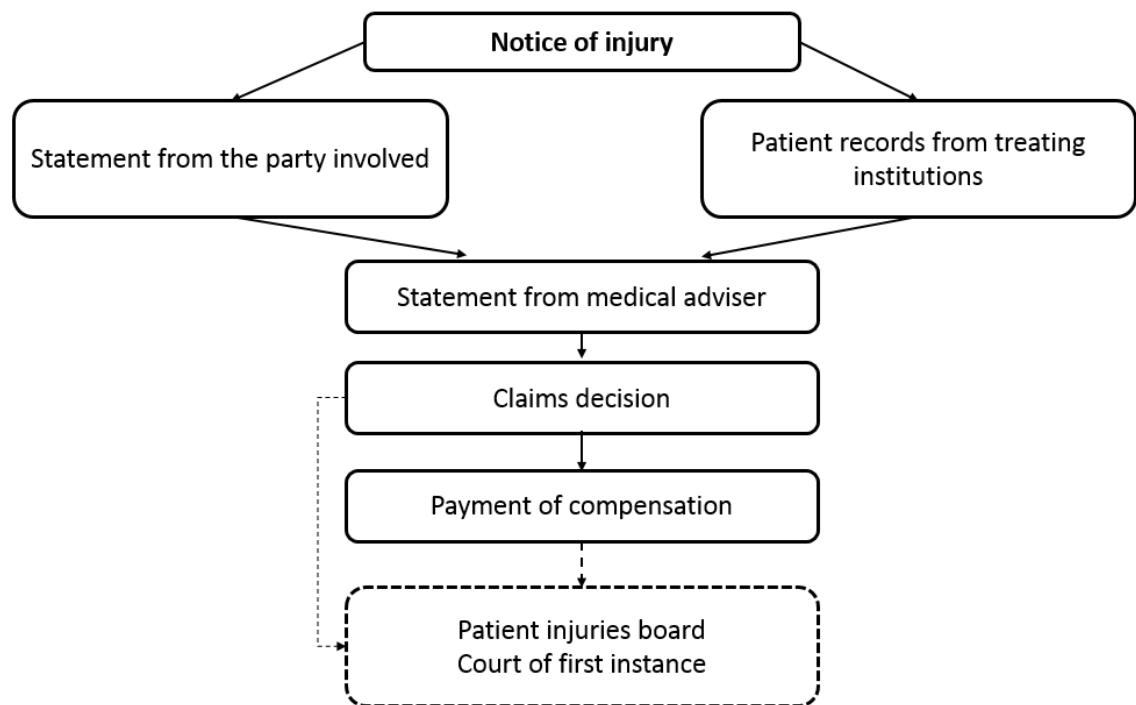


Figure 1 (Palmu, 2009)

Firstly, the insurance company receives the notification about the loss (Initial Notice of Loss) sustained from the policyholder and the request for the reimbursement. Such request should include the whole package of documents, including the statement from the doctor, medical prescriptions and the details of the bank account for the payment of the claim. It also has to include the statement from the parties involved.

Then, the loss package is processed by the insurance company and passed to the medical advisor for the review. The medical advisor is the party in the claims handling process which is responsible for the review of the claim from the doctor's point of view and provisions of the advice to the insurance company on the settlement of the loss and the sum of the compensation.

Once the medical advisor reviews the claim, it is passed to the claims department of the insurance company for the final decision on the loss reimbursement. The insurer is informed on the decision of the claim submitted. If the claimant does not agree with the decision of the insurance company on the loss settlement, it can file it to the court of the first instance.

The loss package is passed to the accounting team for the processing of the payment, and the compensation sum reaches the bank account of the claimant. The claimant can refer to the court on the decision of the sum compensated at this stage as well, and the process of the claim's review goes further, however, it is out of the scope of this master thesis.

1.7. Current Challenges in Insurance Industry

The insurance industry is one of the traditional and oldest industries within the financial scope. Many processes are handled in a historical way because of the traditions and the lack of wish to change something, because it worked somehow yesterday, it is working today, and it will work tomorrow. According to the expert's information, there is the movement towards the digitalization and process optimization, however there are still many problems which are still in place, and they need to be solved.

In the studies of (Singh, 2012), the following inefficiencies in the insurance industry were defined by:

- *The ageing technology*
- *The rising number of fraudulent claims*
- *Increasing complexity in the claims processes*

The problem of ageing technology is caused by the fact that the world is developing too fast and the companies are not managing to be on the same stage with its customers due to the investment and capabilities limitations, and the workers are working with software which is older than 15 years, or there is no software at all. Besides the lack of the appropriate software tools for simplification of claims review, there are fraud claims on the list, which are causing enormous difficulties, therefore the employees are required to be more attentive to each claim and check it in more details for the subject whether it is real loss or not. All these lead to the complicated claims process, as it requires many documents, approvals and checks (Singh, 2012).

At the same time (Capgemini and Efma, 2011) believe that the current challenges in the insurance industry are the following and these inefficiencies could stem from environment, technical and organizational factors:

- *Inappropriateness in claims acknowledgement and assignment* – often the claims are assigned to the wrong team due to the lack of competencies or well-developed management system, that leads to the wrong path in the claim's review process.
- *Ill-design of information systems to identifying existing claims* – this challenge is very similar to what (Singh, 2012) defined. The ageing technology used for the processes in the insurance companies is leading to the failure of efficient claims settlement process.
- *The communication gap between insurers and customers* – poorly developed communication channels between the policyholders and insurance companies are leading to the impossibility of the customers to comfortably reach their insurance providers, as a result, decreasing customer satisfaction.

- *Claims investigation and documentation time-consuming* – complicated claim review process is caused by the lengthy investigation process of the claims and the need to provide the documents for every single factor.

- *Insufficient professionalism in the determination of loss situation and amount* – lack of highly educated and experienced human resources leads to the incorrect loss amount settlement or provision of the inappropriate information to the clients.

- *Inappropriate conclusion and monitoring of claim handling process* – the lack of correctly set KPIs, which could enable the precise evaluation of the claim's handling process.

Another study of the experts highlights the following global industry challenges (Huisman, 2017):

- *High operational costs* are caused by the existence of the manual process within the company, and it leads to the fraud claims and claims leakage.

- *High IT costs* are highlighted as the main challenge of the insurance companies, because of the complexity of IT systems for the implementation and adjustment for the particular insurance company and later its maintenance. Moreover, the constant update and replacement of IT systems and software are not possible without the business interruption and high costs occurrence.

- *Inconsistent service delivery* is caused by the complicated and at the same time fluctuating process and also by the lack of understanding the meaning behind the data and the appropriate defined task management.

- *Lack of management information* – the management as the decision makers are not aware of the trends in the claims' processes and do not know how to act preventing the occurrence of the potential issues. This is caused by the lack of transparent tools for the knowledge sharing and collection of important information.

- *Poor integration* is the result of the lack of interconnectivity between the internal and external systems of the insurance company and their partners and customers. As a result, it leads to a complicated IT environment and the increasing number of manual processes. The main challenge occurs because of the poor data integration, which affects the efficiency of the claims' settlement process, leading to a decrease in customer satisfaction.

- *Financial and government compliance* is a very crucial factor in the insurance industry, as in many countries the insurance is the government institution. The government is primary stakeholder, which complicates the business by adding up the processes and taking the focus from the core business.

- *Increasing customer demand* is increasing with the development of new technologies and the speed of the services offered. The future trends of the digitalization are quickly taking the places in the insurance companies. Already for the past years, the mobile and online presence of the company has become the defining factor for most of the customers.

- *Poor supplier network performance* is the result of the lack of proper communication between the insurance companies and the suppliers and service providers, creating the black spots and the gaps in the claims settlement process. The workers are

not aware of how the processes are working outside of their scope of responsibilities, such as repairs and damage experts. The non-integrated data or its unavailability can cause such poor network.

Summing up all the challenges as mentioned above of the insurance industry, it can be concluded that the main difficulties are mostly high operational and IT costs, which are slowing the process of claims handling. These challenges are leading to the appearance of the other difficulties as complicated communication between the parties or poor data integration. Once primary roots of the problems are identified, and the proposed solutions are implemented, it could improve the processes, increase the customer satisfaction, strengthen competitive advantage and build the reliable brand awareness on the market.

1.8. Current Trends in Insurance

There are many studies about the future of the insurance business and the upcoming trends in the industry. According to the recent reports of the industry experts, the main trends of the insurance sector are mostly related to developing the technologies and their adaptation within the company. According to the studies, the leading industry trends are the following:

- *AI or Robotics* – some of the innovative insurance companies already started the adaptation of artificial intelligence, which is handling the certain operations – for example, transferring the data claims from one database to another. Also, the industry experts highlight that the underlying goal of the implementation of artificial intelligence and robotics to the process of the insurance company is to enable the possibility to achieve the desired goals, but not the reduction of costs for human resources (Fineberg, 2018).

Also, other industry experts believe that artificial intelligence will serve mainly as the primary tools for the detection of fraud claims, so that the claims will be more accurately reviewed and settled. Combining the potential benefits of the trends, features will enhance the customer experience and enable faster claim settlement process (Todorov, 2018).

- *Automation* – all the corporations value the process automation for many aspects of the business processes, leading to the manual process to be left behind. The main reason for the process automation is that the employees will have an opportunity to dedicate more time of their working hours on strategic elements of their role and undertake better quality analysis (WeGoLook, 2018).

- *Technological developments in claims management* – the significant changes in the quality of customer service are expected due to the technological development in the claims management. For example, as it was mentioned in the previous trend, the artificial intelligence plans to be even better in recognizing the fraudulent claims, increasing the service of customer service (WeGoLook, 2018).

- *Data analytics is changing the game* – the advanced analytics will enable the development of better predictive models, so that the insurance companies will have better possibilities for the accurate risk evaluation and delivery of the more excellent value to the customers.

In the studies of McKinsey, the experts provide examples of how the health risk model was developed that combines the actuarial data, medical science, trends in demographics and the national data. The developed tools offer the possibility to make more in-depth analyses of data than it was before (WeGoLook, 2018).

- *Claims volume will decrease* – most of the industry experts believe that the number of insurance claims will decrease in the future, and this can be explained by the several factors. Natural risks such as fire or flood will have better predictivity, therefore the property owners will be claiming less the losses sustained. Alternatively, the motor claims caused by the traffic incident will decrease because of the increased safety on the roads and of the vehicles produced (WeGoLook, 2018).

- *Digital and Omni Chanel* – customers' needs are increasing with the world's development. In order to satisfy their needs, the insurers need to know about their customers in advance and offering them personalized products and tailor communications – therefore, that is why the insurance providers should digitize its services and optimize all interactions (EY Global, 2019).

Customers will prefer to purchase “all-in-one” insurance policies, which will be better adjusted to the customer's lifestyle and needs. Such type of policies could be offered with special corporate technology. For example, one of the experts supposes that lifestyle apps for the insurance companies will enable the better understanding of the customers purchasing the policy and it will allow the insurance providers the better risk assessment, special prices for premiums. All these, will lead to the better customer quality services and increase brand loyalty (WNS, 2019).

- *Big Data and Analytics* – insurance companies are investing considerable funds in data analytics and modelling techniques to improve every part of the business (EY Global, 2019).

The premium prices are planned to be highly personalized with the help of modern technologies – Internet of Things, apps and wearables. Insurance companies are planning to partner up with the leading technologies companies and develop customised technologies for the business improvement and mitigation of issues. The development of drones and virtual reality will enable the insurers more comfortable and quicker remote access of insured assets for the evaluation and analysis. (WNS, 2019).

- *Legacy system transformation* – insurance systems are on the way to modernize the processes, increase collaboration and decrease the costs of the business. One of the software tools which are simplifying the processes in the business, are robots and all the technology developments are aimed at the robotic process automation (EY Global, 2019).

Robots and Artificial Intelligence will be in the centre of the insurance driving new channels and improving data processing capabilities. Bots will be becoming popular in the front and back office, serving the customers with policy purchases and claim management (WNS, 2019).

- *Cybersecurity* – cybersecurity must be the top priority when all the operations and migration on technology as the insurance companies are one of the primary holders of private information (EY Global, 2019). The cybersecurity is the risk as well, resulting in the data breach. Business interruption and etc, therefore it is a current topic for both the insurance companies as well as the cybersecurity policyholders.

- *InsurTech and Blockchain* – they may mean a significant threat to the business and more intense competition, however, it has also much promising new opportunities in the industry (EY Global, 2019). Blockchain and technology will enable the real-time processing of the data and the secure management of the data across several interfaces and stakeholders (WNS, 2019).

Nowadays, most insurance companies are designed in the very old manner, and there is a lack of modern technologies implemented. However, the world is fast developing, and the customers require the fast-delivered services and the highest quality of the services. The interest of the insurance companies to be adjusted to the requirements of their customers, increased the market share and the competitive advantages among other players. According to the experts' information about the insurance industry trends, it may be concluded that all of them are very closely related to the digitalization of every aspect of the business, that leads to the quick claim settlements, to better quality services and increased customer satisfaction.

2. Process Improvement in Insurance Industry

As the author's focus in this master thesis to optimize the claims handling process in the insurance company, the author studied the approaches of the lean management in this chapter to get a better understanding of the applicability of the particular tools within the insurance business. The fundamental principles and the tools of lean management were studied in this chapter for their further application in the analysis.

2.1. Lean Management

For many years, Lean manufacturing technology was one of the main topics for dialogue among the companies. In the beginning, the Lean management was more appreciated among the manufacturers, particularly automotive; however, later different industries started to implement it on their field and felt its benefits.

After the implementation of the lean project, the companies saw the results in the reduced time of the process, in the reduced working capital and inventory, in the increased quality of workforce, in the improved productivity. The lean project affects the company from different sides – from supply chain to back office routine. One of the main benefits of the implemented lean management project is the savings in time and money, and this is the primary reason for its application on the company's processes.

Any company on the market aims to strengthen its competitive position on the market among the other firms and increase the price share. Saved time and money is good, however it is not a great benefit if the company remains on the same competitive position among the other firms and does not increase the revenues. What can increase the company's share price and the competitive position is the low costs, fast service delivery and the best quality. Such improved factors will attract more customers and increase the demand for the goods and services offered (Hobbs & Burton, 2011).

What is the exact definition of Lean? For example, in the book of Dennis Hobbs and Terence Burton, the definition of lean is presented in the following way:

“Applied Lean methods are series of scientific, objective techniques that cause work tasks in a process to be performed with a minimum of non-value-adding activities, resulting in greatly reduced wait time, queue time, move time, administrative time and other delays.

Lean operating systems seek to identify and eliminate all non-value-adding activities in design, production, supply chain management, and other activities used to satisfy customer requirements.” (Hobbs & Burton, 2011).

However, Lean management is such discipline that it is hard to achieve the goal without teamwork and proper training of the whole company to a high level of competency. In the 1980s, the lean management was widely applied in manufacturing industries as it was mentioned before, but nowadays, the lean tools are applied in a wide range of disciplines such as administration, medical, transportation and many other

organizations which are handling the operational processes every day (Taghizadegan, 2006).

2.2. Process for the Lean Project Implementation

The implemented lean tools in the organization will have an improvement effect only when every employee will have access to the tools and approaches of lean and it will support their responsibilities. There are a lot of lean tools, and every company organization can find the ones which are the best suit to the process handled.

Any discussion of the process improvement will be incomplete without mentioning the word *kaizen*. Probably, it is one of the most recognized Japanese words in the business industry. Two parts form Kaizen word: *kai* - continuous and *zen* - good or change for better. However, in Japan, the word kaizen is not about the changes and improvement, but it is more the philosophy in the minds of Japanese people (Trent, 2008).

The process of implementation of Kaizen is usually done through formal events, and they are focusing on one or several parameters, which are needed to be improved. Such a parameter can be the layout of a hypermarket to improve the flow of customers and make them purchase more, the quality of the services to increase the number of customers. In other words, it is the improvement of any performance that may affect the end customer in the better way.

Kaizen process consists of three phases. In the first phase, it is all about to get ready the kaizen event – document the scope of the event, analyze whether it is needed to conduct the event, and prepare for it. In the second phase, the event is already being performed. And the third phase ensures that the implemented processes are permanently working in order.

The conditions for the Kaizen event involve the series of milestones. The kaizen event itself requires one week or a little bit more, however the milestones before and after the kaizen event may take a longer time. The five involved milestones are listed below (Trent, 2008):

Milestone A: on this stage, the focus of the kaizen is defined, and the event's expectations are documented. Also, the costs and benefits are evaluated on this stage. Usually, this stage takes approximately one calendar week.

Milestone B: at this stage, the kaizen event is analyzed and whether the performed change will bring the benefit and value to the process. This milestone lasts approximately one week as well.

Milestone C: at this milestone, the team and equipment are being prepared for the event. The leaders are acquiring any needed information, the communication about the event is prepared, and the stakeholders are informed. This lasts for approximately three calendar weeks.

Milestone D: at this stage, the actual kaizen event is being conducted, and it generally lasts for a week or even less. The leaders and team evaluate the targeted work

process during the event, solve the issue by improving the process and inform the stakeholders with the results.

Milestone E: at this final milestone, the leader and team of the event verify that the improvements from the event are sustained at the current time. The time of the last milestone may last up to six months (Trent, 2008).

2.3. Introduction to Six Sigma

Nowadays, Lean Six Sigma is a version of Total Quality Management. Six Sigma, as a philosophy, tries to raise the profits by eliminating the defects, waste and possible errors, which may affect customer loyalty. Initially, it was developed by Motorola in the middle of 1980s to produce the outputs with no defects.

The central to Six Sigma is the problem-solving model DMAIC – define, measure, improve and control. This road aims to improve the capabilities of the processes in certain characteristics. The table presented below describes each step in the model, and it helps to define the specific quality improvement opportunity and leads it to the successful completion:

Structure of DMAIC model

Phase	Description
Define	<ul style="list-style-type: none"> - Defines the scope of the project - Defines the process to be improved - Defines the customers, their needs, wants, concerns
Measure	<ul style="list-style-type: none"> - Collects the data - Determines the types of defects - Measures business performance
Analyze	<ul style="list-style-type: none"> - Analyze the collected data - Identify the gaps between the current and desired performance - Identify the root causes - Prioritize the improvement opportunities
Improve	<ul style="list-style-type: none"> - Create solution to the problems - Eliminate the roots of the problems - Develop and apply the implementation plans
Control	<ul style="list-style-type: none"> - Ensures that the processes are maintained - Prevent the revert back - Develop and implement the monitoring plan

Table 1, (isixsigma, 2019)

The model of DMAIC is not the unique Six Sigma methodology, however it is almost the only one which is accepted as the primary Six Sigma Methodology. This methodology suits best for the processes which are not meeting the customer's expectations, and there is space for improvement. Besides DMAIC, there are other methodologies such as DMADV (Define, Measure, Analyze, Design, Verify), DMADOV (Define, Measure, Analyze, Design, Optimize, Verify), DCCI (Identify, Design,

Optimize, Validate), DMEDI (Define, Measure, Explore, Develop, Implement) (Trent, 2008).

2.4. Six Sigma Tools

There is a wide range of Lean Six Sigma tools, which can be applied to the processes and they are aimed at improvement. The main ones, which are suitable for the application on the processes of the insurance companies are presented in this subchapter.

SIPOC – (Suppliers, Inputs, Process, Outputs and Customers)

SIPOC is a diagram which is widely used across the DMAIC model for problem-solving. Especially in the Define part of DMAIC. The name of the power tool corresponds to the five elements: Suppliers, Input, Process, Output, Customer. This is a useful tool which helps to define the scope of the project, processes for improvement, the customers' needs and wants (Pyzdek, 2003). SIPOC helps to determine the Suppliers of the process, Inputs to the process, Process itself which is planned to be improved within the scope of the project, Outputs, which the process brings and Customers which receive the outputs of the process. As an example, the sample diagram of SIPOC model for the production process of packages is presented below:

Suppliers	Inputs	Process	Outputs	Customers
<ul style="list-style-type: none"> - Final customer - Equipment and software supplier 	<ul style="list-style-type: none"> - Geometric or graphical models - Specifications - Pre-printing equipment and software 	<div>Pre-printing</div>	<ul style="list-style-type: none"> - Structural design 	<ul style="list-style-type: none"> - Printing area of Production Department
<ul style="list-style-type: none"> - Pre-printing Department - Raw materials suppliers - Equipment supplier 	<ul style="list-style-type: none"> - Structural design - Tints - Cardboards - Printing equipment 	<div>Printing</div>	<ul style="list-style-type: none"> - Printed cardboards 	<ul style="list-style-type: none"> - Cutting and creasing area of Production Department
<ul style="list-style-type: none"> - Printing area of Production Department - Pre-printing Department - Equipment, tool and material suppliers 	<ul style="list-style-type: none"> - Printed cardboards - Structural design - Cutting and creasing equipment and tools - Special glue 	<div>Finishing</div>	<ul style="list-style-type: none"> - Finished product 	<ul style="list-style-type: none"> - Shipping area / Logistics Department
<ul style="list-style-type: none"> - Shipping area / Logistics Department 	<ul style="list-style-type: none"> - Finished product - Order packaging 	<div>Shipment</div>	<ul style="list-style-type: none"> - Finished product shipped to the final customer 	<ul style="list-style-type: none"> - Final customer

Figure 2 (Pyzdek, 2003)

Voice of Customer

The term of Voice of Customer Gathering (VOC) is widely used for the purposes of capturing the customers' requirements. The tool of Voice of Customer is the technique that helps to obtain detailed information about the customer wants and needs. Later they

are organized in the vertical format depending on the priority and importance (Griffin & Hauser, 1993).

Voice of Customer usually consists of quantitative and qualitative market researches. For example, the information from the qualitative research is obtained from the interviews of the focus groups or feedback sessions. The information for the quantitative research can be obtained by the questioners or another analytical approach (Griffin & Hauser, 1993).

Critical-to-Quality

Critical-to-Quality (CTQ) helps to identify the characteristics of the process which have a direct impact on the overall process or product which the customers receive. The variables of CTQ are presented in the form of a tree, and it determines the needs of the customers, drivers that are important for the customer and the performance requirements which are needed to satisfy each quality driver (Nonthaleerak and L.C. Hendry, 2004).

As an example of how the tree of CRQ looks like is presented below:

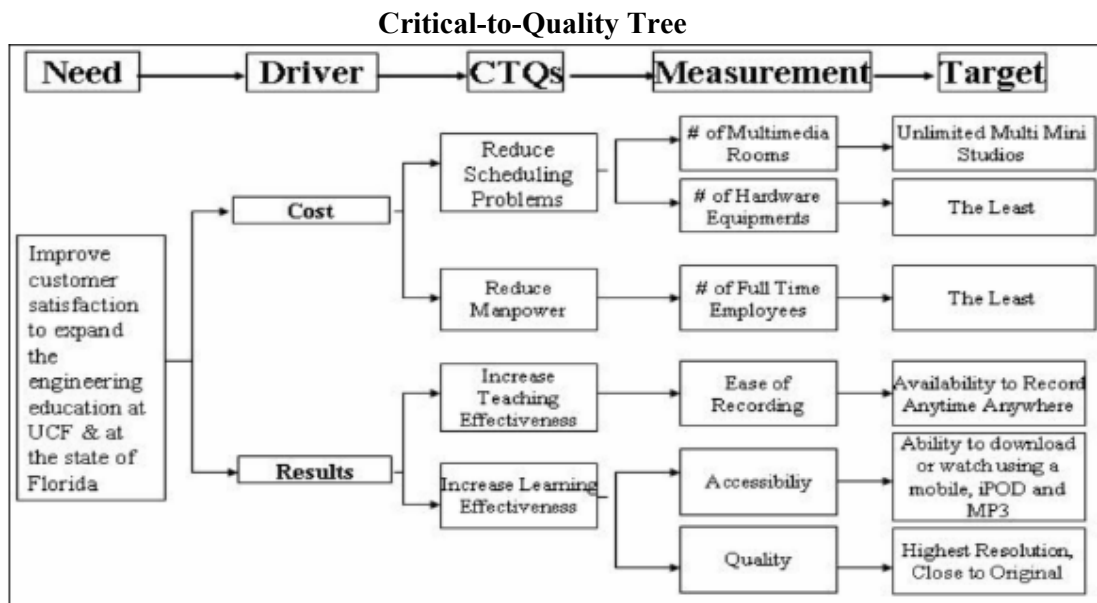


Figure 3 (Pyzdek, 2003)

Flowchart

Flowchart is one of the main tools for mapping the business processes and illustrates the flow of actions. The flowchart enables the visual representation of the set of actions following in the particular order, which are needed to perform the process (Gygi, DeCarlo, & Williams, 2005).

The flowchart requires each step to be shaped in the denoted form and connected with the lines and arrows. Organizing the information in such way leads to a better understanding of the process from the beginning to the end (Gygi, DeCarlo, & Williams, 2005).

The main shapes of the actions in the flowchart are briefly explained below:

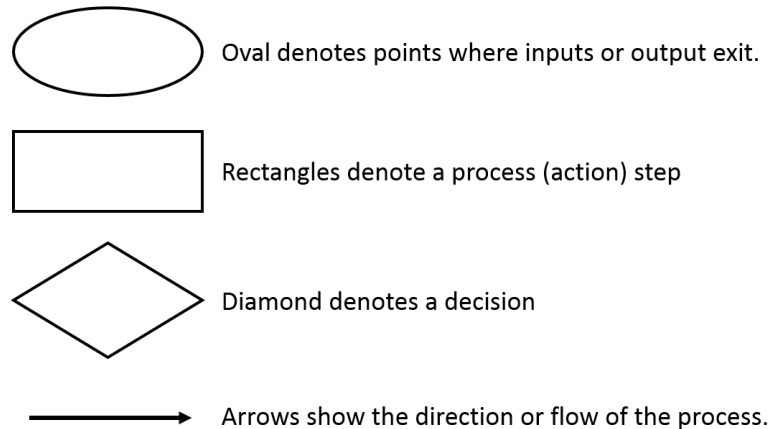


Figure 4 (Gygi, DeCarlo, & Williams, 2005)

There are many types of the flowchart: swimlane, workflow and process diagrams, influence, data flow. Historically, the primary purpose of the flowchart diagram was to organize the work process in the industrial engineers (Gygi, DeCarlo, & Williams, 2005).

The main reason to use the flowchart is to allow the team or the individual to determine the actual flow or the order of the actions or events which are occurring during the process. Flowchart helps to answer the questions related to the team performance and the work design. The primary focus of the flowchart is the work rather than job titles or vertical organization of the company structure (Gygi, DeCarlo, & Williams, 2005).

First Time Yield

The First-Time Yield (FTY) measures the percentage of the units that are performed from the first try, without any rework or scrap; it is defined as the number of units that are coming out of the process and divided by the number of units that initially went to the process during the specific period of time. In other words, it can be said that the First-Time Yield is the number of goods produced over the number of total units went into the process (isixsigma, 2019).

Lead Time

Lead time is an essential metric of the process improvement. It is measured by the time when the process starts up to the point when it ends. It sums the minutes, hours or days depending on the defined metric. The companies review the lead time for the better understanding of whether the process is handled efficiently and how far it is from the benchmark. The reduced lead time can improve the operations and productivity, leading to increased output and revenue (isixsigma, 2019).

Gantt Diagram

The diagram which is widely used in project management and it is one of the best ways to represents the activities and how much time it takes to complete the process.

Tasks to complete are listed vertically from the left side of the diagram and the time intervals are presented on the horizontal axis. The time required for each activity is presented by the bars; the position of each bar and its length reflects the start and end date of the activity, showing the total time needed for each task (Wilson, 2003).

Gantt diagram enables us to see the schedule of the process, the times when the actions are overlapping and by how much. The example of the Gantt diagram is presented below:

Gantt Diagram

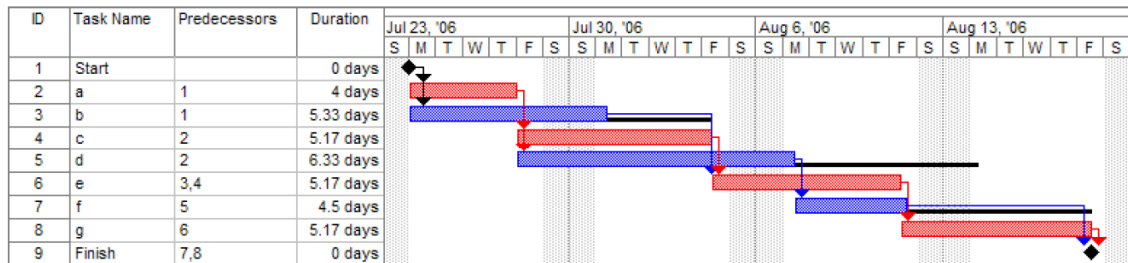


Figure 5 (Flickr.com)

Pareto Analysis

The Pareto rule of 80/20 which shows the idea that 20% of the work generates 80% of the benefit. For example, talking about quality improvement – a vast majority of problems (80%) are caused by a few critical problems (20%).

The rule of 20% can be applied everywhere: 80% of customers are complaining about 20% of products and services; 20% of salesforces produces 80% of company's revenue; 20% of defects cause 80% of its problems.

The primary tool for the Pareto analysis conduction is Pareto Bar chart. The bars are presented from the highest to lowest order, according to the priority and critical contribution, therefore the Pareto chart shows 20% of the issues are causing 80% of the problems (Gygi, DeCarlo, & Williams, 2005). The example of the visual representation of the Pareto chart is presented below:

Pareto Chart

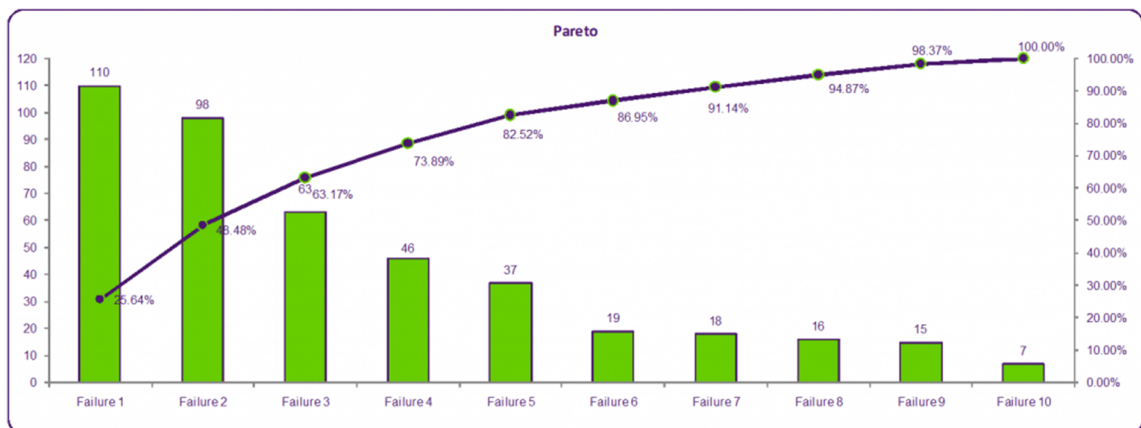


Figure 6 (<https://www.whatissixsigma.net/pareto-chart-and-analysis/>)

Fishbone diagram

Fishbone diagram has different names: Ishikawa diagram or cause-and-effect diagram or Fishikawa. This tool is used to visualize the categorization of potential causes of the problems and identification of the root causes.

The diagram is very similar to the skeleton of the fish, where the main problem is presented as the head of the fish, and the causes of the problem are feeding into the spine. Also, the fishbone diagram is a useful tool for search and prevention of the potential problems; in other words, it is used to troubleshoot before the trouble appeared. The author below presented the figure as an example of how the fishbone diagram looks like:

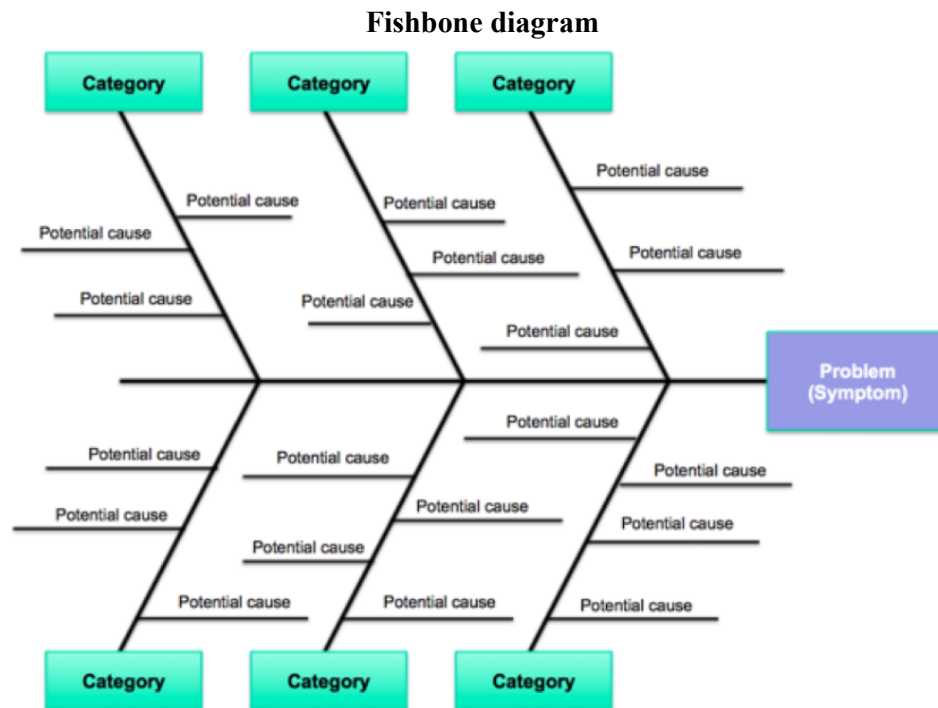


Figure 7 (<https://goleansixsigma.com>)

3. Methodology

The methodology part of the master thesis, introduces the reader more to the topic of the thesis, its strategy and limitations. Also, in the chapter of Methodology, the author describes how the analyses were conducted and the reasoning behind the tools and approaches used.

3.1. Research strategy

The research in this master thesis is conducted in the form of case study, which examines the process of claims handling in the particular insurance company and aims to provide the proposal of improvement with application of lean tools. In this master thesis, the inductive approach between the theoretical outline and the practical part is exercised, meaning that the author firstly collected the data, which is relevant for the topic of the thesis. Later, based on the information collected, the author looked for the patterns in the data and stated the hypothesis, which is explaining those patterns (Bryman, 2012).

The research strategy of this master thesis is first, to obtain both quantitative and qualitative data:

- The quantitative method of the data collection is the data provided by the insurance company, which contains limited information about 130 health claims for three years period from 01.01.2015 to 31.12.2017. This data contains information about the date of loss, date of submission of the documents to the insurance company, date of the loss settlement by the insurance company to the claimant, amount of the loss compensated and a short comment about each of the loss. Later the author categorized the data provided per the following criteria:

- 1st category (Green) – losses were compensated from 20 to 39 days.
- 2nd category (Yellow) – losses were compensated from 41 to 59 days.
- 3rd category (Red) – losses were compensated from 60 days and more.

Such criteria were defined based on the internal Key Performance Indicators of the Company. One of the performance indicators for the process of claim settlement is the timing.

The medical partner promises to provide the review for the health claim within 10 days, later the claims department has 10 working days to approve the claim settlement for the payment. The accounting department has 8 working days for the processing the payment to the Insured, therefore, taking all the possible delays the Company has “the best-case scenario” of 39 days for the claim settlement.

The analyzed insurance company has three “baskets” of claims. The first basket is for the claims, which were settled within 20-39 days after the submission of the documents; the second is for the claims, which were reviewed and approved for the settlement from 41 to 59 days; and the last basket is for the claims for which the settlement

process took more than 60 days. Therefore, the author used the same metrics for the project and sorted the claims as per such categories.

After the data preparation, the table looked as presented below:

Policy number	Date of first notice	Date of the claim settlement	Days spent for the claim settlement	Category	Claim Sum in EUR
81	14.4.2015	18.5.2015	34	Green	1 193,00
10	14.4.2016	12.7.2016	89	Red	612,00
24	3.4.2017	22.6.2017	80	Red	2 068,00
23	13.4.2017	3.7.2017	81	Red	6 971,00
25	17.4.2017	26.6.2017	70	Red	5 080,00
27	20.4.2017	26.6.2017	67	Red	6 227,00
44	6.8.2015	22.9.2015	47	Yellow	8 517,00
84	13.8.2015	8.9.2015	26	Green	1 346,00
86	24.8.2015	17.9.2015	24	Green	6 169,00
87	27.8.2015	28.9.2015	32	Green	5 351,00
43	31.8.2015	14.10.2015	44	Yellow	6 892,00
42	31.8.2015	26.10.2015	56	Yellow	2 730,00
54	2.8.2016	26.9.2016	55	Yellow	3 487,00

Figure 8, Source: company provided data

Author counted the number of claims in each category, and all the claims are almost equally distributed between the time zones, meaning that every category represents 1/3 of the sample size. 52 claims out of 130 were settled between 20 to 39 days, 41 claims were settled between 40 to 59 days, and 38 claims were settled within more than 60 days:

Percentage	Number of claims	Category
40%	52	Green
32%	41	Yellow
29%	38	Red

- The qualitative method was an important part of the data collection due to the nature of the topic. Throughout the work on the thesis, the author was constantly in touch with the insurance company representative and discussing the process related questions, which were arising during the writing process of the thesis. Moreover, to see the other side of the process – customers, the author created the focus group, consisting of 5 people, which are continually purchasing one or more insurance policies for their financial protection. The author tried to invite people with a different style of life and social status – married/single, with/without kids, worker/student, so that the focus group could cover the broader range of the insurance company's target groups. Author conducted face-to-face interviews with each of the members of the focus group asking the following pre-designed questions:

1. Do you buy insurance coverage and if yes, what types of insurance policies you have currently?

2. What percent of your income goes to the purchases of the insurance coverages?
3. Do you buy all the insurance policies from one insurance company or you prefer to buy different policies from different companies?
4. Have you ever asked for the reimbursement from the insurance company?
5. How many days or months it took for you to get a reimbursement for your claims?
6. What is your primary expectation from the insurance company?
7. What could be improved in the insurance company from your point of view?
8. What is an ideal way insurance company should to work?

3.2. Rational criteria and limitations

For the better overview of the situation, it is necessary to extend the scope of the analysis by studying every type of the claim settlement process, considering all possible involved parties, as the claim process differs depending on the type of insurance policy and its conditions. Also, the time frame of the analysed sample data and the time limits spent on the research increase the probability of errors and biases, therefore it is recommended to expand the period of the data set and dedicate more time for the process analysis. Moreover, the availability of more advanced software tools, such as Tableau, would increase the accuracy of the analysis.

The author was provided the limited data from the insurance company due to the strict GDPR and confidentiality rules. Furthermore, the author was not provided any information about the costs of the projects for implementation, the author could only suppose how much the proposed projects would cost.

Also, all the proposed solutions by the author will not be implemented during the time when this thesis is being written, therefore the author will be analysing the benefits brought by the improvement on the mock data, considering that the solutions were indeed applied. All the improvement proposals offered by the author will be considered once the insurance company will be planning the implementation of the project for the improvement of current processes.

3.3. Specific methodology approach

3.3.1. Literature Review

For a better understanding of the key components of the insurance companies and the internal processes, the author reviewed the relevant literature. The most important resources used for the preparation of the theoretical background of this master thesis are categorised and listed below. Also, the below-listed literature was one of the main components for the analysis of claim settlement process in the insurance company, even though it does not provide the possibility for the complete assessment of the whole insurance company and its performance.

1) Books:

- Insurance Europe. (2012). *How Insurance Works*. Brussels: Insurance Europe aisbl.
- Insurance Information Institute. (2010). *Insurance Handbook*. In *A guide to insurance: what it does and how it works*. New York.

- Hobbs, D., & Burton, T. (2011). *Applied Lean Business Transformation: A Complete Project Management Approach*. Fort Lauderdale: J. Ross Publishing.
 - Trent, R. (2008). *End-to-End Lean Management : A Guide to Complete Supply Chain Improvement*. Fort Lauderdale: J. Ross Publishing.
 - Pyzdek, T. (2003). *The Six Sigma Handbook: A Complete Guide for Green Belts, Black Belts and Managers at All Levels*.
- 2) Reports: Swiss RE, EY, WNS, IBM Corporation
 - 3) Electronic Databases: EOCB, Investopedia, Britannica
 - 4) Journals:
 - George, R. (2016). *Process improvement in the financial services industry*. Journal of Management & Engineering Integration.
 - Panigrahi, R. (2015). *Case Study: Improving Medical Bill Review Cycle Time*.
 - 5) University studies
 - 6) Internal sources

3.3.2. Six Sigma Implementation: the DMAIC framework

The author of the thesis applies the Six Sigma approach for the process of the claim settlement in the insurance company. In the practical part of the thesis, DMAIC (Define-Measure-Analyse-Improve-Control) approach was exercised as the methodology offers a structured approach for the implementation of the improvement proposals. As it was described in the previous part of the thesis (page 22), DMAIC is the problem-solving methodology behind Lean Six Sigma. Techniques and tools of lean management, which were studied before (page: 23-27) are employed to achieve the minimization of non-value-added activities and efficient allocation of resources.

3.3.2.1. Define

The first phase of DMAIC model is Define and it aims to define the scope and the objective of the product.

SIPOC

The main tool used for the identification of the product's scope is SIPOC, as it enables to find out the Suppliers of the process, Inputs to the process, Process itself which is planned to be improved within the scope of the project, Outputs, which the process brings and Customers which receive the outputs of the process (page 23). The author summarized the information from the insurance company representative about the process to SIPOC table. This table defines the current process of the claim settlement in the analyzed insurance company, the main parties involved and their contribution to the process. The SIPOC table shows the route from the point when the claim happened until the time when the insurance provider finally compensated it. Also, SIPOC model shows the main parties involved in the process, as Suppliers and Customers. The SIPOC table with the information to the thesis analysis is presented on page 40.

Voice of Customer Gathering

As the part of the qualitative research and for the better understanding of the average customer, purchasing the insurance policy, the author conducted the interviews with each member of the focus group, asking pre-designed questions, which are listed above (page 29-30). The information obtained from the Voice of Customer Gathering enabled deeper analysis of the customers' needs and wants and how the processes of the insurance companies are perceived from the customer perspective. The main highlights of the interviews are presented on page 41-42.

Critical-to-Quality

The principle of Critical-to-Quality and the form, of how it is presented, is explained in the page 24 of this master thesis. Based on the information obtained from the Voice of Customer, the author could highlight the main needs of the insurance company from the process, the quality drivers of the need, the performance requirements of those quality drivers and the Critical-to-Quality metrics. Later the author decided to focus only one quality driver as the expected advantages brought by the improvement of that quality driver would bring more benefits than any other quality driver among the listed ones. Once the focus driver was selected, the final version of the table with one quality driver was presented on page 44.

Flowchart

For the visualization of the claims handling process in more details and the actions performed throughout the claim journey within the insurance company, the author used the swim lane flowchart. The swim lane flowchart helped to show the route of the average health claim once the claimant submits it to the insurance company. One of the main benefits of the swim lane flowchart and its applicability for the analyzed process is that it groups the processes according to the principle of "who does what". Most of the information relevant for the flowchart was obtained from the insurance company, as a part of qualitative data collection. The prepared flowchart is presented later on page 42.

Once all the information from the side of the insurance company and from the side of the customers was gathered, the author could define 8 main challenges which are currently present in the claim settlement process of the analyzed insurance company.

3.3.2.2. Measure

Once the main defects were identified in the part of Define of DMAIC model, the goal of Measure part of DMAIC model was to validate the identified defects and gain a deeper understanding of the process. To achieve this goal, the quantitative data obtained by the insurance company was the primary source. The structure of the data was previously explained on page 28-29.

Lead Time

To measure the average time required for the settlement of one claim, the author used the Lead Time, as it enables to calculate the number of days, hours or minutes required for the completion of the process, from the point when it is initiated till the moment it ends, as it was explained on page 31. The author believes that the value of the Lead Time could be improved by 30% once the improvement proposals will be implemented.

The Lead Time was calculated according to the information from the flowchart and the consultation with the insurance company representative. The main considerations of the author regarding the Lead Time were that all the actions are performed without any delays and according to corporate standards. Another consideration of the author was that all the actions are correct from the first try, in case there was missing documentation, or the loss is outside of the policy conditions, such outputs are leading to the Start or the End of the flowchart, and their journey is not presented further. The results of the Lead Time are presented further on page 46-47.

Gantt Diagram

For the easier understanding and visualization of the process's timing, the author used Gantt diagram. The example of the Gantt diagram and its description was presented on page 26 in the section of Six Sigma Tools. The Gantt diagram with the measurement of the current process is presented on page 47.

First-Time Yield

As First-Time Yield measures the percentage of the units that are performed from the first try, it is very useful tool to measure the percentage of the claims in the insurance company which are compensated from the first "pass", meaning that the claim package was correctly submitted and there was no communication required between the insurance company and claimant during the claim settlement process. The author explained the meaning behind the First-Time Yield previously, on page 25, and later applied the calculation on the real case on page 47-48. The First-Time Yield was calculated by summing up the number of claims settled from the first "pass" and dividing it by the number of total units going into the process. The author believes that the value of First-Time Yield could be improved by an additional 20%.

3.3.3.3. Analyse

In the third phase of DMAIC model, Analyse, the author used the data provided from the insurance company and various statistical methods to determine the roots and possible causes of the problems.

Basic statistical values

First, the author calculated the mean, median and standard deviation of the days spent for the claim settlement. The mean was found by dividing the total number of days on the total number of claims compensated, and it shows the actual number of days spent for the health claim settlement process within 3 years period. After the mean, the author

found the standard deviation to find out the amount of data values variation from the mean - the closer the values to the mean, the more precise the mean is. The standard deviation helped to see how much precise the mean value is. The median was found by placing all the value in the descending order and finding the value which is right on the middle, in other words, it separates the values of the higher half from the lower half of a data sample. The author preferred to focus the attention on the median value as one of the main advantages of using the median than mean is that it is not skewed so much by extremely large or small values, so it better gives an idea of a typical value.

Histogram

Histogram enabled to check the statistical data distribution by checking the sample values for the normality and presenting the values in the form of a histogram. In case the data is normally distributed, it is always symmetrical about the mean, and the bars of the histogram have the share of the bell. However, if the bars of the histogram are U-shaped, J-shaped, bimodal, right or left skewed, then the data is not normally distributed, and the values are not symmetrical to the mean.

In the Analysis part, the author prepared the histogram for the days spent on claim settlement in the insurance company. The author believes that the more histogram is J-shaped or right shaped is better, meaning the higher number of claims is settled within a short period of time. More bars on the left side of the histogram, showing the high number of claims are settled within a longer period. The histogram for the number of days spent for the claim settlement is presented on page 49.

Correlation coefficient

To determine the patterns in the data, the author ran the correlation analysis and see whether one set of values is correlated with another set of values. The author performed the correlation analysis by checking the dependency between the days spent for the claim settlement and the number of returns. The higher the correlation confident, the stronger the dependency. The correlation analyses are presented later in the thesis, page 50.

Hypothesis Testing

Later the author did the hypothesis testing to check whether the hypothesis whether the higher the monetary value of the claim, the more days are required for the process review, because the insurance company needs to be more attentive to a higher amount and conduct more checks.

First, the author prepared the data for the analysis. The author categorized the variable with the monetary values of the claims and divided them into 4 categories depending on the amount of the sum claimed:

The claims distribution in the categories depending on the claim sum:

1 category	-	2 499,00
2 category	2 500,00	4 999,00
3 category	5 000,00	7 499,00
4 category	7 500,00	> 10 000,00

Figure 9, Source: data from the company and author's analysis

Later, the author prepared the information for the hypothesis testing:

Null hypothesis – the time length of the claim settlement depends on compensation amount – the higher the monetary value of the claim the longer the loss will be reviewed.

Alternative Hypothesis – the time length of the claim settlement does not depend on the compensation amount – the monetary value of the claim does not affect the time it takes to review the claim.

Significance level – the author set the standard significance level $\alpha = 5\%$, therefore the author will assume that there is 5% of the probability of rejecting the null hypothesis, given that it was true.

Data – the author checked for the dependency the values of claim amounts and the days it took to be settled.

To check the hypothesis, one-way Analysis of Variance (ANOVA) was used in conducting the analysis. The reason why the author selected one-way ANOVA for the analysis in hypothesis testing is to see if there is any difference between the groups of the variables. After running the hypothesis testing, the author compared P-value with 5% significance level to decide whether to accept or reject the null hypothesis.

Later, the accuracy of the analysis, the author found the correlation coefficient to see whether the number of days spent for the claim settlement and the monetary value of the loss are correlated.

Author checked one more hypothesis about the claim settlement and whether it influences the final product. Author tested whether the timing of the claim settlement process varies by the season, for example, if the claim was submitted in the summer time, it would be reviewed longer than in spring or autumn time, due to the holiday season. Only the claims, which were in Red and Yellow categories, were considered by the author for the analysis of this hypothesis, because the claims in these categories are not performing well and reviewed longer than the standards require.

To check whether this hypothesis is true or not, the author selected the claims only from Red and Yellow. Then, the author summed the total number of days in each month for the last three years and compared which month has the highest number of days spent for the claim settlement.

Pareto Analysis

The principles of Pareto analysis were described in the previous part of the master thesis on page 26, and the author applied this tool in the Analyse part of DMAIC model.

Throughout the analyses and interviews, the author identified 8 main challenges which are impacting 80% of the process.

The author went through the history of each claim with the company representative and tried to determine, which from the previously identified challenges, occurred during the claims settlement process of each loss. Later the author assigned respective challenges to the claims in case the difficulties occurred, if there was not any problem during the settlement process, the field was left empty. There were claims which were involving different problems at the same time, therefore several challenges were assigned to the claim.

Once every claim was analysed, the author counted the number of times the particular challenge occurred during the claim settlement process. Such procedure allowed to identify all possible difficulties which were appearing during the claim journey after submission the loss package by the Insured. Later the author summarized the results and presented it in the form of Pareto graph to see the problems which have the most significant impact on the process of claims review. The final graph is presented on page 51.

Fishbone

Once the challenges were highlighted, and the respective analyses were conducted to determine the main root causes of the problems, the author summarized the information in the roots/causes chart – Fishbone diagram. Fishbone diagram was explained by the author in the previous part, on page 27. The Fishbone diagram, which reflects the current claim settlement process in the insurance company is presented on page 56. The author divided the roots of the challenges in several categories: people, process, technology, controls, procedure, service.

3.3.3.4. Improve

In the Improve phase of DMAIC model, the author suggested the improvements to implement. First, the author listed the opportunities for improvement, which were defined in the Define part of DMAIC model, in the descending order, according to the size of the cause, from the Pareto analysis.

For the easier understanding and navigation, the author presented the information about each opportunity in the form of the table and it included the following information:

- *Description of the challenge* – the author described possible the roots of the challenge and how the process is currently designed. The challenges were described and later were reviewed with the company representative for validation.

- *Number of times the difficulty occurred* – the author used this information from the Pareto analysis and showed what the percentage of claims which faced with the particular difficulty during the claim settlement process is.

- *Proposal for improvement* – the author brainstormed the possible ways to avoid the occurrence of the particular challenges in the future and how to implement it

- *Expected benefits* – the author listed the benefits, which could be brought by the implementation of the proposal of the improvement for the particular challenge.

- *Expected costs of implementation* – the author was not disclosed how much the implementation of the project could approximately cost, and the author provided the approximate costs for the project implementation depending on the market prices for the particular services.

- *Required time* – the author evaluated the approximate period which could be required for the implementation of the proposal.

- *The difficulty of implementation* – the author evaluated the difficulty of the project to implement and scaled in from 1 (easy) to 10 (difficult).

Once the table for each of the challenges is filled, the author prepared another table with the summary of the opportunities for improvement, where the following information was shortly listed:

- Name of the challenge
- Priority
- Cost
- Difficulty

The author listed the challenges in the table according to the difficulty of the implementation, which was previously defined. After it, the author selected the top five opportunities for improvement, which are the easiest and the cheapest to implement. The summary of the table is presented on page 64. As the last stage before the actual implementation of the projects, the total sum of the project is calculated by summing up all the costs of the projects, which are planning to be implemented.

Once the opportunities for improvement were selected, the author described how the solution has to be implemented. The description of each Kaizen event and how it has to be designed, the author explained in the previous part of the master thesis, on page 21-22. Applying the theoretical outline of the Kaizen project, the author designed the Kaizen event and proposed the expected schedule for the project implementation, using Gantt diagram (page 65-72).

3.3.3.5. *Control*

In the last phase of DMAIC model, the author checked the potential results brought by the implemented projects. As it was mentioned before, in the part of Research Limitation, all the proposed solutions by the author will not be implemented at the time, when this thesis is being written. Therefore, the author could see the results of the implemented projects only on the mock data, considering that the projects are implemented indeed.

In order to see the potential results of the solutions offered, the author supposed that the implemented project solving a particular issue would reduce the occurrence of the issue by 60%. The author did not suppose the total elimination of the defects leaving some space for the biases and errors. Such an assumption was applied only to those opportunities for improvement, which were selected for implementation.

To measure the results of the projects, the author calculated the Lead Time and First-Time Yield and compared it to initial values, which the author obtained in the part of Measure of DMAIC model (page 73-75). Later, the author calculated the mean, median

and standard deviation and compared it to the initial values as well to see the size of the change. The author also presented the new values of days spent on the claim settlement in the form of the histogram in order to see the distribution of the days spent on the claim settlement and how the bars of the histogram moved, showing the potential improvements brought to the process.

Risk Analysis

To measure the risks associated with each of the projects, the author conducted the risk analysis. The author prepared the risk analysis with the application of model FMEA (Failure Mode & Effects Analysis) to determine the possible errors and failures, which can impact the process of claims settlement in the insurance company. The model of FMEA enables to determine the negative consequences once the project is implemented (Jing, 2019).

FMEA is a useful tool for the risk analysis as it helps to identify the possible failures, the impact brought by that possible failure, the possible causes. The model enables to scale (1 – low, 10 – high) the severity (S), probability (P) and detectability (D) of the possible failure. Then the risk number is calculated by multiplying the values defined for each of the measures: $S * P * D = Risk\ number$. The table with risk analysis is presented on the page 77-78.

5W1H

As part of the Control phase in DMAIC model, the author applied the methodology of asking 6 following questions about the process and project implemented (isixsigma, 2019):

- What to control?
- Why to control?
- When to control?
- Whom to control?
- Where to control?
- How to control?

Four questions starting with W and one H allows to focus on details and get the fundamental facts about the control part of the project once it is implemented.

3.4. Process improvement in insurance industry

There was a study of the medical bills handling in the US insurance company, and it was a case where the application of Lean Six Sigma was a smart move towards operational excellence and increased customer satisfaction. In this study, the company implemented Lean Six Sigma project to decrease the operational expenses and improve customer satisfaction (Panigrahi, 2015).

In this case study, the insurance company outsourced the process of medical bill review to another leading company in the industry. Initially, the process of medical bill review was experiencing constant inefficient communication between the insurance company and the medical partner, leading to the decrease in the quality of services

provided and the increased time for the bill's review. Such delays also were reflected in the customer dissatisfaction, leading to the high volume of phone calls and email with complaints and the questions about the time when the claim will be settled. Also, in the United States, there are some states (there are 30 such states in total), where the fines are applied in case of the delayed loss payment (Panigrahi, 2015).

The primary goal of the project was to shorten the average cycle time of the medical bill review from 28 days to 15 days, and the expected benefit was the annual saving for \$1 million.

The study was conducted by applying the Six Sigma DMAIC model. In the Define part, the main problem was stated – the long cycle time of the medical review process.

In Measure part, the review process was measured by identifying the upper and low control limits and the operational output metric. Later they created the mapping process – flowchart, which shows each step in the process. After it, they divided the flowchart into two parts to show the average time for the claim settlement: for the states with strict rules for the payment of the medical bills within 30 days and the states without such government rule.

In Analyzes part, they prepared a Fish Bone Diagram to outline the potential roots of the bill review process which takes more than 30 days, these potential causes related to the machines, providers, measurements, partner and internal operations, the methodology involved. In this part, they also confirmed by running the hypothesis testing that 30 days bill review response time requirement does not impact the actual turnaround time (Panigrahi, 2015).

In Improve part, the team did a process value analysis to determine non-value-adding activities and which are contributing the potential delays in the medical bill review timing. To summarize the findings, they presented the output in the form of a table with three columns: non-value-added activity, solutions to eliminate this activity and the amount of saving the project brings. (Panigrahi, 2015)

In the last control stage, the team tested the proposed new project with a pilot version in the few states, and after the successful workout, they implemented the control plan in all of the states.

At the end of the project, the team reached the targeted results – they reduced the bill review time from 28 days to 15 days, and they saved for the company \$1,6 million in penalties, fines and lawsuits (Panigrahi, 2015).

4. Process Analysis

The part of the Processes Analysis, the author will exercise the relevant analysis of the process to understand more profound the current process performance of the insurance company. The methods of how the process analysis was conducted are described in the previous part of the master thesis, and in this part, the methodology was followed to perform the studies.

4.1. Define

The theoretical outline of the Define phase of DMAIC model was presented earlier in the thesis (page 22-23) and the methodology of how the Define was presented earlier as well (page 31-32). In this chapter, the author will define the process and the aspects which are connected to it.

4.1.1. SIPOC

SIPOC model described previously in the theoretical outline of the master thesis topic, page 22-23. It is a useful tool for the understanding of the process, which the author is about to change. The author summarized the information to the table below, which shows the current process of claim settlements in the analyzed insurance company. The SIPOC tool shows the route from when the claim happened until the time when the insurance provider finally compensated it. Also, SIPOC model shows the main parties involved in the process, as Suppliers, Inputs, Process, Output, Customers.

Sometimes this model is called COPIS and the process information is filled starting with the customer and moving to the right to the supplier:

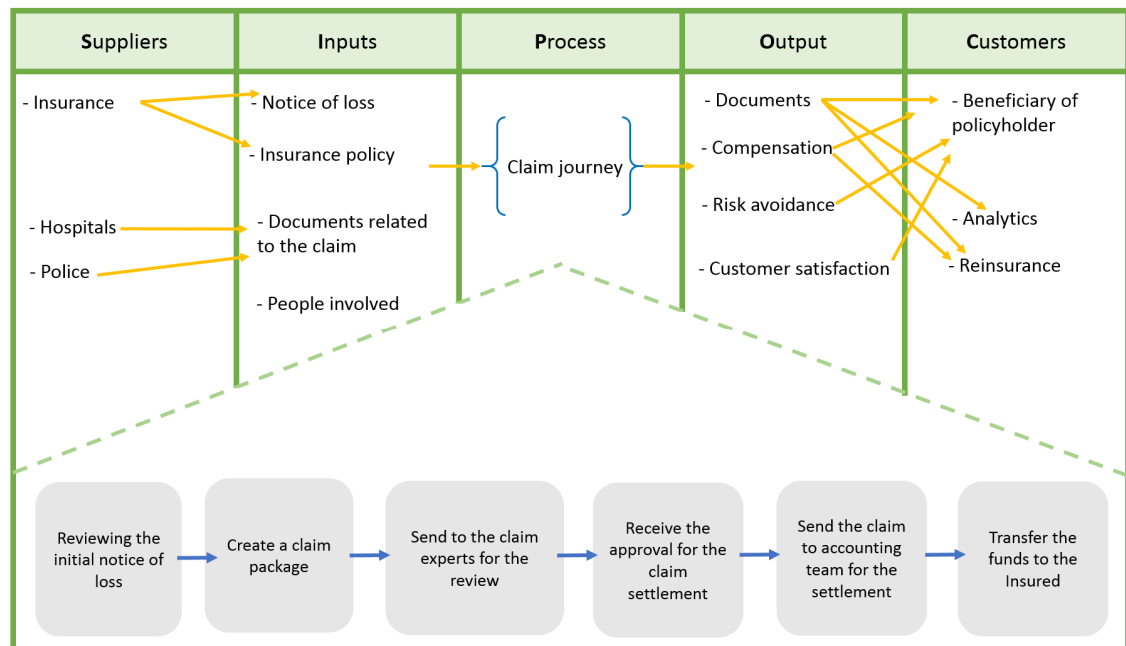


Figure 10, Source: author's analysis

First, who are the final customers of the happened claim? – It is beneficiaries of the insurance policy; the final beneficiaries can be the policyholder itself, his or her relatives and any other third-party people.

What kind of output do they get? – First, they get their claim documented; second, they receive compensation, such as money in the bank account, dividends etc; also, beneficiaries of policyholder receive the benefit of happened claim in the way that they avoided the risk - they bought policy and transferred the risk they could face to the insurance company; and last, but not least, they also received simple customer satisfaction.

Also, the final customers of the insurance claim could be analytics and reinsurers. Analytics may consider the whole information about the claim as data for further analysis; they receive the documentation and information about the loss development and final sum of compensation. In case the sum of loss is big enough, the claim is passed to reinsurers, and later the part of the paid amount is compensated by the reinsurers to insurance companies based on the claim outputs and reinsurance contract conditions.

How were the Outputs listed in the table above received? - These outputs were received because of the inputs from suppliers through the whole process of claim settlement. The main inputs to the process were Notice of Loss, informing that such insurance event happened, and insurance policy that the policyholder bought from the insurance provider. Another important input is all documents related to the claim from all involved parties; inputs to the process are also all the people involved that made this loss happen and people who were involved for the post claim procedures.

The final column of the table are Suppliers – these are all parties involved to the process, such as Insurance company, police, hospitals and many other institutes which can be involved during the claim settlement process.

Therefore, all the inputs and the suppliers of the inputs are passing through the process, that is specified on the table above under the “Claim Journey” and reaching the final outputs for the final customers.

4.1.2. Voice of customer gathering

In the upper part of the thesis, in the section named Six Sigma Tools (page 23-24), the author described the Voice of Customer Gathering and its applicability in the part of Define of DMAIC model. For the better understanding the final customers, their wants and needs, for the better adjustment of the process, the author gathered the information by conducting the interviews with each of the member of the focus group, 5 people in total, which are purchasing the insurance policies on a regular basis. The main highlights from the interviews are listed below in the bullet points:

- Every member of the team buys a minimum 1 insurance policy and at least once sustained the loss, which was covered by the insurance policy conditions, therefore the person was claiming for compensation.

- Most of the members of the focus group are spending from 300 EUR up to 6 000 EUR per year for the purchases of the insurance policies.

- The main concerns of the people were long claim settlement process; high number of documents required; weak communication channels between the Insured and the insurance company.

- The primary expectation of the members of the group from their insurance providers is that the company has to be reliable and economically stable, more client-oriented, compensating the claim as soon as possible, more clearly defined and understandable conditions of the insurance policy.

- All the members of the focus group believe that the speed of the claim settlement could be improved, and quality of the services provided to be on a higher level.

- The ideal ways of how the insurance company should look like according to the opinion of the focus group members are following: have a broad scope of hospital-partners or develop a special unique form to fill by the doctors by which the insurance company will be paying the compensation instead of collecting the bills. Insurance companies must be more digitalized entity, where the interaction between the clients and the service providers is faster. And the insurance companies have to be adjusted to different types of clients - different languages, wide territory of coverage.

Concluding all that is shortly stated above, the author can conclude that the primary complaint from the policyholders is the speed of the claim settlement and the quality of the services. Customers are spending a big fraction of their income for the purchases of insurance policies, and they are expecting a good level of services which they would like to receive at the end. Also, the focus group complained about the non-modernity of the insurance industry – not digitalized, not user-friendly and not interactive.

4.1.3. Critical-to-Quality

The model of Critical-to-Quality was described in the theoretical part of the thesis (page 24), and the author applied it to the current analyses according to the information collected from the Voice of Customer. The author summarized in the table below the drivers and performance requirement for customer satisfaction as the need.

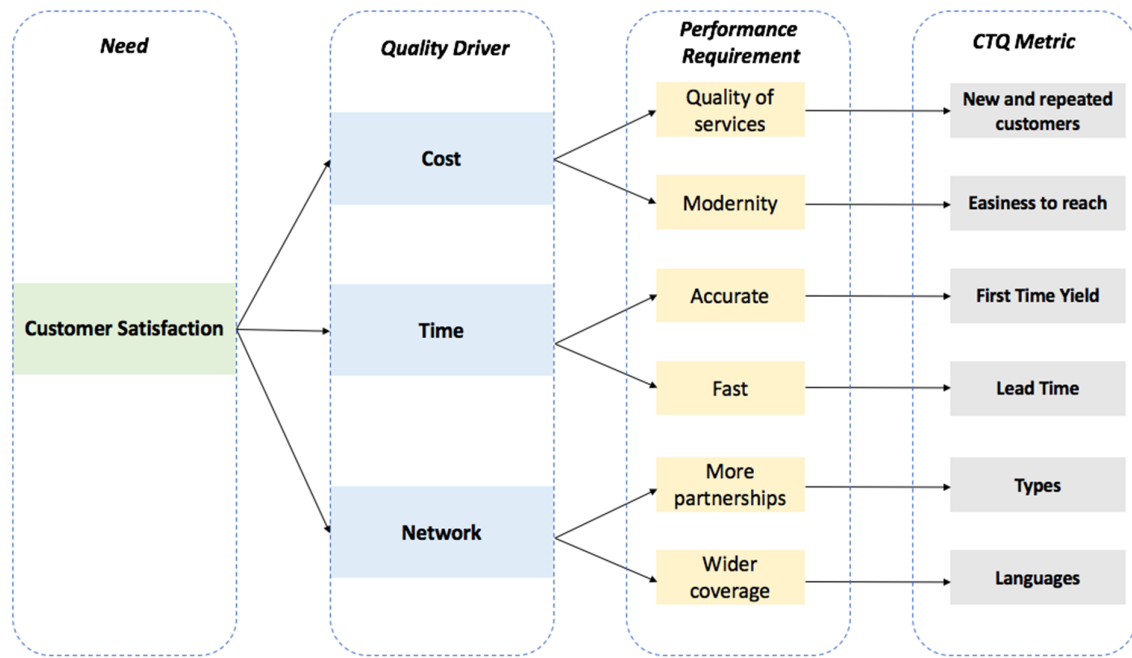


Figure 11, Source: author's analysis

Based on the interviews with the focus group, the author could determine that one of the main drivers of the customer satisfaction in the insurance industry is the cost of the insurance policy vs the time it takes for the claim settlement; the time of the claim settlement; and the network of the insurance industry.

For the project of this master thesis, the author focused only on such quality driver as Time, because the invested money to the insurance policy will worth of the improved speed of the claim settlement; therefore, the quality driver as Cost will be balanced out with the fast compensation process. Moreover, according to the recent studies of J.D. Power and & Associates Property Claims Satisfaction Study, the claim cycle time is the leading indicator of the customer satisfaction (J.D. Power, 2018). Also, the Network as the quality driver will be improved as well under the improved Time, leading to faster communication between the partners and the adjusted client services team.

For the current state of the project, Time is the main focus for the improvement, as the expected advantages brought by the improvement of Time as the quality driver will bring the higher benefits than any other quality driver – it was mentioned by all the members of the focus group and it is the primary expectation of the customers to receive the high-quality service within the short time.

The procedure to analyse the CTQ derives on the selection of Time as the most crucial variable to review first. After selecting focus in the quality of drivers which are correlated between each other, the more precise Critical-to-Quality tree is presented below:

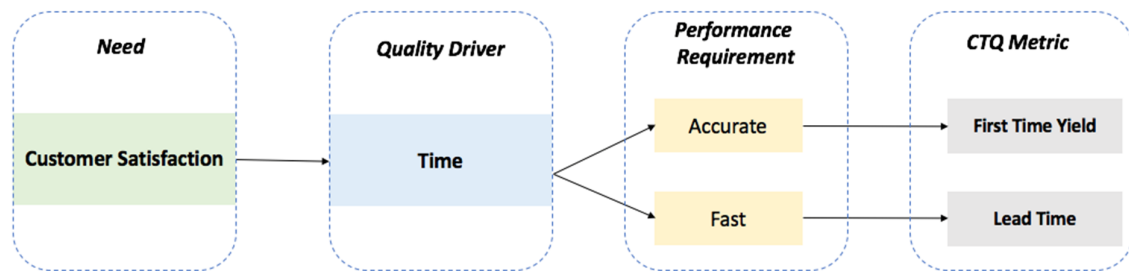


Figure 12, Source: author's analysis

As for the measurement metric of Critical-to-Quality, the author will be calculating the First Time Yield for the accuracy of the claim settlement and Lead Time for fastening the process. The more detailed calculations are presented in part Measure (page 46-48) of the DMAIC mode

Once the proposal projects will be implemented, the author will consider the implementation of Cost and Network as quality drivers.

4.1.4. Process Mapping

For a better understanding of the current average claim settlement process in the insurance industry, the author prepared the flowchart presented on page 45, which represents the average end-to-end journey of the claim in the insurance industry.

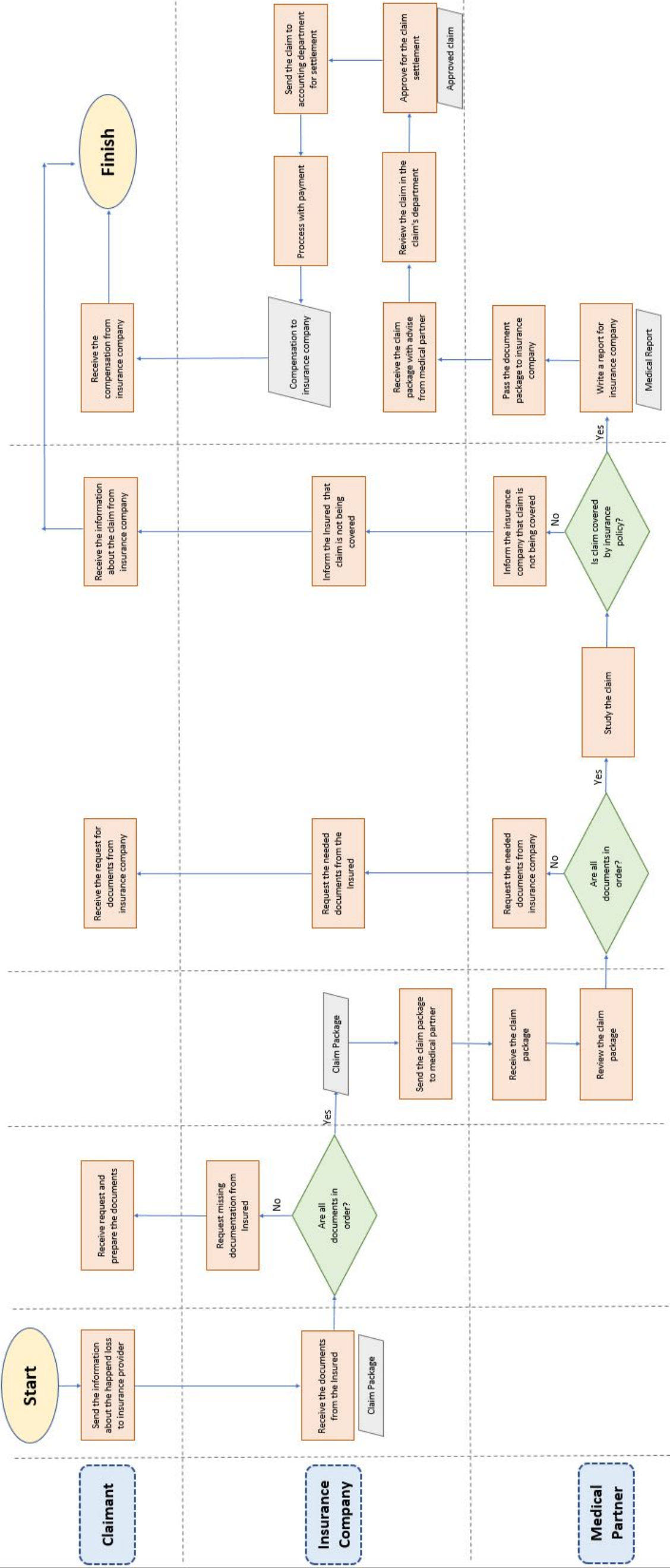
The flowchart was conducted based on the information given by the insurance company representative. The prepared flowchart very closely reflects the actual process.

The flowchart is divided into three leading action players – claimant, insurance company and the medical partner:

- *Claimant* is the original Insured person, which suffered the loss.
- *Insurance company* is the company which sold the health insurance policy and promised to be compensated the loss if it is in the scope of the insurance policy coverage.
- *Medical Partner* as the analyzed losses are viewed under the health insurance policies, the claim needs to be reviewed by the medical partner, because these kinds of losses need to be confirmed with qualified person, which understands the diagnosis, documentation and reason behind the loss amount and whether the conditions of the insurance policy covers the claim.

In the further parts of the thesis, this flowchart will be analysed in the details, and the new algorithms of the actions will be offered.

Combining gathered Voice of the Customer and Voice of the Business (VoB), the following issues were mentioned during the interviews and the flowchart construction process:



- 1) *Long waiting time for the action of each player* – once the claim package reaches the responsible person for the review, it is waiting in the long queue time, leading to the waste of the time and non-value-added activities.
- 2) *High number of departments for the claim to pass through* – once the claim is submitted to the insurance company, it has to pass the set of the departments, before it is approved for the payment. Often the claim is being queried after passing several departments and only after a while it can be discovered that the claim package is missing some important document as an evidence of the loss happened or the claim submitted is outside of the policy conditions, therefore it cannot be reimbursed by the insurance company.
- 3) *Incorrectly submitted documents* - it happens that the loss occurs, and the Claimant submits some documents to the Insurance company with the request to provide the reimbursement for the costs sustained. However, the documents submitted to the insurance provider do not provide enough of evidence to approve the loss as an insurance event, therefore the Insurance company refers back to the claimant and asks to provide more documentation to be able to recognise the loss and record it accordingly in their books.
- 4) *Not exact specification of the policy conditions and risk coverage* – the sum of the compensation that is asked by the claimant differs by the sum of the reimbursed claim. Mostly, this is happening by the fact that the policyholders are not aware of the exact insurance policy conditions. Once the claim is settled, it leads to the questions and queries from the policyholders with the request to explain why the amount of loss reimbursement is lower than the claimed one.
- 5) *Complicated communication between the insured and insurance company* – the customers are complaining that it is difficult to reach the insurance company and ask for the current status of the loss reimbursement. Often, the insurance companies are still using letters sent by post as the way of communication with insured.
- 6) *Non-acceptance of the foreign documents* - the insurance company is not accepting the documents if they are in foreign language. It is common in case the loss happened abroad, and the claimant had treatment in another country, therefore all the documentation provided by the doctor is in a foreign language. Therefore, the claimant is obliged to provide the documents with the official translation.
- 7) *High compensation amount* – the company representative stated that usually once the claim sum is large, the higher attention paid to the claim than for the ordinary claim, therefore it slows the process of the claim settlement.

- 8) *Long loss investigation process* – the overall investigation process of the claims review is slow, and it takes a lot of time to approve and later initiate the payment of the loss.

4.2. Measure

To measure the current process of claim handling in the insurance company, the author used the quantitative data provided by the insurance company. As it was mentioned before, the author limited the scope of the current analysis to Time as the quality driver of customer satisfaction. For the measurement of the process, the author used the Lead Time and the First Time Yield. The methodology of the calculation is presented on page 32-33 and the theoretical background is explained on page 22.

4.2.1. Lead time

During the creation of the flowchart, the author considered the average process for the claim settlement in the insurance company. Also, the author considered that all the actions are performed without any delays and according to corporate standards. Another consideration of the author was that all the actions are correct from the first try, in case there was missing documentation, or the loss is outside of the policy conditions, such outputs are leading to the Start or the End of the flowchart and their journey is not presented further.

One of the primary concern of the average customer, purchasing the policy, is that the claim compensation time is too long and often the claim package is not accepted from the first time by the insurance provider. It always asks for the additional documents, and the communication, between the insurance provider and Insured, is too complicated and time-consuming. Author conducted the analysis for measuring the time it takes for the claim to be compensated.

First, the claim happens, the claimant reports it to the insurance provider – insurance company, later it passes to medical partner, which checks the claim from the medical perspective and whether it suits to the conditions of the insurance policy. Medical partner provides the recommendations for the insurance company for the claim compensation, and then the insurance company makes the final decision whether to compensate this loss or not, how much to pay and in what form (one-time payment, periodic payments etc).

From the point when the claimant provides the notice about the insurance event to the insurance provider, it takes approximately 37 working days for the documentation to pass through all stations and send money to the bank account of Insured. The calculation of average time is presented below in the form of Gantt Diagram:

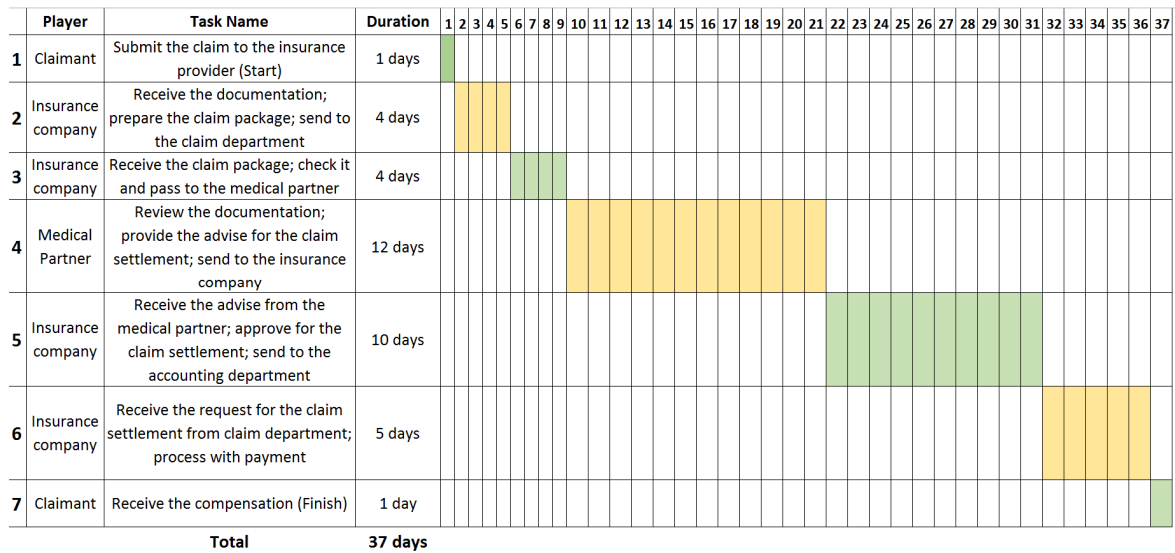


Figure 13, Source: author's analysis

Summing up the time spent by every party involved, the author can conclude, and it was confirmed by the company representative, that the lead time for the claim settlement is 37 working days, or one and half month approximately.

Author believes that this time could be improved and reduced up to 25 days, what in total will take approximately one month for the claim settlement and the waiting time for compensation will decrease by 30%.

4.2.2. First-Time Yield

After the analyses of the average time spent on the claim settlement, it is useful to see how many of the claims are processed for the settlement from the 1st 'pass', meaning that all the submitted documents, bills and reports were correct, all the filled forms are correct as well. First-Time Yield was explained by the author in the previous part of the thesis (page 25), and it is calculated by summing up the number of units produced and dividing it by the number of total units going into the process.

First, the author calculated the number of returns from the sample size. For example, there were 32 claims out of 130 which were returned only once, 13 claims out of 130 were returned 2 times, and 3 claims were returned 3 or more times. The table below summarizes the results:

Number of returns	Number of claims	Percentage of the returned claims
0	82	63%
1	32	25%
2	13	10%
3	3	2%

Figure 14, Source: author's analysis

All these calculations are leading us to the calculation of First-Time Yield coefficient. There are 130 unit of claims which are entering to the process, and out of these 130 units:

- $(32/130)*100 = 25$, meaning that 25% of claims out of 130 were returned only ones.
- $(13/130)*100 = 10$, meaning that 10% of claims out of 130 were returned twice.
- $(3/130)*100 = 2$, meaning that 2% of claims out of 130 were returned trice or more.

After calculating the percentage of claims being returned some number of times, the author sees that: $25+10+2 = 37\%$, meaning that 37% of claims out of 130 are being returned due to some issues and misunderstandings between Insured and Insurance company.

The same can be calculated just finding the percentage of claims which were compensated with 0 returns – $(82/130)*100 = 63$, showing that 63% of claims were compensated to the claimant by the insurance company from the first ‘pass’ or without any interaction between the Claimant and insurance company after submitting the claim package.

$100\% - 37\% = 63\%$, this percentage represents the ***First-Time Yield***, or the percentage of claims being compensated with the first ‘pass’. The author believes that the value of the First-Time yield could be improved by an additional 20%.

4.3. Analyse

In the Analyse part of DMAIC of process analysis, for the determination of the roots and possible causes of the problems, the author used various statistical calculations and methods.

4.3.1. Mean, Median, Standard Deviation

First, the author calculated the basic statistical values based on the data provided, and it is listed on the table below:

Mean	50,94615385
Median	48
Standard Deviation	21,464343

Figure 15, Source: author's analysis

The mean of 50,94615385 is found by calculating the average of days spent for the claim settlement. It shows the actual days it took to settle the claim in the sample period. According to the corporate standards, where the Company is supposed to settle the claim within 39 days, or according to the Lead Time, where it was found out that the claim settlement process lasts 37 days, the average settlement time shows higher number of days than the company’s target and it is behind the goal.

However, the median value of 48 shows the value which is exactly in the middle of the sample size, when the values are presented in ascending order, in other words, it

separates the values of the higher half from the lower half of a data sample. One of the main advantages of using the median than mean is that it is not skewed so much by extremely large or small values, so it better gives an idea of a typical value. In the analysed sample data, there are extreme values like 101, and the extremely low values as 21 and such values are spreading the data. Therefore, the more precise average time for the claim settlement will be showing the median value of 48.

Standard deviation is the value which represents the amount of data values variation from the mean – the closer the values to the mean, the more precise the mean is. While high values of the standard deviation show that the data points are spread out over a wider range of values. In case of the analysed sample size, the standard deviation is equal to 21,464343 meaning that it is varied from the mean on 21,464343, and there are values in the data sample such as 28 and 60 days.

4.3.2. Histogram

To check the statistical data distribution, the author checked the sample values for the normality by representing the values in the histogram, the graph is presented below and shows the way how the data is modelled:

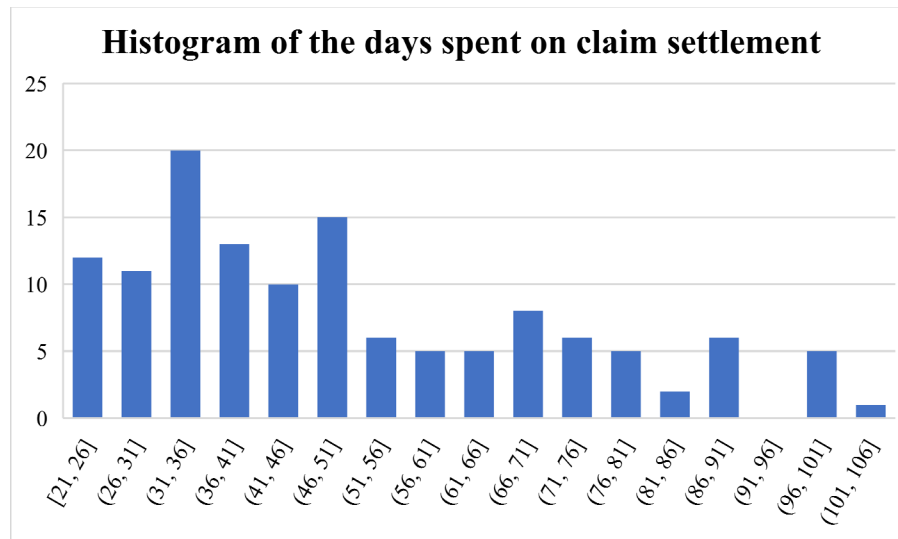


Figure 16, Source: company's data and author's calculations

From the chart above, it is clearly visible that the data is not normally distributed, and it can be caused due to several reasons, for example, the values are extreme or, as it was mentioned before, the data is skewed in distribution. As it was calculated above, the standard deviation of the data sample is relatively high, therefore it causes the values to be extreme and the data to be not normally distributed.

As the main target of the thesis is to offer the process improvement solution which will speed up the process and decrease the average claim settlement process to 25 days. Currently, as the histogram shows, there are only 15 claims out of 130 which are settled within 25 days, which is only about 11% of the total number of claims. There are only 51 claims which are settled within 39 days, and suit to the corporate standards of the

company and there are 79 claims left outside and not fitting to the performance indicator of the company.

The graph above also represents the direction towards which the author aims to move the process. One of the main goals of the thesis is to offer the solution for the time minimization of the claim settlement in the insurance industry, therefore, every bar on the graph, except the first and highest, aims to be moved to the left – to the new category of the time period within which the loss was reimbursed.

4.3.3. Correlation Coefficient

One of the main causes of the delayed loss payment is the number of returns of the claim. Such return may be caused by the incorrectly submitted documents, missing some document in the claim package or incorrectly specified bank detail for the payment of reimbursement. To determine whether the time of the claim settlement and the number of returns are correlated, the author ran the correlation analysis to find out the evidence. The table below shows the correlation coefficient:

Correlation coefficient analysis		
	<i>Days spent for the claim settlement</i>	<i>Number of Returns</i>
<i>Days spent for the claim settlement</i>	1	
<i>Number of Returns</i>	0,719896034	1

Figure 17, Source: author's analysis

The correlation between the number of days spent for the claim settlement and the number of times the claim was returned is 72%. This represents a relatively high correlation between the variables. Interpreting the results, the author may conclude that the length of claim settlement depends on the frequency of communication between the claimant and the insurance company.

If the claim was returned one or more times, the length of loss payment increases. The increased communication between the policyholder and the insurance company can be reasoned by several factors, and they were described in the Define part of DMAIC model.

4.3.4. Hypothesis Testing

According to the information from the insurance company representative, the higher the compensation amount, the longer the process of claim settlement is expected, because the insurance company must be more attentive to higher amounts, need to conduct more checks etc. The author would like to test this hypothesis on the data and conducted the hypothesis testing analysis.

The first step for the hypothesis testing is to state the null hypothesis:

Null hypothesis – the time length of the claim settlement depends on compensation amount – the higher the monetary value of the claim the longer the loss will be reviewed.

Alternative Hypothesis – the time length of the claim settlement does not depend on the compensation amount – the monetary value of the claim does not affect the time it takes to review the claim.

Significance level – the author will set the standard significance level $\alpha = 5\%$, therefore the author will assume that there is 5% of probability of rejecting the null hypothesis, given that it was true.

Data – the author will check for the dependency the values of claim amounts and the days it took to be settled.

ANOVA Analysis

ANOVA analysis is one of the ways to find out if the results of the tests are significant or not, in other words, it helps to find out whether to reject the null hypothesis or accept the alternative one. Below the output of ANOVA Test is presented:

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	118,00	5 973,00	50,62	458,20
Column 2	118,00	301,00	2,55	1,19

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	136 320,27	1	136 320,27	593,48	4,06E-66	3,88
Within Groups	53 749,03	234	229,70			
Total	190 069,31	235,00				

Figure 18, Source: author's analysis

From the above-presented table, the author may conclude the following:

P-value is less than the standard 5% significance level, therefore, the null hypothesis is to be rejected, and the alternative one is to be accepted.

Finding the correlation coefficient

Checking the dependency between the two values, it was determined that the correlation coefficient is small enough to conclude that there is no evidence of the dependency.

	<i>Days spent for the claim settlement</i>	<i>Monetary Value of the Claim</i>
<i>Days spent for the claim settlement</i>	1	
<i>Monetary Value of the Claim</i>	-0,023847986	1

Concluding the hypothesis testing, according to the analysed sample size, the monetary value of the claim does not affect the time within which the claim is being settled.

The statistical analysis shows that the days spent for the claim settlement does not depend on the claim amount. The results were discussed with the company representative and the reason behind such output is that the claim compensation process is still quite long, and even if the high amount claims are being reviewed in more details, they are still making the claims with low or medium amount being settled longer as well, because they are stopping the process and creating the queue. The claims with the higher amount asked for compensation are reviewed by the same people, which are reviewing the claims with smaller amounts.

According to the hypothesis testing analysis and the determination of dependencies, it can be stated that as for now, there is clear evidence is that the claim settlement process is heavily depended on the number of times the insurance company was returned to the claimant.

Author also tested whether the long claim settlement process is dependent on the month of the year and the season. The claims, which are only in the Red or Yellow category, were considered by the author for this test, because the claims in these categories are not performing well. The author's hypothesis was that during the summer time – the period of holidays, the claims are being reviewed for a longer time that it is required by the time frames standards of the insurance company. In the table below, it is visible that the relatively highest values are in July and December:

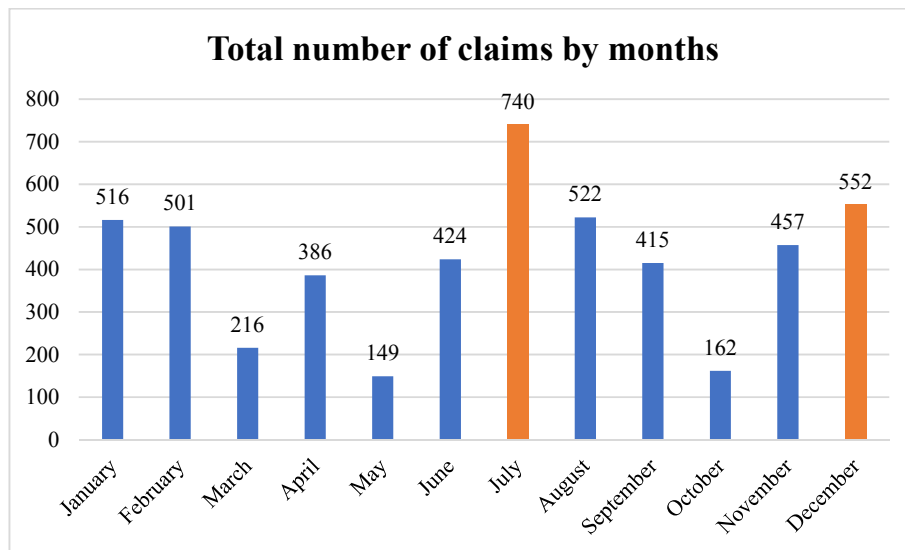


Figure 19, Source: author's analysis

It may be stated that the claims which were notified to the insurance company in July have relatively longer review process than the claims notified to the insurance company in May or October, because there is high number of employees on holidays and there is lack of human force to do the job and maintain the service level on the company's desired level. Also, as it was mentioned above the same trends can be seen December, it has the second highest value after July in terms of the timing for the claims review, this

number can be reasoned by the Christmas holidays and end of the annual accounting period in the insurance company.

However, the reasons for the claim settlement listed above are only the suggestions of the author as the evidence for the long loss payment process. These reasons were suggested to the insurance company's representative; however, they were not confirmed as well, but only stated that it could be one of the reasons, but it is not fully only because of these reasons.

4.3.5. Pareto Analysis

As it was explained in theory section of the master thesis (page 26), Pareto analysis is showing the causes of the problems. It is a helpful tool to identify the top causes of the problems and determined the risks that have the most impact on the process. Analysing the causes of the problems, Pareto analysis clearly represents the root of the issues which have a place in the analysed process.

For the better understanding of the current situation and what the specific factors which are disturbing the process of loss review and approval, the author analysed the reasons which have the most significant impact, and which are needed to be eliminated to improve the current company's performance.

As it was mentioned in the Define part of the DMAIC model, the author identified 8 main problems which are usually were occurring in the claim settlement process in the insurance company during the analysed period of time. The claims are shortly listed below:

- *Long waiting time for the action of each player*
- *High number of departments for the claim to pass through*
- *Incorrectly submitted documents*
- *Not exact specification of the policy conditions and risk coverage*
- *Complicated communication between the insured and insurance company*
- *Non-acceptance of the foreign documents*
- *High compensation amount*
- *Long loss investigation process*

The author went through the history of each claim and tried to identify which the problems highlighted above occurred during the settlement process of the loss. Later the author assigned these problems to each claim in case the difficulties occurred on the side of the insurance company, if there was not any problem during the process, the field was left empty. There were claims which were involving different problems at the same time – for example, incorrectly submitted documents by the Insured and long waiting time for the action of each player. Once every claim is analysed, the author counted the number of times the particular problem occurred during the claim settlement process. Such procedure allowed to identify all possible challenges which were appearing during the claim journey after submission the loss package by the insured. Later the author

summarized the results and presented it in the form of Pareto graph to see the problems which have the more significant impact on the slow process of claims review:

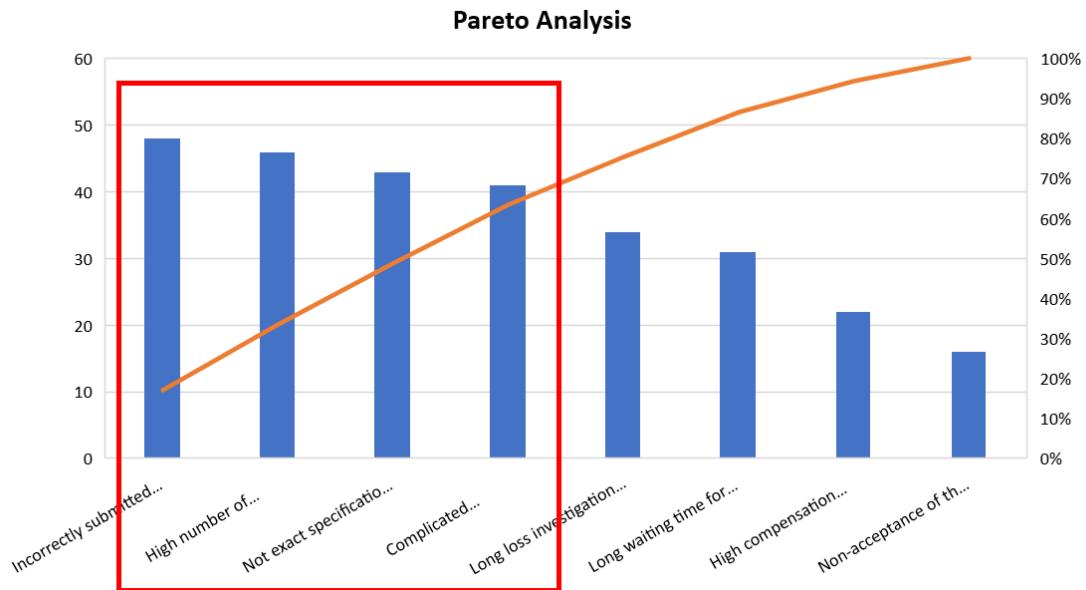


Figure 20, Source: author's analysis

In the graph presented above, it is visible the top four problems which are impacting 80% of the process. They are:

- 1) Incorrectly submitted documents to the insurance company by the claimant
- 2) High number of departments for the claim to pass through
- 3) Not exact specification of the policy conditions and risk coverage
- 4) Complicated communication between the Insured and insurance company

These are the top priority problems which need to be solved in order to improve the performance of the company. After the consultancy of the author with the insurance company representative, it was confirmed that there is a high probability that mainly these problems are appearing the most and the process of claim settlement could be faster if the factors causing these problems were improved.

However, the author looked at these problems deeper in Measure part of DMAIC model and analysed the costs versus benefits and whether the solution of the problem worth the impact it could bring.

4.3.6. Problem analysis

The author went deeper to every problem listed above in order to get a more precise understanding of the reasons why such problems occurred during the claim settlement process.

For example, the first problem from the list above is incorrectly submitted documents to the insurance company by Insured. Such a problem occurred on 48 claims out of 130, which represent almost 37% of total claims experiencing such a problem. Author briefly went through the claims, and all of these claims had more than one number

of returns, which means that as the result of incorrectly submitted documents, the Insured was submitting the additional requested documents to the insurance company.

The second problem is the high number of departments for claims to pass through. Such problem appeared on 46 claims out of 130 during the loss settlement. The average number of days it took to pay these claims to the final Insureds is 67 days, which represents a very high number of days, falling into the red category. The median of the number of days for the claims where this problem occurred is almost the same; it is 68,5 days. Both the mean and median represent a very high number, and they are very close to each other, meaning in this case both the mean and median are giving the precise understanding of the number of days it took to settle the claims where the problem of a high number of departments for the claim to pass through appeared.

The third problem is not the exact specification of the policy conditions and risk coverage. This difficulty appeared 43 number of times for this sample size of the claims. Comparing the requested amount by the insured and what was actually paid by the company, the author sees that out of 43 claims only 9 of the claim were paid with the same amount as it was requested by the Insured. This means that the insureds were requesting the compensation for the risks which were not covered by the insurance policy conditions. This can be explained by the fact that the Insured people were not aware of the exact policy coverages.

The fourth top problem, identified by Pareto analysis, is the complicated communication between the insured and insurance company, meaning that the communication between both parties takes a long time – send email or letter by post, wait for the reply etc. There are 41 claims where such a problem was identified and the average time for the settlement of those claims was 61 days, and the median is 63. It can be concluded that the long settlement process is caused because of not well-developed algorithms of communication between the Insured and insurance company.

4.3.7. Fishbone

Once the top highlighted problems, which are impacting the process of claims settlement the most, were identified, the author summarised the findings to the fishbone diagram to see the possible roots of each problem, the chart itself is presented on the graph below:

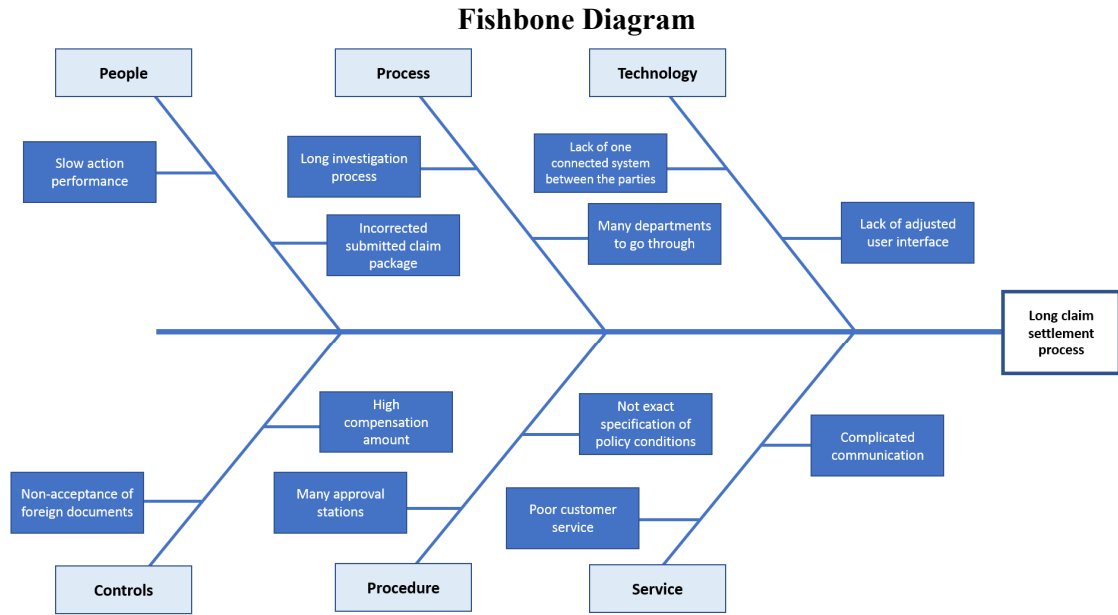


Figure 21, Source: author's analysis

5.4. Improve

Once the current performance of the company is analysed, and the possible roots of the problems are determined, part of DMAIC model, Improve allows to analyse the priority of the problems, cost and time for the implementation of the solutions.

5.4.1. Improvement Proposals

As the author stated before, the main problems which were identified in the upper part of the master thesis are presented below:

Priority	Opportunity for Improvement
1	Incorrectly submitted documents to the insurance company by the Claimant
2	High number of departments for the claim to pass through in the company
3	Not exact specification of the policy conditions and risk coverage
4	Complicated communication between the Insurance company and claimant
5	Long loss investigation process
6	Long waiting time for the action of each player
7	High compensation amount of the claim
8	Non-acceptance of the foreign documents

The author will be analysing each problem according to its priority. The author will compare the number of times the claim appeared, possible solutions, the difficulty of implementation (1 – easy, 10 – difficult), approximate costs of the project to implement and expected benefits. Author specified the possible costs, which may be associated with the implementation of the project, however they cannot be considered as the real costs

which can actually occur. The author provided the approximate costs, depending on the market prices for particular services. Once only the relevant problems selected for the solution, the author will offer the scenario for implementation with application Kaizen model. For the easiness of understanding the author summarized the information in the tables.

Opportunity for improvement - Incorrectly submitted documents by the Claimant

The first problem, which appeared the most number of times is incorrectly submitted documents by the Claimant; the problem is caused by the lack of proper information about the system of loss reimbursement and what are the exact documents required by the Insurance company for the claim settlement.

Number of times the problem occurred	48 out of 130 = 37% of the sample size
Possible solution	<p>Make the claimant submit the correct package from the first try:</p> <ul style="list-style-type: none"> - the insurance company may specify various possible scenarios of losses which may happen under the contract and what are the primary documents required for the settlement. It is in the interest of insurance company to provide as much as possible information on every source available – webpage, insurance policies and offline files as journals, leaflets etc. - the insurance company may promote the hotline for the customer service team, so the policyholders can call before submitting the claims, and the colleagues will advise the exact documents required depending on the type and nature of the loss. - offer the communication via email before the submission of the claim. The policyholder may write an email to the insurance company and provide the demo versions of the documents to be submitted, the customer care team will briefly review the email, and in case the package will lack something, they will advise to the claimant accordingly.
Expected benefits	Reduced number of claims with incorrectly submitted documents; reduced number of returns of the insurance company to the claimant; decreased interaction between the insurance company and claimant; faster claim settlement process; increased customer satisfaction and strengthened competitive advantage.
Expected costs for implementation	- <u>Adjustment of the web-page and other sources of information</u> – expenses for the marketing and IT departments to make the webpage more interactive, user-friendly and make the information easy to find. The author believes that these expenses will not be higher than 3 900 EUR.

	<ul style="list-style-type: none"> - <u>Training of the internal employees</u> – as the customer care team will be promoted for the customers, the author expects that more customers will be referring to the webpage or customer care team and the employees have to get the training to provide better quality services. It does not require the additional workers; therefore, the author expects zero amount expenses. - Summing up the potential expenses, the solution to this problem is expected to be no more than 3 900 EUR.
Time required	6 weeks for the preparation and implementation, 6 months to see more precise results.
Difficulty for implementation	3

Opportunity for improvement - High number of departments for the claim to pass through

This problem is caused by the fact that there is a very high number of departments the claim passes before it is approved for the payment. Very often, the claim is being queried after passing several departments and only after a while it can be discovered that the claim package is missing some important document as evidence of the loss happened or the claim submitted is outside of the policy conditions, therefore it cannot be reimbursed by the insurance company.

For the health insurance claims the leading expert for the claims review is the medical partner, as it has the most profound knowledge and the best understanding of the loss. However, the claim package reaches this party only after the several steps in the insurance company, or as it may be seen from the Gantt Diagram, approximately on the 10th day, the package is passed to the medical partner for the claim review.

Number of times the claim occurred	46 out of 130 = 35% of the sample size
Possible solution	<p>To shorten the time and eliminate non-value-adding steps, the author offers to pass the claim to the medical partner and the claims department at the same time to reduce the waiting time of each action player. After the medical partner is reviewing the claim, it is passed to the claim's department where the final decision for the claim settlement is taken, and later it is passed to the accounting team for the payment.</p> <p>As per the Gantt diagram (page 47), it may be seen that once the claim package is prepared, the claim's department has 4 days for the review and send it to the medical partner. However, if the claim package was sent to the medical partner directly, it would reduce the time spent in the claim's department by 4 days, and two activities would intersect and reduce the timing of the process.</p>

Expected benefits	Reduced rotation of the claims within the company; more efficient order of the departments for the claims review; faster claim settlement process; increased customer satisfaction; strengthen competitive advantage.
Expected costs for implementation	<ul style="list-style-type: none"> - <i>Restructuring the internal processes</i> – the internal restructure of the claim settlement does not require significant expenses, therefore, the author to keep 200 EUR for it. - <i>Training of the employees</i> – the employees of the insurance company need to be aware of new claim handling procedure, therefore, the author offers to provide the training for the employees and teach how to act according to the new rules. The author expects that it will not require any investments as it is internal training. - Summing up all the potential expenses, it is planned to cost no more than 200 EUR.
Time required	6 weeks for the preparation and implementation, 6 months to see more precise results.
Difficulty for implementation	4

Opportunity for improvement - Not exact specification of the policy conditions and the risk coverage

According to the analysis, such problem occurred when the claimed amount was higher than the amount which was actually compensated, because the claimant was lacking the knowledge about the exact insurance policy conditions and the risk coverage, therefore he was expecting that the higher amount of the loss will be compensated.

Lack of knowledge about the exact conditions of the insurance policy is caused by not enough information provided by the insurance company to the policyholders. The solution of the problem may not be expensive but may be time-consuming, as it will require to adjust the current channels and sources of information for the more straightforward navigation of the policyholders.

Number of times the claim occurred	43 out of 130 = 33% of the sample size
Possible solution	The solution to problem №1 may lead to the solution of this problem as well. The underlying goal of the solution to the 1 st problem is to make the information available and easy to find. Therefore, it may require a better explanation of the risks in the insurance policy document, information on the web page and better specification of the policy conditions via the different channels of communication.
Expected benefits	The customers will be better aware of insurance policy conditions and knowing what will be covered by the insurance policy and what is not.

Expected costs for implementation	- <i>Restructure the insurance policy conditions</i> – the insurance company should restructure the insurance policy conditions, where the more precise conditions and list of documents needs for the loss reimbursement will be provided. As this activity does not require any investment in the equipment, the costs will be minimal; the author believes that the expenses required for the restructuring of the insurance policy will not be higher than 200 EUR.
Time required	6 weeks for the preparation and implementation, 6 months to see more precise results.
Difficulty for implementation	3

Opportunity for improvement - The complicated communication between the insurance company and insured

The problem itself is quite big and complicated, and the proper solution to it may involve a lot of resources and time. For the communication between the insurance company and the policyholder to be more efficient and fast, it will require the development and implementation of new IT software which is fully adjusted to the needs and specifics of the insurance company. It will be quite complicated not only for the insurance company, but also for the customers as well. It will take some time once both parties are got used to the new ways and tools of communication and the interaction of the parties will be smooth and easy. According to the industry experts who are forecasting the upcoming trends, new digitalized way of communication between the insurance company and the customers will take place soon.

Number of times the claim occurred	41 out of 130 = 31% of the sample size
Possible solution	<p>The article with frequently asked questions is already presented on the webpage; however, there are still many customers who are emailing or calling the insurance company to get the answer on their questions, and 60% of the questions they are asking are listed in the article of FAQ (Frequently Asked Questions).</p> <p>The author believes that the implemented chatbot on the general webpage may help to solve the problem partially. The chatbot will be recognizing the keywords in the question, and according to it, will offer the answer to what was asked. This can be lead to fewer emails and calls from the policyholders, as they received their answer from the chatbot on the webpage, and the team of customer care may focus on more complicated questions and cases. Once such a solution is implemented, the author expects higher responsiveness rate of the insurance company to their customers and more a efficient way of communication between the parties.</p>

Expected benefits	Increased customer satisfaction, less work for the customer care team and the differentiation among the competitors by the service offered.
Expected costs for implementation	The author believes that for the development of the chatbot, the external IT agency will be required to get a high-quality product. The employees of the customer care team need to advise the frequently asked questions and in close cooperation with the agency, develop the new tool for the more accessible communication between the insurance company and customers. As the solution requires the development, moreover, it requires the involves different people, the author expects that all the costs will be approximately 5 000 EUR.
Time required	6 weeks for the preparation and implementation, 6 months to see more precise results.
Difficulty for implementation	6

Opportunity for improvement - Long investigation process and long waiting time for each action player

The author believes that two problems, long investigation process and long waiting time for each action player, are very closely related to each other and the implementation plan must solve both problems at the same time. The long investigation process and the long waiting time for each action player are too serious problems for the solution, as it must require significant structural changes and the approvals from the top management.

Number of times the claim occurred	34 out of 130 = 26% of the sample size
Possible solution	The author was advised that the problems are too big and it would require many funds for the implementation; therefore, the author considered the problems and put them in the highest priority, however, did not offer the solution, as it is too expensive and takes a long period of time for implementation.
Expected benefits	Fast claim settlement process; increased customer satisfaction; outstanding competitive advantage.
Expected costs for implementation	Restructure of the company, development of adjusted IT software. Expected costs – more than 35 000 EUR.
Time required	More than 1 year
Difficulty for implementation	9

Opportunity for improvement - High compensation amount of the claim is reviewed longer than usual

The insurance company representative stated that usually once the claim sum is large, the higher attention paid to the claim than for the ordinary claim; therefore, it slows the process of the claim settlement. However, as it was determined by running the correlation analysis, the claim amount does not depend on the number of days the claim is being settled. The author can conclude that the claim compensation process is still quite long, and even if the high amount claims are being reviewed in more details, they are still making the claims with the low or medium amount being settled longer as well, because they are stopping the process and creating the queue. The claims with the higher amount asked for compensation are reviewed by the same people, which are reviewing the claims with smaller amounts.

Number of times the claim occurred	22 out of 130 = 17% of the sample size
Possible solution	One of the suggestions of the author is to divide the department of claims handling on two parts. One part of the department will be focusing on the claims with relatively less amount, and the second part of the department will be focusing on the claims which are higher than a particular amount. Therefore, the claims which are more expensive will not slow the process of the settling other claims, and it will balance the overall timing of the review process.
Expected benefits	Enables the faster claim settlement process for the claims and the review of large losses by more experienced workers. Increased customer satisfaction and competitive advantage.
Expected costs for implementation	<p>- <u>Restructure of the team</u> – mainly the restructure of the team is the internal changes, which does not require the outlay of money. The author suggests setting the minimal budget in the amount of 200 EUR.</p> <p>- <u>Training of the employees</u> – the new responsibilities need to be assigned to the workers according to their experience and qualifications, and later the workers need to be trained how to work with the assigned scope of responsibilities to them. The internal trainings do not require any investments; therefore, the author expects zero investment costs.</p> <p>The total expected costs are approximately 200 EUR.</p>
Time required	6 weeks for the preparation and implementation, 6 months to see more precise results.
Difficulty for implementation	5

Opportunity for improvement - Non-acceptance of the foreign documents

The insurance company is not accepting the documents if they are in a foreign language. It is common in case the loss happened abroad, and the claimant had treatment

in another country; therefore, all the documentation provided by the doctor is in a foreign language. It was found out that once such claims were submitted to the insurance company, the company was referring back to the claimant with the request for translation; otherwise, the claim will not be compensated. Also, there were cases when the claim was submitted already in the translated form because the policyholder knew that the translation would be required. But it decreases the customer satisfaction, because there were so many steps needed to be done before submitting the claim package to the insurance company.

Number of times the claim occurred	16 out of 130 = 12% of the sample size
Possible solution	Such problem did not occur so many times as any other problem; however, the appearance of the problem is a signal for the need to change something in order to prevent its occurrence. It would be more expensive to hire the internal translator to the company which will be responsible for the translation of the claims, because the problem does not appear so often, and the salary expenses can be higher than the expected benefits. To fasten the process of the claim settlement, the insurance company can start not asking the claimant to provide the translation but do the official translation by themselves. The insurance company can send the documents by itself to the translating authority and get the documents translated. It will lead to a reduced number of people in the chain for the claim settlement process. However, there is another concern - how to charge the claimants if their claim package was translated. The insurance company can pay the claim less the expenses for the translating services, or the insurance company can increase the price of the insurance policy by including the risk that the claim package can be required for the translation and later, in case the translation is needed, the insurance company will bear with translating expenses on their own.
Expected benefits	Customers are less bothered by the insurance company with the request to provide the translation of the documents. The insurance company can faster compensate the claim.
Expected implementation costs	<ul style="list-style-type: none"> - Increasing the cost of the insurance policy or charging the translation fees upon the need, finding the proper translating authority. - The author believes that the monetary costs will not be so high, then the operational costs, as the insurance company needs to decide which of the offered scenarios will be implemented, and the price will differ accordingly. - The author expects that the solution to this problem will cost around 1 000 EUR.

Time required	6 weeks for the preparation and implementation, 6 months to see more precise results.
Difficulty for implementation	7

After analysing the possible scenarios of the improvements for the implementation and evaluating the costs, benefits and difficulty of implementation, the author summarized the data into the table below for the easier understanding:

Opportunity for Improvement	Priority	Costs for the proposed solution	Difficulty for implementation (1 – easy, 10 – difficult)
Not exact specification of the policy conditions and risk coverage	3	200 EUR	3
Incorrectly submitted documents	1	3 900 EUR	3
High number of departments for the claim to pass through	2	200 EUR	4
High compensation amount of the claim slows the process	7	200 EUR	5
Complicated communication between the insured and insurance company	4	5 000 EUR	6
Non-acceptance of the foreign documents	8	1 000 EUR	7
Long loss investigation process of the claim	5	35 000 EUR	9
Long waiting time for the action of each player	6	35 000 EUR	9

On the table above, the author placed the cheapest and the most accessible challenges to solve on top, and on the ascending order the placed problems which are more expensive and difficult for the solution. After the discussions with the company representative, it was decided to select the problems from the table which are the easiest for the solution, and they require relatively less outlay of money.

The author selected the first 5 opportunities for improvement listed on the table for implementation because the costs versus the difficulty of implementation are the most realistic for the implementation, the problems for the focus of the solution are:

- 1) Not exact specification of the policy conditions and risk coverage
- 2) Incorrectly submitted documents
- 3) High number of departments for the claim settlement to pass through

- 4) High compensation amount
- 5) Complicated communication between the insured and insurance company

Computing the total costs needed for the implementation of the project, the author believes that in total it would cost no more than 9 5000 EUR. However, this figure cannot be considered as the final one; the expected cost can vary depending on the various factors. The author was not disclosed the costs; therefore, the author only approximately supposes how much the implementation would cost.

5.4.2. Plan for Implementation of the Proposal

Once the improvement proposals were offered, the author provided the steps for their implementation by conducting the Kaizen events. The principles of the Kaizen event were presented earlier in the thesis. As there are several improvement proposals, the author offered to conduct several Kaizen events, which will be minimizing the difficulties occurring during the claim settlement process. For the description of the Kaizen events, the author used the methodology of (Trent, 2008). The steps for the implementation of the proposals are listed according to the order were defined on page 21-22.

Kaizen event: *Not exact specification of the policy conditions and the risk coverage and incorrectly submitted documents*

The author sees that two challenges – not exact specification of the policy conditions and the risk coverage and incorrectly submitted documents are closely related, as both opportunities for improvement have similar roots. The challenges were described in detail on page 56-57. Both of them are caused because of the lack of proper information presented on the sources of the insurance company. Considering the nature of the problem, the author offered to perform one Kaizen event, which will be solving two challenges at the same time.

The solution offered by the author to minimize the occurrence of the challenges are the following:

- the insurance company may specify various possible scenarios of losses which may happen under the contract, and what are the main documents required for the settlement.

- the insurance company may promote the hotline for the customer service team, so the policyholders can call before submitting the claims and the colleagues will advise the exact documents required depending on the type and nature of the loss.

- offer the communication via email before the submission of the claim. The policyholder may write an email to the insurance company and provide the demo versions of the documents to be submitted, the customer care team will briefly review the email, and in case the package will lack something, they will advise to the claimant accordingly.

For the Kaizen event to be in place, leading to the effective results, the insurance company has to follow the steps and milestones listed below:

First Phase

- Milestone A: on this stage, the insurance company must define the relevance and the need to solve the challenge. Also, at this stage, the insurance company must evaluate the costs, with which the company can potentially bear during the implementation of the project and once it is already in place.

As the author supposed before, cost for the implementation of the solution for the challenge of *incorrectly submitted documents* would cost approximately 200 EUR, and the price for the implementation of the challenge *not exact specification of the policy conditions and the risk coverage* would cost approximately 3 900 EUR. Therefore, the total cost for the implementation of this Kaizen event is planned to be approximately 4 100 EUR. The main operational costs, which can incur during the implementation of the Kaizen events are: restructuring of the insurance policy document, adjustment of the different sources of information, making it easy to find and understand, training of the employees.

According to the standards of the Kaizen event, this milestone has to last no more than 1 calendar week (= 5 working days).

- Milestone B: on this stage, the insurance company has to analyse whether the planned Kaizen event will bring the benefits and will have a positive impact on the process. The potential benefits, which the process can bring is reduced number of claims with incorrectly submitted documents; the reduced number of returns of the insurance company to the claimant; decreased interaction between the insurance company and claimant; customers will be better aware of the insurance policy conditions; increased customer satisfaction and strengthen competitive advantage.

The author believes that the analysis of the potential benefits could be performed within 1 calendar week (= 5 working days), that suits to the standards of the Kaizen event.

- Milestone C: at this moment, the team and equipment must be formed, and the project leader should be assigned. Also, the leader should acquire all the needed information about the project, which is to be implemented and all the stakeholders should be informed accordingly.

At this stage, the team has to be prepared for the actual implementation of the project, therefore they would need to develop the new version of the insurance policy contract and have it approved. Brainstorm about the sources which the insurance company is using and check what is the information is presented there, and then offer the new version of how the information is presented there. Also, the team has to develop the strategy of how to promote the customer care service's team, so it will be easier for the customers to reach it. Also, develop the strategy of how the policyholder can consult with the representatives of the customer care team for the submission of demo version documents of the claim.

This stage involves much work, preparations and product development, and the author believes that this stage will last 4-5 calendar weeks (20-25 working days).

Second phase

- Milestone D: at this moment, the team should release the prepared implementation plan and conduct the actual Kaizen event. At this stage, the team should start to sell the new versions of the insurance policies, which were developed before; the team should release updated information on the sources selected earlier; and also, the team should start the promotion of the customer services' team and tools for the consultations with the insurance company employees. The author believes that once all the materials are ready, the implementation of this phase should last no longer than 1 calendar week (= 5 working days).

Third Phase

- Milestone E: at the final milestone, the team should verify the results of the project. The author believes that the first actual results of the project could be seen only after 3 months after the implementation. However, the more precise results could be visible even after one year after the implementation, as the author offered to change the structure of the insurance policies. As the policies last usually for 1 year and the results will be better visible when the first sold policies expire, so the results brought by the change could be evaluated.

The author expects that the preparation phase and the implementation phase will last maximum of 39 days. The author did not include the time needed for the control of the results of the project. The Gantt diagram showing the schedule of the event is presented below:

Gantt Diagram with the schedule for 1st Kaizen event

	Milestone	Activity	Duration	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
1	A	Define the relevance to solve the challenge	2																																										
2	A	Evaluate the costs with which the company can bear by implementing the solution	3																																										
3	B	Analyse whether proposal will bring the benefits	5																																										
4	C	Form the team and equipment, assign the leader of the project	3																																										
5	C	Introduce the project to the team and stakeholders	1																																										
6	C	Develop the new version of the policy and approve it	7																																										
7	C	Check the sources of the company and more relevant information there	5																																										
8	C	Develop the strategy for the promotion of the customer care team and other services	8																																										
9	D	Implement all the prepared materials	5																																										
10	E	Verify the results	>90																																										
Total			39																																										

Figure 22, Source: author's analysis

Kaizen event: *High number of departments for the claim settlement to pass through & High compensation amount slows the claim settlement process*

Earlier in the thesis, the author offered the ideas for implementation to minimize the occurrence of the challenges mentioned above, the author decided to connect these two challenges in one Kaizen event as the solutions are similar. One Kaizen event instead

of two ones is cheaper and requires less time. Moreover, both solutions, require the training of the employees, and if the company were conducting several Kaizen events which are requiring the change in the procedure of the work of the employees, it would be confusing the workers and slowing the claim settlement process even more. First of all, the author offers to pass the claim to the medical partner and the claims department at the same time to reduce the waiting time of each action player. After the claim is being reviewed by the medical partner, it is passed to the claim's department where the final decision for the claim settlement is taken, and later it is passed to the accounting team for the payment. However, once the claim is passed to the claims' department, the claim will be assigned to the respective team depending on the loss amount. Senior workers will be working with claims which are above the particular threshold, and junior workers will be working with the claims of a lower amount.

In order to implement the offered solution, the insurance company can perform the following steps to enable the smooth integration of the change to the processes:

First Phase

- Milestone A: on this stage, the insurance company must define the relevance and the need to solve the challenge. Also, at this stage, the insurance company must evaluate the costs, with which the company can potentially bear during the implementation of the project and after.

As the author supposed before, the cost for the implementation of the solutions is approximately 400 EUR. The main operational costs, which can incur during the implementation of the Kaizen events are: restructuring of the internal processes and training of the employees how to work under the new process, negotiation with the medical partner.

According to the standards of the Kaizen event, this milestone has to last no more than 1 calendar week (= 5 working days).

- Milestone B: on this stage, the insurance company has to analyse whether the planned Kaizen event will bring the benefits and will have a positive impact on the process. The potential benefits, which the process can bring is reduced rotation of the claims within the company; more efficient order of the departments for the claims review; faster claim settlement process; increased customer satisfaction; strengthen competitive advantage.

The author believes that the analysis of the potential benefits could be performed within 1 calendar week (= 5 working days), that suits to the standards of the Kaizen event.

- Milestone C: at this moment, the team and equipment for the implementation of the change must be formed, and the project leader should be assigned. Also, the leader should acquire all the needed information about the project, which is to be implemented and all the stakeholders should be informed accordingly.

At this stage, the team has to be prepared for the actual implementation of the project, therefore they would need to develop the new algorithm of the claims review process by placing the actions of the medical partner further. The team leader should

negotiate about this change with the medical partner and whether they agree with the change. Also, the claims' department has to be divided into two parts, depending on which employees will be responsible for which types of claims. Besides these, it is necessary to provide the training to the employees how to work with claims under the new processes.

This stage involves preparations and product development, and the author believes that this stage will last 3 calendar weeks (=15 working days).

Second phase

- Milestone D: at this moment, the team should release the prepared implementation plan and conduct the actual Kaizen event. From this stage, the claims should follow the new procedure of claims settlement by sending the claim package to the medical partner and the claims department at the same. Once the claim is reached the claims' department, it is assigned to the respective person, depending on the loss amount. The author believes that once all is ready, the implementation of this phase should last 1 calendar week (= 5 working days).

Third Phase

- Milestone E: at the final milestone, the team should verify the results of the project. The author believes that the first actual results of the project could be seen in the first month after the project is implemented. This Kaizen event allows to see the actual results in such a short time, because the consequence of the implementation will be visible once the first claims reimbursed and whether the new process is performing well or not. However, the more accurate picture could be obtained after at least half a year from implementation.

The author expects that the preparation phase and the implementation phase will last maximum of 35 days. The author did not include the time needed for the control of the results of the project but considering that the first results will be visible minimum in 30 days, the author may suppose that the results of the change could be more or less evaluated in 70 days (=4 month) after the implementation. The Gantt diagram showing the schedule of the event is presented below:

Gantt Diagram with the schedule of the 2nd Kaizen event

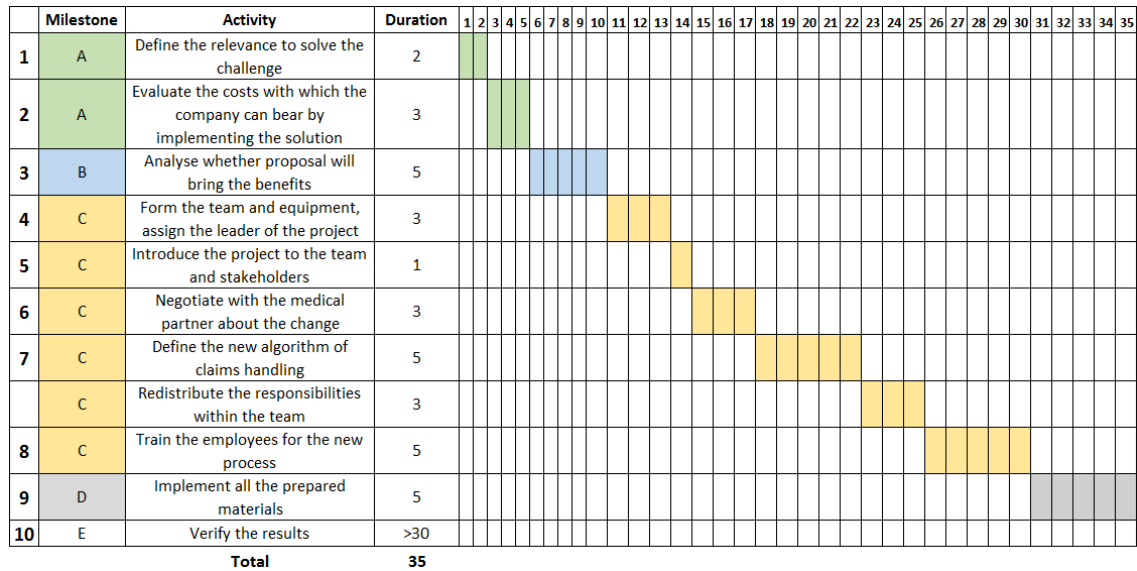


Figure 23, Source: author's analysis

Kaizen event: *Complicated communication between the insured and insurance company*

As the author mentioned before, the problem itself is quite big, however, the author offered one of the possible tools to improve the current process at least a little bit. The author believes that the implemented chatbot on the general webpage may help to solve the problem partially. The chatbot will be recognizing the keywords in the question, and according to it, will offer the answer to what was asked. This can be lead to fewer emails and calls from the policyholders, as they received their answer from the chatbot on the webpage, and the team of customer care may focus on more complicated questions and cases.

In order to implement the offered solution, the insurance company can perform the following steps to enable the smooth integration of the change to the processes:

First Phase

- Milestone A: on this stage, the insurance company must define the relevance and the need to solve the challenge. Also, at this stage, the insurance company must evaluate the costs, with which the company can potentially bear during the implementation of the project and after.

As the author supposed before, the cost for the implementation of the solution for *the high compensation amount slows the claim settlement process* is quite expensive - 5 000 EUR. The main operational costs, which can incur during the implementation of the Kaizen event, are: development of the chatbot from the IT perspective. It will require the team of technicians which will be responsible for the development of it and the help of the employees, which will be responsible for advising the most frequently asked questions by the customers.

According to the standards of the Kaizen event, this milestone has to last no more than 1 calendar week (= 5 working days).

- Milestone B: on this stage, the insurance company has to analyse whether the planned Kaizen event will bring the benefits and will have a positive impact on the process. The potential benefits, which the process can bring is increased customer satisfaction, less work for the customer care team and the differentiation among the competitors by the service offered. The author believes that the analysis of the potential benefits could be performed within 1 calendar week (= 5 working days), that suits to the standards of the Kaizen event.

- Milestone C: at this moment, the team and equipment for the implementation of the change must be formed, and the project leader should be assigned. Also, the leader should acquire all the needed information about the project, which is to be implemented and all the stakeholders should be informed accordingly.

At this stage, the team has to be prepared for the actual implementation of the project, therefore the team of customer care, claims department and IT department have to cooperate in order to implement the solution closely. Also, they have to brainstorm about the keywords by which the chatbot will be recognizing the questions and providing the correct answers. IT team have to develop the tool and be ready for its implementation.

This stage involves preparations and product development, and the author believes that this stage will last 6 calendar weeks (=30 working days).

Second phase

- Milestone D: at this moment, the team should release the prepared implementation plan and conduct the actual Kaizen event. IT team have to release the chatbot on the webpage, and the customers have to start using it. The author believes that this stage will last from 1 to 3 days in total.

Third Phase

- Milestone E: at the final milestone, the team should verify the results of the project. The author believes that the first actual results of the project could be seen after the first month once the project is implemented. IT team can track the usage of the service and whether it is popular or not. The customer care team can provide feedback and whether they feel the change in the volume of their work once the chatbot was implemented. One month would be a short period to make the conclusions, but it can still show the result. Of course, the most precise results could be obtained after 6 months once the project implementation.

The author expects that the preparation phase and the implementation phase will last maximum of 41 days. The project is planned to last for a comparatively long time, as it requires IT development and involvement of the several departments. The author did not include the time needed for the control of the results of the project but considered that

the first results would be visible minimum in 30 days. The Gantt diagram showing the schedule of the event is presented below:

Gantt Diagram with the schedule of the 3rd Kaizen event

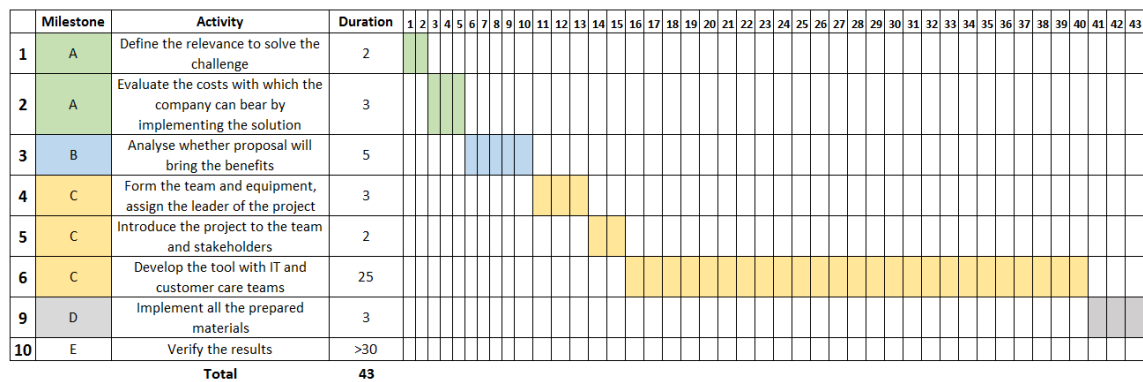


Figure 24, Source: author's analysis

Summing up the implementation proposals, the author analysed each identified challenge, brainstormed for the possible solution, evaluated for the difficulty of implementation, estimated the expected costs of the projects, and the potential benefits. Later the author chose only those challenges, which are cheapest and easiest for implementation. Once the author finalized the calculations, the expected costs offered for the implementation would cost 9 500 EUR, and it requires to conduct 3 Kaizen events in the insurance company.

6.5. Control

As it was mentioned in the limitations of the thesis (page 30), all the offered solutions from the author will not be implemented during the time when this thesis is being written. All the improvement proposals will be considered when the company will be improving its current processes in the future. Therefore, the author could not measure in the reality whether the offered solutions will have a positive impact on the process. To see the potential result of the proposals offered, the author supposed that the implemented solutions for challenges could reduce the number of times the problem occurred on 60%. Such an assumption was applied only to those problems, which were selected for implementation, and they are:

- 1) Not exact specification of the policy conditions and risk coverage
- 2) Incorrectly submitted documents
- 3) High number of departments for the claim to pass through
- 4) High compensation amount slows the settlement process
- 5) Complicated communication between the insured and insurance company

As the author did not have an opportunity to implement the project and see the actual results in reality, according to the analysis and the solutions offered, the author supposed how much the process will be improved, if the improvement proposals were implemented.

6.5.1. Lead Time

Calculating the Lead Time, the author believes that the average process for the claim settlement will be improved from 37 days to 28 days, and the claim settlement time will be reduced by 25%.

Gantt Diagram representing the new timing of the claims settlement

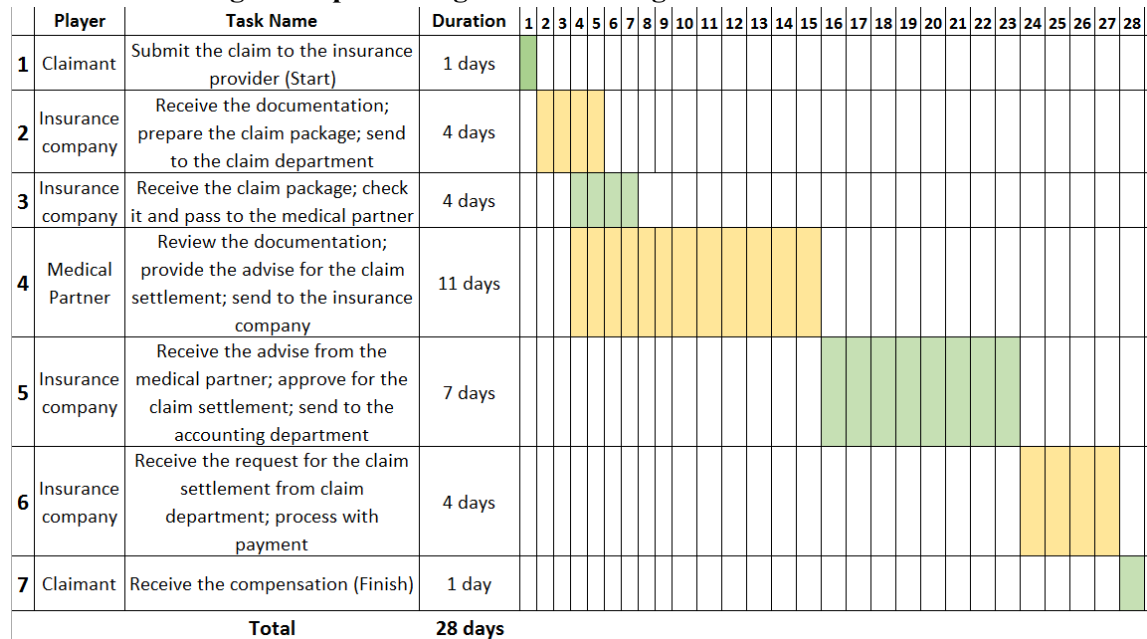


Figure 25, Source: author's analysis

The author calculated the Lead Time by considering that the Medical Partner and the claims department start the review of the claim at the same time, so two actions are overlapping on Gantt diagram, so the process is reduced by 6 days. Moreover, the author considered that the opportunities for improvement, which were selected for the implementation decreased by 60%, leading to a faster process of claim settlement. Once the improvement proposals are implemented, the author suggests setting 28 days as a new KPI for the days spent on the claim review and payment.

6.5.2. First-Time Yield

In the part of Measure of DMAIC model, the First-Time Yield was calculated, and it was found out that only 63% of the claims out of 130 are settled from the first “pass” and there was no communication between the insurance company and the claimant during the settlement process. Once the author proposed the above listed solutions for implementation, it is expected that the new First-Time Yield will be 82%, meaning that 106 claims out of 130 will be submitted correctly and settled smoothly with 0 number of returns.

6.5.3. Mean, Median, Lead Time

In the part of Analysis, the author calculated the mean, median and standard deviation of the days spent for claim settlement. Then the author calculated the values again, however, with consideration if the improvement proposals were applied. The author supposed, that once the offered solutions are implemented, it would reduce at least by 60% the problems which occurred in the analysed sample size. Therefore, the new values of the claim settlement process are presented below:

	Before	After
Lead Time	37 days	28 days
First-Time Yield	60%	82%
Mean	51	48
Median	44	31
Standard Deviation	21,46434272	17,43312387

Figure 26, Source: author's analysis

From the table above, it is visible that all the values decreased, meaning that in overall, the claim settlement time was reduced. Looking more deeply into the figures, the mean was decreased by 28% and the median by almost 30%. The standard deviation did not decrease much, and it shows that there are still outliers in the sample size. As the author stated before, for the better measurement of the claims handling performance, in this case will be the median, as it represents the more precise middle value. Before, on average, the claims were settled between 48 to 51 days, now with the proposed solution, the claims should be settled within 31-35 days, and as the main company's target is pay out the compensation at least in 39 days, the results of the proposed solution are fitting well the company's KPI.

6.5.4. Histogram

Also, in the Analysis part of the Master Thesis, the histogram was presented to see how the values of days spent for the claim settlement process are spread. The histogram of the improved scenario is presented below:

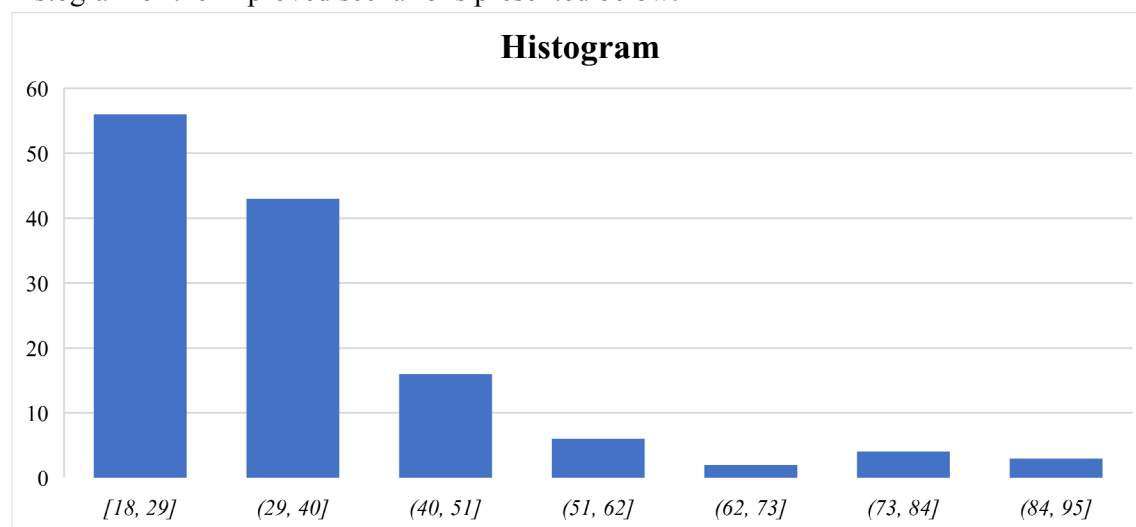


Figure 27, Source: author's analysis

As it can be seen, the number of claims which are out of the first two categories is significantly decreased, comparing it to the original histogram. The claims which were in the right-side categories before, moved to the left, increasing the number of claims which would be settled in a shorter period of time.

6.5.5. Risk analysis

For the determination of possible failures and the impact which it can have on the process of claim settlement, the author prepared risk analysis with application of model FMEA (Failure Mode & Effects Analysis) (Jing, 2019). This model helps to determine possible failures and errors which may occur one the projects are implemented.

The table presented on the pages 76-77 summarizes all the information completed for the model.

From the table of risk analysis, it can be concluded that the less risky activities are number 4, restructure of the claims handling procedure to reduce rotations within the company, and number 6, installation of chatbot for a quick consultation and getting the answers. However, one of the riskiest activity is to provide more detailed information on publicly available sources, because it may cause harm not only from the customers' side, not also from the competitors' side. In case the activity is too risky, the insurance company can go even further and develop the personal accounts on the webpage for each policyholder, and such information will be presented there, and it will be visible only for the particular people with the safe access.

According to the table presented by the author in the part of Improve, where the priority and costs are specified, the approximate price for the implementation of the project offered will cost 9 500 EUR. The improvement proposal will increase the FTY to

Ref.	Risk Activity	Possible Failure Mode	Impact	Possible Causes	S	P	D	Risk Number (S*R*D)	Current controls	Recommended Changes
1	Restructure of the claims handling procedure to reduce rotations within the company	Confused workers after the implementation of the project	Excessive rotation of the claims within the company due to the lack of knowledge about the correct procedure	Claims are settled even longer	3	2	2	12	Better training of the employees at the phase of the project implementation	Development of more sophisticated IT software for the easiness of the claims navigation within the company
2	Installation of the chatbot for quick consultation and getting the answers for the questions	Mismatch in the answers to the questions provided	Customers get incorrect information	Customers get wrong information and they are confused. They have wrong expectation about the services of the insurance company	2	3	2	12	Close cooperation with IT team, constant checks for the possible errors	Better adjustments of the possible questions and the answers for it
3	Restructure of the claims' department by dividing it on two parts	Increased volume of work, lack of senior people in the team for "small amount claims"	Incorrect compensation of the claim due to incompetencies	Slow settlement process of "small amount claims", increased communication between the insurance company and claimant	3	3	4	36	Better training of junior workers and setting the KPI - the speed of the claim	Process automation and the initial correct submission of documents, so the loss amount does not influence the process of settlement
4	Improvement of services of Customer Care Team	The overloaded Customer Care Team due to the excessive number	Poor quality service, slow response time, incorrect advises to the clients	Customer dissatisfaction, decrease in the competitive advantage,	5	4	4	80	Coaching and training of employees; customers	Increase number of workers in the team, process automatization

		of calls and emails		misleading information					feedback and scores	
5	Offer the claim pre-submission consultation via email	The overloaded Customer Care Team due to the excessive number of emails; incorrect advice of the employees due to the lack of specific knowledge about the claim	Poor quality service, slow response time, increased number of returns to the claimant	Slow settlement process, repetitive claim review due to the added documents	5	4	4	80	Setting the KPI - claim submitted correctly from the first "pass"	Development of the general form for the doctors to fill, so it could replace large number of documents for submission
6	Better specification of insurance policy conditions in the insurance policy	Customers are not paying attention to the article with detailed information about the claim's submission	Incorrectly submitted documents to the insurance company with the request for compensation	The problem is remained, customer dissatisfaction, long claim compensation process	5	7	3	105	Do the tests on the focus groups and determines the best ways of information delivery to the customers	Development of the general form for the doctors to fill, so it could replace large number of documents for submission
7	Provision of more details information on publicly available sources	Customers are not reading the information provided; the competitors can have too much of strategically important information of the company	The right information still does not reach the customers; Another insurance companies can use the in public information as example for the adjustment of their processes	Incorrectly submitted documents, wrong sum requested for compensation	6	5	4	120	More accurate information provision	Create personal account for each policyholder in the webpage and provide the information exclusively there

Table 26. Source: author's analysis

82% and shorten the Lead time to 28 days. Looking at the real numbers and the average days for the claim settlement process, it must take on average 31 days.

Considering the information from the risk analysis and the cost of implementation, the author believes that the cost of the project worth the expected benefits. In case the insurance company does not take any actions for the improvement of the current process, the performance of the company and the financial results can be worthen.

Therefore, it is better to implement the proposal for improvement with the associated costs, and it will pay off in the future, once the processes will be improved and the quality of service will more client-oriented than in other companies on the market, therefore, it will lead to the increasing market share of the insurance company.

6.6.6. Process Control

To see the full potential of the implemented project, it is necessary to introduce the relevant control tools. The author used various lean tools which can enable the control of the projects implemented and reduce the possible waste in the process.

5W1H

The tool of 5W1H – Five “Ws” and One “H”, enables to keep for the long term the benefits brought by the project implemented. The application of the tool was described earlier, on page 38.

Five questions listed are answering the most important questions which can arise after the project is implemented:

- *Why to control?* – the reason to control the projects implemented is to keep the process at the current level of performance and prevent of decrease in the level of the team performance.

- *What to control?* – the subject of the control is the change implemented to the process of claims handling.

- *Whom to control?* – all parties which are involved in the process of claim settlement – policyholders, hospitals, employees.

- *When to control?* – the process has to be the subject of the constant control, therefore the periodic checks are necessary – 2 times in one month.

- *Where to control?* – on the premises of the insurance company, on the premises of the medical partner, on the premises of the hospitals.

- *How to control?* – compare the defined KPIs with the real figures of the process and whether they are fitting to the defined standards.

Pilot Project

To avoid the outlay of money because of the not paid off project, the author recommends doing the pilot projects before the actual implementation of the real projects. It will help to evaluate more precisely the expected performance, than the forecasts on

the paper. For example, for the implementation of the solution for the challenge – *high number of departments for the claim settlement to pass through & high compensation amount slows the claim settlement process*, the insurance company could create test group, consisting of several employees, and they will be testing whether the new process is working efficiently enough to implement it on the real claim settlement process.

Before implementing the solution for the challenge *not exact specification of the policy conditions and the risk coverage and incorrectly submitted documents*, the insurance company can create the focus group of customers and test how they understand and perceive the information and whether they understand the insurance policy conditions and what type of documents are required to submit the claim for compensation.

And for the last Kaizen event, *complicated communication between the insured and insurance company*, the author offers to test the chatbot with the focus group as well and find out whether it is useful tool to implement and how it is understood by the customer and if they will widely use it.

Conclusion

The goal of the master thesis was to determine the applicability of the lean and operation management tools in the insurance company. The goal was successfully fulfilled, as the lean tools were applied at all the phases of the improvement project for the insurance company.

To reach this goal, the author firstly defined the underlying principles of the insurance industry and lean management. Furthermore, the reader was presented the current trends and challenges in the insurance sector to have a broader overview of today's industry performance. Also, the author provided a wide number of lean tools, which can have an applicable place in the process of claims handling in the company's operations in the insurance industry.

As the second stage of the study, the author exercised the DMAIC methodology and applied it to the thesis topic to reach the stated goal. The author defined the main concerns of the customers and the insurance company by applying the tools of Voice of Customer and Voice of Business gathering. The information collected has shown that Time is the main factor in the claim settlement process for both – customers and the insurance company, therefore it was selected the first to review.

To know better the process and the algorithm of the claims handling, the author prepared the flowchart and SIPOC model, that enabled to measure the Lead Time of the process, which was equal to 37 days at the beginning of the project. With the information provided in the company data, the author could find out the First-Time Yield that was equal to 63%.

To see the meaning behind the figures of the data set provided, the author performed various statistical analyses and checked several hypotheses. The average time for the health claim settlement for the period of 3 years was equal to approximately 50 days. The identified the challenges, which are influencing the process the most, the author presented in the form of Pareto chart and developed the Fishbone chart to see the roots of the causes.

With the help of Pareto chart and identified top priority opportunities for improvement, the author proposed to implement 3 Kaizen events, where the first event will be improving the challenge of *Not exact specification of the policy conditions and the risk coverage and incorrectly submitted documents*, taking 39 working days for the development and implementation and requiring the budget of 4 100 EUR. The second Kaizen event will be focusing on the challenge of *high number of departments for the claim settlement to pass through & high compensation amount slows the claim settlement process*, taking 35 days for the analysis, development and improvement and requiring of 400 EUR. The last Kaizen event is aimed on eliminating the problem of *complicated communication between the insured and insurance company*, requiring 43 working days for implementation and the budget of 5 000 EUR.

The goal of the thesis was reached by proposing the solution with the total investment cost of 9 500 EUR, and this investment can be paid off by decreased Lead Time from 37 to 28 days, the First-Time Yield could be increased from 63% to 82%, and decreasing the potential average time spent for the claim settlement from 51 to 35 days.

To assess the investments and the project, the author conducted the risk analysis, where the most potentially dangerous activity, to provide more information on publicly available resources, was identified, however, the author proposed to develop the personal accounts for each policyholder, so that they will have safe access to the information. To sustain the proposed level of the process performance, the author offered to use several control tools such as 5W1H and conduct pilot projects.

One of the main recommendations of the author for the future research is to focus on two other variables identified in the Critical-to-Quality – cost and network, as these factors were highlighted by the focus group in the Voice of Customer. Also, it is crucial to conduct the interviews with the employees, which are actually in the process and workers, which are responsible for the claim review, so the better picture of their functions will be outlined and evaluated.

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