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RESEARCH OF GLOBAL TRANSPORT AND LOGISTICS ENTERPRISES EFFICIENCY IMPROVEMENT

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Annotation

The Master Thesis investigates and analyses efficiency definitions, efficiency related problems and the potential models to improve the efficiency of global transport and logistics enterprises. In order to investigate the theoretical aspects, a comparison analysis was performed, with a purpose of determining the most appealing efficiency measurement system. The most appealing measurement system, that measures the efficiency of global transport and logistics enterprises, was analyzed to be the Balanced Scorecard System. This system allowed the creation of a conceptual model that was used as a base for empirical research, that investigated the internal and external processes of global transport and logistics enterprises. Furthermore, the empirical research analysis allowed the creation of a new model for efficiency improvement that can be implemented by global transport and logistics enterprises and be used as a tool to develop their efficiency.

The Master Thesis is divided into seven parts: introduction, theory aspects of efficiency, methodology for the empirical research of the efficiency development model, results and observations of the empirical research of the efficiency development, discussion of the outcomes and future research directions for the empirical research of the efficiency development, conclusions, and the reference list.

The scope of the report is 83 pages excluding the appendices, 22 illustrations, 8 tables and the list of 82 references.

Appendices are provided separately at the end of the report.

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Anotacija

Magistro darbe tiriami ir analizuojami efektyvumo apibrėžimai, su efektyvumu susijusios problemos ir galimi modeliai kaip patobulinti tarptautinių transporto ir logistikos įmonių efektyvumą. Siekiant ištirti teorinius aspektus, buvo atlikta palyginamoji analizė, kuri siekė nustatyti aktualiausią efektyvumo matavimo sistemą. Analizės metu, subalansuota rodiklių sistema buvo nustatyta kaip aktualiausia sistema tarptautinių transporto ir logistikos įmonių efektyvumui matuoti. Ši sistema, leido sukurti koncepcinį modelį, kuris buvo naudojamas kaip empirinio tyrimo pagrindas ir kuris tyrė tarptautinių transporto ir logistikos įmonių vidinius ir išorinius procesus. Empirinė tyrimų analizė leido sukurti naują efektyvumo tobulinimo modelį, kurį galėtų naudoti tarptautinės transporto ir logistikos įmonės ir kuris būtų naudojamas kaip priemonė jų efektyvumui tobulinti.

Darbas suskirstytas į keturias dalis: įvadas, įmonių efektyvumo vertinimo teoriniai aspektai, efektyvumo tobulinimo empirinio tyrimo metodika, efektyvumo tobulinimo empirinio tyrimo rezultatai ir analizė, efektyvumo tobulinimo empirinio tyrimo rezultatų ir būsimų tyrimų krypčių aptarimas, išvados ir literatūros sąrašas.

Darbo apimtis - 83 puslapiai, išskyrus priedus, 22 iliustracijos, 8 lentelės ir 82 nuorodų sąrašas.

Priedai pateikiami atskirai ataskaitos pabaigoje.

Prasminiai žodžiai: Įmonių efektyvumas, efektyvumas, efektyvumo vertinimo sistema, transporto ir logistikos įmonės, subalansuota rodiklių sistema

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF EQUATIONS

INTRODUCTION

Topicality. The relevance of the topic of global transport and logistics enterprise efficiency improvement is due to Lithuania's geographical location. Lithuania, because of its geography, crosses two transport routes of international importance, that allows important transit cargo flows, and a well-developed area of transport business in located in this country. In turn, transport in Lithuania was almost 12.3% of country's gross domestic product in 2016 and the constant growth of this branch resulted in a thoughtful competition between eight thousand logistics companies. Henceforth, due to transport increasing the GDP of Lithuania, this Master Thesis topic is important nowadays, as the GDP could continue to grow if efficiency of the enterprises increases (A Modest Challenge to GDP Reforms an Economist's View, 2019). According to B. Young (2019), increasing the efficiency could bring more job opportunities, more profit and thus fewer unnecessary wastes. M. Shi (2018) also agrees with B. Young, while also suggesting that increasing efficiency of transport would decrease the environmental pollution. Therefore, in today's business world efficiency assessment of enterprise is important in measuring the enterprise's current situation and aiming to increase it.

Problem. To increase efficiency, economic and management theories provide different ways to solve this problem, such as applying efficiency measurement systems to logistics and transport enterprises. Therefore, it is important to determine the associations between efficiency measurement systems and create a faultless system that could be easily incorporated into the enterprises.

Research object. The object of this research is efficiency improvement of global transport and logistics enterprises.

Aim of the Thesis. Master Thesis aims at formation an efficiency measurement model for global transport and logistics enterprises.

Tasks:

1. To analyze the theoretical aspects of the enterprise efficiency concept and efficiency measuring systems;
2. To perform an empirical research of global transport and logistics enterprise efficiency affecting factors;
3. To form an innovative global transport and logistics enterprises efficiency assessment model and describe its application context.

Methods of the research. The methods of Master Thesis include scientific literature analysis, systematizing of literature and graphical interpretations, survey, in-depth interviews and expert assessment method according to SWARA calculations.

The structure of the Thesis. Master Thesis is composed of the introduction, four major parts with corresponding sub-parts and conclusion. The first part includes scientific research of theoretical aspects of efficiency measuring systems, that corresponds to the topic of the Thesis. The second part is methodology for the empirical research. Third part is the section for the results and observations, whereas fourth part includes conclusions and future remarks based on the research observations. Lastly, conclusions section includes brief research results.

Implementation of the research. The research and its outcomes can be implemented in the modern business world of the logistics and transport sector with a purpose of increasing the enterprise's efficiency. This research provides a new model for efficiency measurement model that can be incorporated into global transport and logistics enterprise, whether it is starting its development or is already in the process of the development. The results and created model can be used as a tool for future research and therefore the future research directions are formed. These future research directions require a more detailed analysis of transport sector of other countries with different economical situations and analysis of other efficiency measuring systems, while particularly focusing on the green logistics concept. Overall, investigating these future research directions would allow a more developed and supportable efficiency measurement system.

Limitations of the Research. Limitations of the research were defined. These limitations are such as using only Lithuania's economy for investigative the importance of transport sector and limitations related to the choose of Balanced Scorecard System as a base for the empirical research.

1. THEORETICAL ASPECTS OF ENTERPRISE EFFICIENCY

1.1. The Concept of Efficiency

In today's volatile business environment, companies are increasingly seeking to become more competitive by focusing on profit growth, therefore they mostly focus on the efficiency and effectiveness of business processes and try to improve them.

Hence, the concept of efficiency is very broad and applies to different areas. Analyzing the literature, it can be said that efficiency is a process that maximizes the use of available resources to achieve the best result. The term "efficiency" derived from Latin word effcientia and in its original interpretation meaning "achieving determined productivity with smallest wasted energy", was firstly introduced in a year of 1630. Hence, the Cambridge dictionary defines efficiency as "a situation in which a person or a company uses resources such as time, materials or labor well, without wasting any". The economist R. Markovits (2008) defines this concept as an idea that equal to the earned amount of money, while B. Young (2017) suggests that particularly for a logistics enterprise, efficiency means increasing job availabilities. V. Elia (2018) suggests that in logistics efficiency means increasing "waste collection services", which allows control over the waste.

Thus, literature analysis revealed that it can be related that the main benefit of efficiency is to get the maximum result in the company, in other words, it is profit seeking with minimal resources and waste. The cost-effectiveness structure can be composed of general efficiency and comparative. The key difference between general efficiency and the comparative is that overall performance is designed to measure and analyze the company's economic performance, and the key feature of comparative is the ability to judge decisions based on different areas and to evaluate those decisions.

In literature, there are many interpretations of the definition of the term efficiency. The definition is different due to different perspectives, as one group of the authors (Achaball, Chan, Comes and Kersten, and Kjurchinski) analyze efficiency through the aspect of resources, another group of authors (Ducker, Rodruigez, Tovar and Truijillo, and Lu Hung) analyze this term through economics, and lastly authors (Zhemchugov, Zhemchugova, Spacey, Merriam-Webster and Pettinger) identify that costs and production depend on effectiveness of an enterprise. The interpretations of efficiency do not allow to measure the efficiency of an enterprise, because for that specific indicators and factors are needed.

Table 1. Concepts of efficiency in scientific literature

Author	Definition of efficiency
Achaball (1984)	"Efficiency is link to costs in minimum level and referring to allocating recourses across optional uses."
Chan (2003)	"Efficiency in the literature management as utilization recourses of labor, machine, capacity and energy. "
Comes and Kersten (2006)	"Technical efficiency degree measure of a production unit permits to surround if this last one can increase its production without consuming, at the same time, more recourses, or reduce the use of at least one input by conserving at the same time, the same level of production."
Ducker (2007)	"Efficiency is interpreted as the most favorable relationship between purchasing costs and economic outcomes."
Rodruigez, Tovar and Truijillo (2007)	"Allocative efficiency puts in relation the inputs utilization by the enterprise according to the current prices on the market."
Zhemchugov, Zhemchugova (2010)	"Efficiency is the efficiency of a process, a project, an operation, which is the relationship between impact and cost, cost-effective yield."
Lu Hung (2011)	"Performing act is often pertained to efficiency which has started in the literature of management as well"
Kjurchinski (2014)	Efficiency is described as the one of the factors that can measure the quality
Spacey (2017)	"Efficiency measures how well a business converts inputs such as capital, labor and materials into outputs like revenue, products and services."
Merriam-Webster (2017)	"Effective operation as measured by comparison of production with cost"
Pettinger (2017)	"Producing goods and services for the lowest cost" it can be found on the Production possibilities Frontier where obtaining a larger quantity of a good involves diminishing the quantity of another.

Source: made by the author according to literature sources listed in the table

Thus, an overview of Table 1suggests that Kjurchinsi (2014) is related with Archaball (1984) through an understanding of efficiency and its aspect of resources, while Merriam-Webster (2017) and Ducker (2007) clearly analyze the purchase costs and economic outcomes

and the effect they have on efficiency. Therefore, one could analyze efficiency of an enterprise through management decision prism, while other could do that through measurement systems. However, it is important to know that effectiveness is expressed by the ratio between the results achieved and the programmed one and shows the success acquired by using the recourses to accomplish the proposed objectives (Mandl et al. 2008). The cost-effectiveness structure can be derived from overall efficiency and comparative. Overall effectiveness is aimed at evaluating and analyzing the company's economic indicators and results, and the main feature of comparative efficiency is the ability to gather decisions based on different areas to be able to evaluate them in order to choose the optimal variant (Spacey, 2017). There is financial, labor, energy, eco, operational, process, return on investments efficiency types (Spacey, 2017).

The glossary of economic terms provides some of the main types of effectiveness: allocation efficiency is the production of the most suitable combination of goods at the lowest cost or optimal allocation of economic resources. This efficiency also means that the best combination of available resources is used. Allocating efficiency is closely related to the marginal productivity principle. Technological or technical efficiency is the complete absence of losses, making best use of available resources. Dynamic performance is achieved when innovative changes occur quickly and at the right time. Competition, leading firms to introduce new technology, leads to dynamic performance (Pettinger 2017).

The concept of the enterprise's efficiency is also very multifaceted and broad, so companies can rely on their different concepts for choosing ways to increase efficiency. According to Lukoszewicz (2011), economic efficiency as a category always relates to the ratio of results to costs, which guarantees the maximum result. So, we can say that the greater the result of this relationship, the better the efficiency.

Nonetheless, Productivity Commission of the Australian Government (2013) reveals that there are a few different types of efficiencies:

- Allocative;
- Productive;
- Economic;
- Technological.

Allocative efficiency (Chen, 2018) is the most appropriate combination of products at the lowest cost or optimal allocation of economic resources and it also means using the best combination of available resources. The allocation efficiency is closely linked to the marginal productivity principle and is raised as an objective of economic organization, which is achieved under conditions of perfect competition in the market. There are three conditions that have to be met to achieve allocation efficiency:

1. best distribution of goods to consumers, where benefit equals the costs of the products or service;
2. best allocation of resources, where the value of the product or a service equals the value of its cost;
3. optimal output, where the output of the product or a service produces a desired profit that can bring benefit to the company and its employees.

Therefore, if all of the conditions are met, then it would be impossible to make another person richer without making damage to the others.

L. Chen (2018) has made an investigation testing the allocative efficiency of carbon emission in China from 2016 to 2020 and concluded that logistic enterprises in China need to improve their allocative efficiency to decrease the amount of carbon emission. Another example how allocative efficiency is beneficial was investigated by M. Lee (2019), where the power plants were tested for their allocative efficiency in Korea. It was concluded that the realization of allocative efficiency would have decreased the power price by 7.6% annually.

Thus, allocative efficiency is beneficial when trying to increase the productivity while remaining at the same economic level.

Productive efficiency is a measure of how the inputs (such as for example the costs of medicine in the hospitals) and their value is converted to output values (such as recovery in the hospitals). It is measured by the ratio of outputs to inputs and is usually a measurement of an overall productivity. For example, M. L. Polemis (2019) did an investigation of the productive efficiency by taking into accounts time effects and technological development of the enterprise. The two aspects (input being time and output being technological development) were compared to one another and an overall productive efficiency calculation was received.

Economic efficiency is the effectiveness of the production activity, showing the dependence between economic or political activity and the results of the living work (Jia, 2018). To describe economic efficiency N. Jia (2018) says that "When the political audience faces little uncertainty about lobbying content, firms make sourcing decisions to maximize economic efficiency", and by this statement it means that the economic efficiency of an enterprise depends on the economic and political activity. The economic efficiency is achieved when people in a society use their utility and resources of the economy to a maximum capacity and look at it through the enterprise efficiency prism. Additionally, it also shows the result obtained with a value, as the result normally achieved is estimated as profit or cost and resource saving. The size of the economic efficiency of the company depends on:
1. the volume of production and cost savings;
2. productive and allocative efficiencies.

It is also possible that there is an economic inefficiency of an enterprise or a product, such as for example electricity, as according to Y. Qiu (2018), he says that "economic inefficiency can be caused by time-invariant retail electricity prices because they do not reflect variations in the cost of providing electricity during the day". This example of an electricity proves that economic inefficiency is possible and can be avoided if the right actions are taken.

Production is considered technologically efficient if the same production technology produces with the same output at a lower cost, hence using fewer resources, less time and energy, while also avoiding unnecessary waste and limitations. M. L. Polemis (2019), who tested technological development of an enterprise, discovered that for a technology to grow, there has to be an appropriate market, which is a number of firms and their production, and concentration of a particular sector.

In order to evaluate the economic efficiency of economic activity, the determination of factors determining the activity of the company remains a priority. Overall, the concept of efficiency depends on its allocation and accepted contributions of the employees to the fullest comfort. Therefore, a service or a product is considered to be economically efficient if there are no other resources that could present a higher benefit. On the other hand, a service or a product is considered to be inefficient if the cost of it is higher than its benefits, or it can be proven that the resources of this service or a product could bring higher benefits. According to Lukosevicius (2005), efficiency of economic activity as a category is always linked to the value-for-money ratio that guarantees maximum results, thus we can say that the better the result of such a relationship, the better the efficiency. However, the rapidly changing business market, the changing features of management methodology, technological trends and the ever-developing business environment competition can distort the perception of efficiency, so it is imperative to rely on the factors identified to measure efficiency. Profitability, efficiency, quality of services and work, economy, production and innovation are the best factors for describing performance, and as M. Olkiewicz (2018) says improving effectiveness helps enterprises improve their quality and decision-making, and therefore develop even further as a united organization.

After analyzing and generalizing the interpretation of the efficiency definition of authors, can be summarized: efficiency is the pursuit of an efficient, productive result at minimal cost and rational use of available resources. Also, it is very important to remember that there is a lot of different types of efficiency like: allocating, technological, dynamic and etc. According to that, most important is to understand what efficiency category will be most valuable to increase results, and because there are different types of efficiencies, table 2, illustrates their key characteristics and factors.

Table 2. Types of efficiencies and their factors

Types of efficiency	Features	Factors
Allocative	Combination of products at the lowest cost or optimal allocation of economic resources (Chen, 2018)	• Productivity indicators • Economic level indicators
Productive	Ratio of outputs to inputs	• Output indicator (ex. medicine) • Input indicator (ex. Recovery due to the medicine) • Productivity indicators
Economic	Dependence between economic or political activity and the results of the living work (Jia, 2018)	• Economic and political indicators (Jia, 2018)
Technological	When production technology produces with the same output but at a lower cost	• Technology development indicators • Similar business concentration in the market

Source: made by the author according to literature

The analysis of the scientific literature revealed that efficiency is treated as a relationship between the enterprise performance level and resources of the company used to achieve those results. Nonetheless, all of the different types of efficiencies are linked by achieving the best results at a lowest cost. However, another important factor in the company's performance is its interaction and interaction with the external environment. Organizations as open systems are dependent on the surrounding external environment - labor and material resources, social factors, goods or services, etc.

In order to better and more accurately assess economic efficiency, Girdzijauskas and Jefimov, (2006) distinguish factors that determine the efficiency of activities, by also dividing it to two groups: internal environmental factors and external factors.

Internal factors are more important to the efficiency of the company. They directly determine the activity of the company and arise within the company. The main internal factors are the results of all of the company's activities, and not the main internal factors that reflect performance, but do not have a decisive influence on them, are disciplinary violations, company

structural organizational shifts, and etc. (Klimaviciene, 1999). But the most influential factor is the communication of employees, according to M. Slijepcevic (2018), as she says that "communication is important for all the members in the organization, it is extremely important to know how to communicate with managers, and in what way with employees".

Communication is important between logistics managers as well, as they have to deal with a lot of figures and data on a daily basis, besides coordinating smooth discharge of operations. The scope of their work includes ensuring the safety of the fleet and staff, fleet loading, cross-checking route maps, sanctioning fuel bills and so on. When done manually, this can be a time-consuming and tedious task that can take your focus off from attention to details. Investing in an automated solution or application for data entries, fuel bills, loading and unloading ledgers can go a long way in streamlining operations by allowing logistics managers the luxury of time to look at the finer nuances of operations (Vinod Saratchandran 2017).

Nonetheless, one of the most significant impact on the efficiency of the company is the economic factors, such as economic situation in the country, expected economic changes, demand and supply fluctuations, nature of competition and others. Additionally, another important factor, according to M. Slijepcevic (2018), is coordination, as she says that "Internal communication must at all times be coordinated with external communication". Therefore, external factors, which may be economic, political-legal, social-cultural and communicational, are outside the company and have a direct impact on the performance of the company. They can have a direct impact on profitability, earnings or costs. Social factors and communication between internal and external factors can be attributed to the financial crisis, as well as political changes or government tax policies. (Girdzijauskas and Jefimov, 2006).

The sharp fluctuation in fuel pricing can be explained by the constant rise and fall in oil. The OPEC (Organization of the Petroleum Exporting Countries), led by Saudi Arabia, has often refused to curb production on the overall market which has resulted in an abundance of crude oil. This increase caused a disparity between the demand and supply of crude (which is later converted into other products such as fuel), with repercussions on fuel prices. The matter is still to be solved (OIL market report IEA, 2017). Those factors are making huge impact on hauliers for transport logistics companies which have own influence with prices in the market.

Though the future looks bright for the truck industry, the shortage of drivers is a result of factors. Demographically, a lack of availability has been noted. Low wages have also contributed to a decrease in some drivers. One more important factor is the working conditions which apparently are unsatisfactory, taking into account the dangers and weather conditions while driving in extreme regions.

Any external conditions that exist in the market are often understood as a macro environment. The nature and maturity of the macroeconomic market are subject to certain conditions. Thus, constantly increasing interest rates on loans and leases force carriers to reduce staff numbers, as well as look at route distances and refrain from leasing cars under leasing contracts. As a result, carriers are forced to reduce service prices in order to be competitive in the market, but there is a chain of problems for the company itself. Over time, as freight forwarders have fallen in the market, freight rates can increase and, over time, create an artificial rise in prices and competition. Experts call on carriers to take into account macroeconomic forecasts and scenario methods (Kadlubek, 2016).

Route planning, being an important external factor, has an impact on the stability and economic efficiency of transport work, where the route in the broad sense is the way the cargo will be transported. According to Litvinenko and Palsaitis (2005), the principle of route formation is particularly important due to the enormous competition as well as the impact of economic factors (fuel, work, equipment). Route planning is needed to facilitate customer service, reduce transportation costs (fuel, wear, repairs, etc.). H. Ballou offers the following route planning methods: "sweeping" method, "saving method", route routing method (Bazar et al. 2010).

Additionally, Yahya and Kingsman (1999) argued that one of the most important factors in the efficiency of an expedition company is the choice of suitable carriers. During the process of getting goods to the freight forwarders, the reputation of freight forwarders is directly dependent on the quality of the carrier's services. Therefore, there is an automatic risk that forwarders may face situations that they will not be able to control. For these reasons, it is important to have a system of criteria that the freight forwarder can check and select from.

Currently, an important factor that affects the efficiency of the company of "social conditions and use of labor in the company" is addressed by one of the biggest logistics companies, known as DHL. One way to solve this problem of unfair labor in the company is by incorporating robotics into logistics processes. Workers in warehouses are largely engaged in mechanical work, so replacing employees with robotics would significantly reduce costs and increase productivity. Big companies like DHL have already replaced some of their employees with robots. For example, DHL has installed robots in distribution centers that are capable of recognizing and sizing different parcels by size. According to DHL (2016), the field of robotics will become a breakthrough in the logistics industry. This is also evidenced by the Tesla lorry trucks currently being tested, which, according to Tesla founder Elon Musk, will be released in 2019.

Overall, according to Klimaviciene (1999) and the analysis of this Thesis, it is important to highlight the main factors that affect efficiency of an enterprise in order to fully understand which factor influences the enterprise the most. Therefore, figure 1 concludes all of the most important enterprise efficiency factors that have an effect on the company's performance and development.
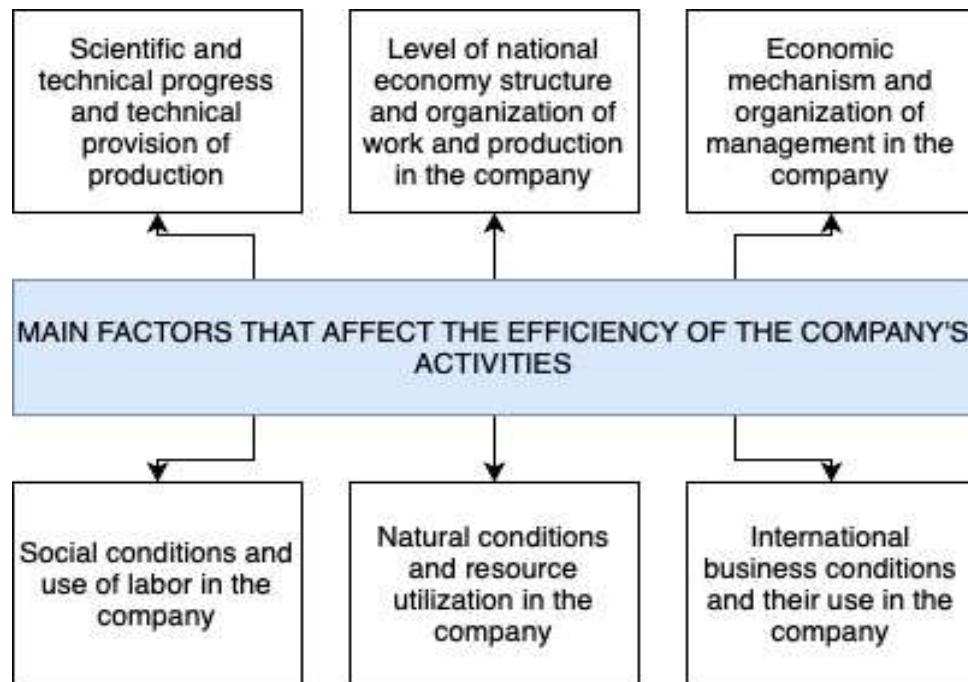
Figure 1. Main factors that affect efficiency

Source: made by the author according to the analysis of Klimaviciene (1999)

In conclusion, it can be concluded that there are multiple types of efficiencies, as can be seen in table 2, and they all contain different factors that play a role in developing that specific efficiency of an enterprise. Therefore, these factors also allow the efficiency of an enterprise to be dependable on those factors, which can be seen in figure 1. These factors are divided into internal and external, all of which have an impact on the company's operations and its efficiency. Most important internal factors being more subjective as they are happening within the enterprise and they can be controlled, while the external factors being more objective as the enterprise does not control them. Therefore, when considering the effectiveness of a company and its service, both factors have to be taken into consideration and an ultimate goal of how to improve and develop the company's efficiency has to be created based on these two factors that are the main problems of an enterprise. In the next part of Master Thesis, main efficiency issues of each factor will be analyzed.

1.2. Models of Enterprise Efficiency Assessments

After the analysis of the term efficiency, its factors, and what main problems of these factors transport companies are facing the most, there will be different efficiency measurement models compared. In order to find out which efficiency measurement model is the most efficient it is very important to identify how models can be used or applied and analyze their main characteristics, There are multiple efficiency measurement models in the scientific literature, but the most usable models in business were picked for the further research, which are (Gunther, 2016):

1. Financial model;
2. AHP model;
3. The Performance Measurement System;
4. The Eco-Efficiency system;
5. The Balanced Scorecard System.

Financial model. It is best to evaluate the company's performance on the basis of different financial indicators, since these indicators could best reflect the company's performance, growth and the utility of decisions made. In this case, both financial and non-financial measurements should be carried out, which would effectively assist in the decision-making process, and this would mean that the main direction of the last activity evaluation is that the financial result is the result of most processes. Similarly, based on the financial statement, one can continuously monitor the company's activities and compare it with other companies, comparing the growth of different periods, its financial reasons and better understanding what factors can influence certain growth or decline. Therefore, every decision taken within a company over a certain period of time has an impact on the financial position of the company. In order for these decisions to have no negative impact on the company's operations, financial indicators need to be constantly monitored to minimize the risks or consequences for the company. According to Aleknaviciene, (2009) these could be the following financial model indicators:

- Profitability indicators;
- cost indicators;
- property indicators;
- solvency or liquidity ratios.

Unfortunately, this system is very limited and cannot disclose internal processes, human resources, and customer analysis, however it can also be further broken down into the AHP model that is also considered to be of a financial aspect.

19

AHP model. Yahya and Kingsman (1999) used the AHP model (analytical hierarchy process) to create a logistics service efficiency evaluation system that can be used to evaluate supplier (partner) service cost, performance, service quality, and technological progress, and calculates a common index that may be compared to the index of other suppliers (partners). Therefore, supplier in this case is a partner. In logistics supplier could be referred to as a partner, who is responsible for renting their services to the logistics enterprise. An example of a service could be, renting a vehicle or a trailer, hiring drivers or even certain warehouse spaces. Using this model, the sub-criteria indexes are calculated, the common criterion index is based on the mean of sub-criteria values, and the common criterion index is the average of the criteria values. So, this is a three-level index that helps you evaluate the different aspects and risks of your suppliers (partners). The pattern structure is presented in figure 2.

Figure 2. Structure of evaluation criteria for the logistics service provider

Source: Created by the author according to Yahya and Kingsman (1999)

Yahya and Kingsman (1999) suggest, that logistics enterprise efficiency can be analyzed through the supplier logistics index. This logistics supplier efficiency index in the AHP model divides to the costs, operational efficiency, service quality and technologies that all impact the overall enterprise efficiency. Though, AHP model has many limitations and is of a too narrow specialization, therefore it does not cover the entire logistics chain and in the overall logistics process it does not significantly affect the efficiency of the process.

The Performance Measurement System (PMS System). Created by Dornhofer, Schroder and Gunthner (2016), the PMS system, based on the authors, is practical and easy-to-use, allowing you to explore the efficiency and productivity of logistics during the logistics process and discover process flaws that are usually remains unnoticed, since according to this model it is well agreed that the process of logistics has a huge influence of the efficiency of an enterprise as a whole. The PMS model consists of three levels: identification and assessment of external factors, identification and assessment of key performance indicators, and performance

management systems summarized by the results obtained. The structure of the model is given below (figure 3).
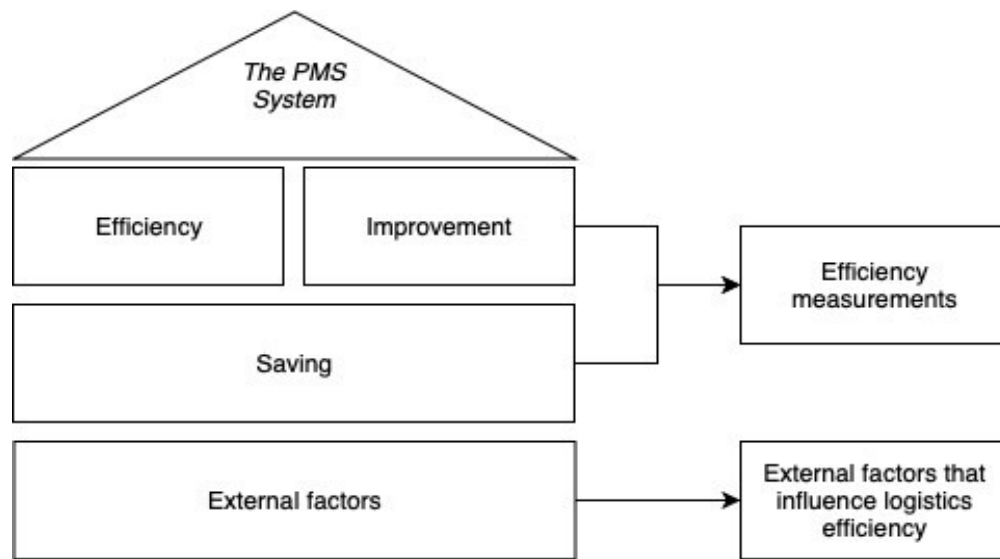
Figure 3. The structure of the performance measurement system (PMS)

Source: made by the author according to Dornhofer, Schroder and Gunthner (2016)

The PMS model is flexible, so it is appropriate to use in logistics company. Modeling experiments have shown that the model deeply examines the nuances of the logistics process itself, taking into account internal and external factors. According to the authors, such a complex model should realistically reveal the shortcomings of efficiency and identify aspects that would reduce the costs and time of the company.

The Eco-Efficiency system. New studies (Meilong, 2018; Chen, 2018) also emphasize the importance of eco-efficiency for logistics companies. Green (2012) states that environmental sustainability should be one of the strategic steps associated with the company's mission to improve the company's operational performance efficiency. Eco-efficiency is defined as a reduction in environmental pollution by continuously improving resource efficiency. Eco - efficiency can be measured jointly by environmental and economic analysis, as environmental analysis is useful for evaluating the company's internal activities and the value of its activities to its customers. For example, logistics companies can replace garage lighting with LED lamps, thus reducing energy waste or putting in a waste sorting policy within the company. Economic analysis can also help to reorganize an efficient company transport infrastructure. Eco - efficiency compares companies by adapting Kaizen and Six Sigma with the goal of improving processes to meet customer requirements and severely reducing process deviation. Additionally, concentrate on reducing production time and increasing revenue. In this way, Six Sigma improves processes and increases customer satisfaction. As old customers

continue to buy, and new customers are starting to buy (from a company known for its high quality) it goes without saying that market share and revenue will increase (Yilmaz & Chatterjee, 2000).

Correspondingly, eco - efficiency can be measured by inducing key performance indicators, such as the level of carbon dioxide emission, or the pollution of each vehicle, and comparing them with last year. The efficiency of logistics operations in the near future will also benefit the modernizing supply chains. Stank, Autry, Daugherty and Closs (2015) distinguish three main trends in the management of supply chains: collaboration, dynamic and systematic.

However, it is important to mention the fact that so far there is no complex model that would allow the comparison of aspects mentioned before in different companies. This is mainly due to the difference in business areas, as well as the cultural context, the differences between tradition and business goals. Hence, applying the same efficiency measurement system does not expect to achieve the same result.

The Balanced Scorecard System. In 1992, Mr Kaplan and Mr Norton, two students from Harvard University have proposed an instrument for strategic management of the company. This project is justified convincing that justification of the methodology of performance evaluation of an organization with financial indicators alone does not ensure the growth of the economic value of the company (Gudelyte, 2010). Both, Robert S. Kaplan and David P. Norton, conducted a study of 12 organizations to discover a new measurement method - a balanced metric, a way for quick management to fully assess the company's performance. According to two scientists, an effective strategic learning process is required for a divided strategic structure that illustrates the strategy and enables all members of the company to see how their individual action contributes to a comprehensive strategy. The author states that it is precisely this system that allows for the creation of unique business development tools that will allow the development of new strategies and visions.

The Balanced Scorecard System was one of the first concepts focused on the interest of organizations in finding a simple and compact solution for understanding and developing non-financial indicators. This is very important in order to ensure a sustainable future operation of the organization. In particular, the system of balanced indicators was designed to evaluate the performance of the company by dividing the strategy into four perspectives and assigning measures to implement them. In the mid-1980s, this system was improved by creating a map of strategies in which intangible assets are transformed into a tangible financial impact process (Markiewicz, 2013).

Regardless of the easy system development, the Balanced Scorecard System has many advantages over the analysis of financial indicators and also has its drawbacks.

Main benefits of Balanced Scorecard (Lueg, 2015):

- Rapid response to changes in the surrounding environment;
- Evaluating indicators in the company;
- Translates vision and mission to evaluated strategy;
- Consistent analysis of selected indicators.

Deficiencies of Balanced Scorecard (Lueg, 2015):

- No new strategies are created;
- Abandoning traditional methods of control and planning;
- Hard to implement.

Chen T., Chen C. and Peng S. (2008) argue that the system involves not only financial aspects, but also integrates business strategies into a management system. According to the author, the mission and strategy of this system allow the organization to create measurable, balanced indicators that can measure the organization's well-being. It is important to note that balancing indicators cannot adequately assess the factors that are related to business risk.

The Kaplan and Norton (Kaplan and Norton, 1992) proposed and widely used and widely applied system of balanced indicators outlines four different perspectives for measuring activity the traditional financial perspective, prospects for customer satisfaction, internal processes, and improvement and learning, where each of them answers particular questions such as (Sudnickas, 2008):

- Financial perspective – How do we look to our shareholders to bring us financial success?
- Prospects for customer satisfaction – To achieve our vision, how do we look to our customers?
- Internal processes – To satisfy our shareholders and customers who are in business processes are best for us?
- Improvement and learning - How to strengthen your skills and competences to meet constantly changing external requirements?

Literature analysis (Lueg, 2015) revealed that the system of balanced indicators is a strategic tool in the businesses, which allows to control the implementation of the strategy while highlighting different factors as well. According to Lueg (2015) and Buchanan (2005) the Balanced Scorecard System affects Micro factors, which are individual, managerial and leadership, and Macro factors, that are political and social. Lueg (2015) also says that this system separates vision from the strategy and allows to control internal and external contexts while using strategic goal control.

Ultimately, this analysis allowed to determine measurement models that allow to determine the efficiency of an enterprise. Thus, according on the gathered information from multiple sources, all of the models are compared and summarized in the table 3 below.

Table 3. Characteristics of logistics enterprise efficiency measurement models

Model	Characteristics	Indictors
Financial model	It is best to calculate the effectiveness of the company on the base of altered financial indicators, because it is these indicators that best reflect the results of the company, growth and the usefulness of the decisions made.	Profitability indicators, cost indicators, property indicators, solvency or liquidity ratios (Aleknaviciene, 2009)
The AHP model	The system that can be used to assess the supplier's (partner's) service cost, performance, service quality and technological progress, and calculates a common index that can be compared with another suppliers' index.	Factors that affect the logistics supplier (partner) efficiency are: 1. transport costs; 2. client satisfaction (number of clients); 3. quality of work; 4. IT development. (Yahya and Kingsman, 1999)
The PMS System	The model deeply examines the nuances of the logistics process itself, taking into account internal and external factors, by also realistically revealing deficiencies in efficiency.	Logistics process factors: 1. number of vehicles moved; 2. amount of goods transported. (Dornhofer, Schroder and Gunthner, 2016)
The Eco-Efficiency system	The reduction of resource pollution by continuously improving resource efficiency	Performance, pollution, emission concentration (Meilong, 2018)

Model	Characteristics	Indictors
The Balanced Scorecard System	Allows a quick management to fully assess the company's performance. The system involves not only financial aspects, but also integrates business strategies into a management system.	Strategic objectives, Management participation, Cause and effect relationship (Lueg, 2015)

Source: made by the author

Ultimately, table 3 reveals each efficiency measurement model according to economists and their understanding. According to the definitions it could still be unclear of which model could be applied to the efficiency measurement technique and be the most beneficial. Therefore, figure 4 particularly compares and analyses each model system by addressing its best advantages and comparing them to the advantages of other systems.
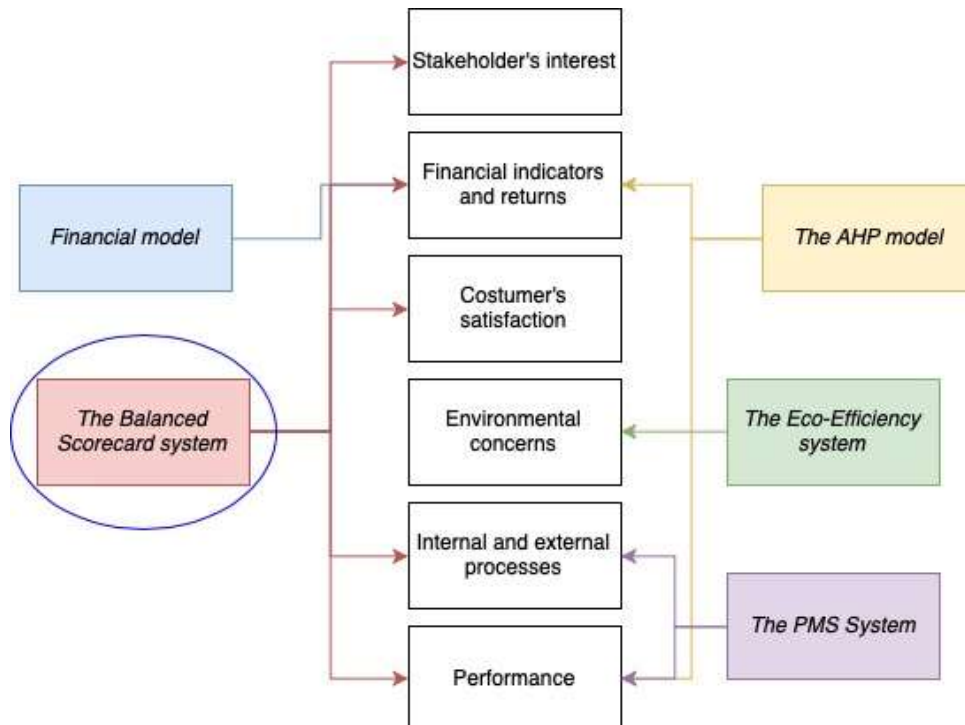
Figure 4. Comparison of different efficiency measurement models while addressing their advantages

Source: made by the author

Henceforth, by looking at figure 4, that compares the advantages of each efficiency measurement system as the main aspects that bring benefits to the enterprise and improve its efficiency are listed in the middle column, it can be concluded that particularly the balances scorecard system covers most of the aspects and therefore can be considered to be the most effective. Other models of measurement cover fewer aspects of the business companies that bring benefits to it, and therefore can be considered to be less effective and usable in the organizations that aim to grow and develop.

Overall, according to the table 3 and figure 4 and the positive aspects of the system of the balance scorecard, we can say that this system has fewer limitations than the financial analysis system, the PMS or the AHP model. The Balanced Scorecard System allows more focus on the strategy and its control, which allows employees to concentrate on the defined goals. Nonetheless, the main advantage is that this system involves non-financial indicators that can have even greater influence than the components of the financial analysis, and therefore represent more aspects than just those in the financial district.

1.3. Possibilities of the Balanced Scorecard System Development

The Balanced Scorecard System is considered to be an efficiency measurement system with fewer limitations and inconveniences that the other measurement models that have been discussed in section 1.2 (Lueg, 2015; Chen T., Chen C. and Peng S., 2008; Gudelyte, 2010). Particularly, developing and analyzing the Balanced Scorecard System so it can be later applied to a logistics enterprise allows the managers to fully take control of their strategic plans without any interruptions and increase the efficiency of the enterprise. The Balanced Scorecard System is going to be analyzed first by highlighting its application steps, then by identifying the four main perspectives of it, then showing its strengths and limitations, so they can be avoided in future conceptual models.

According to Balaji (2018), the Balanced Scorecard System has been publicly accepted by many enterprises as a company's supply chain performance measurement tool. This is due to its ability to enable competitive advantages. Currently, businesses, government and organizations use this system to improve their communication and update the organization's development and growth. Strategic planning is one of the most important steps in the success of business success. It is the strategy that allows us to go deeper into each subsequent stage and analyze it consistently. The strategies of Robert S. Kaplan and David P. Norton state that the perception of the strategy begins with a "value position that enables companies to define their approach to customers", that is, when there is a direction for the positioning clients themselves.

Svaravicius (2005) states that "The initial stage is to formulate the mission of the company and then to develop a general (core) strategy for the company. The overall strategy of the company combines different product and service groups into a single logic. Target setting is one of the most important stages in the development of a balanced system of indicators. Strategic goals are the main tasks - what to do and when to implement the core strategy. Indicators - a strategy transformed into numbers." Therefore, we can say that the strategy of the company is an instrument that helps to define the list of strategic goals and helps to create a system of balanced indicators. Consequently, creating this strategic plan creates a logical chain by combining financial and non-financial measures (Lueg, 2015). Creating such a chain can focus on each point even deeper, which would mean consistency and a thorough analysis.

Both, Svaravičius (2005) and Lueg (2015) distinguish a few steps of system development, that are important in order for enterprises to implement the Balanced Scorecard System into their daily routine. Nonetheless, it is also important in order for the Balanced Scorecard System to "become the ultimate yardstick for managing an organization" (Lueg, 2015), so it can be used to benefit the enterprise. Overall, the steps of development are presented in figure 5.
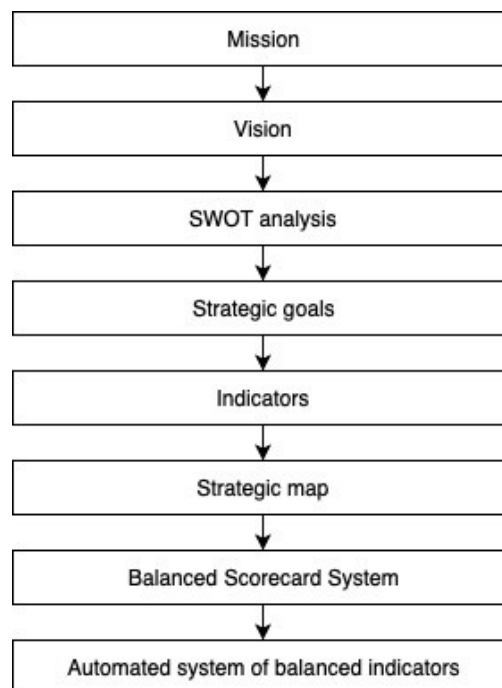
Figure 5. Steps of Balanced Scorecard System application

Source: made by the author according to Algirdas Svaravičius (2005) and Lueg (2015)

According to the scheme provided by the authors (figure 5), the following explanations are provided for each item:

The first step is to formulate an enterprise mission that helps to understand the meaning of a company and its necessity in society. Because it is the mission that allows us to formulate and disclose the needs and benefits of the company to society.

In the planning of the next, the strategic planning team formulates vision. Vision is a formulation that describes the long-term goals of the company (3 to 10 years). Formulated mission and vision, the Strategic Planning Team provides the opportunity to formulate the company's strategy.

Comparative Analysis (SWOT) conclusions are used to develop the strategy. In order to set the goals to be pursued, one needs to know the strengths, weaknesses, opportunities and dangers of the company. The analysis of external factors helps identify the opportunities and dangers of a company. Analysis of internal information helps to identify the company's strengths and weaknesses. The conclusions of the benchmarking analysis will help to check whether the strategic objectives are related to the existing business environment and based on previous business experience.

Thus, the Strategic Planning Team formulates a general (core) company strategy. The key strategy will be to create a list of strategic goals that will be needed to create a balanced set of indicators. It expresses the scope of activity of the whole company, which are the markets and the areas in which the activity will be carried out. The Strategic Planning Team formulates strategic goals based on the overall strategy of the company. Goal setting is one of the most important steps in the business planning process. Strategic goals are the main tasks that need to be accomplished to implement the strategy. A Strategic Planning Group is a list of strategic goals that show what and when to do to implement a vision and strategy

The Strategic Planning Team conducts the structuring of goals and divides strategic goals into 4 groups called perspectives:

- Financial Perspectives;
- Prospects of internal processes;
- Customer perspectives;
- Learning and growth.

All four of the perspectives are covered by the Balanced Scorecard System and help it in measuring the efficiency of the enterprise (see figure 6)
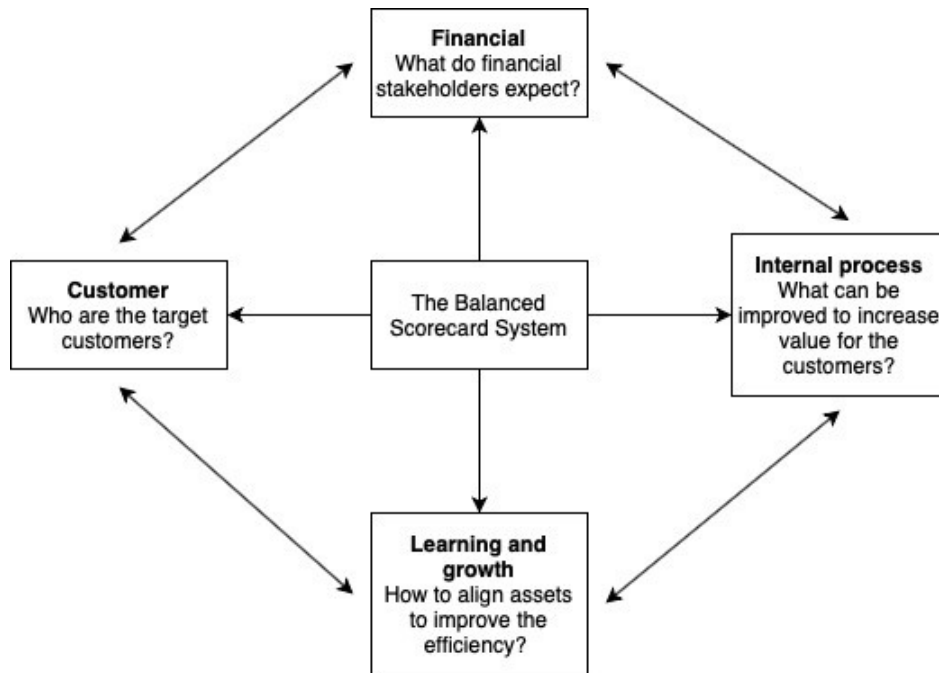
Figure 6. Steps of Balanced Scorecard System development

Source: made by the author according to M. Balaji et al. (2018)

Ultimately, to really understand what each perspective reveals and what the best approach of using it, according to Bacala (2014), they each have to be explained and clarified independently:

Financial Perspectives. The objectives of the financial perspective indicate what needs to be done to satisfy investors. Defines the position of investors in relation to the organization. Examples of Financial Perspective Indicators:

- Turnover;
- Profit;
- Product group overcharge;
- Profitability of one employee;
- Profit from new products;
- Dividends;
- Credit rating assessment;

- Cost optimization;
- Net profit growth;
- Return on usable capital;
- The ratio of borrowed and own funds;
- Return on equity;
- Profitability of capital employed;
- Return on investment.

Cohen, Thiraios, and Kandilorou (2008) argue that the financial perspective describes the outcome of a tangible strategy in traditional financial terms. Financial goals are considered to be organizational goals, but they represent long-term aspirations. Balanced indicators help the organization to watch and move forward without looking back. Financial metrics are considered to be late indicators as they are the result of other qualitative actions.

Prospects of internal processes. According to Bacala (2014), Internal Process Perspective Objectives indicate what needs to be done to make the company's processes effective, meet the expectations of customers and shareholders. For this purpose, process quality monitoring is carried out and process efficiency is checked. Examples of Process Perspective Indicators:

- Damaged Goods Percentage;
- Reducing the carrier's loss;
- Average response time to customer inquiries;
- Downtime;
- Planning accuracy;
- New product launch time;
- Stock turnover;
- Maximizing the operational process.

Cohen, Thiraios, and Kandilorou (2008) argue that the perspective of internal processes determines important processes that create and deliver valuable offers to the client. This perspective should ensure that the product or service meets customer needs. This perspective is believed to be the most responsible for the success of the organization. Perspective metrics can be process improvement and collaboration with suppliers (partners). This perspective is an important aspect for the organization to use the results of the work.

Customer Perspectives. The goals of the customer perspective indicate what the organization needs to do to ensure that customers are satisfied with their business and thus lead the enterprise to success (Lueg, 2015). In a competitive environment, ignoring this perspective brings the company to an end. Examples of Customer Perspective Indicators:

- Number of customers;
- Number of new customers;
- Market share;
- Customer satisfaction;
- Number of regular customers;
- Number of lost customers;
- Average turnover per customer;
- Average cost of customer service;
- Contact effectiveness;
- Average profitability of a customer group.

Cohen, Thiraios, and Kandilorou (2008) argue that the prospect of customers forces managers to identify the type of customer in the target segment to make it easier to select value settings and meet customer needs. Low customer satisfaction is considered to be a downward financial prosperity.

Learning and growth. Svaravicius A. (2005) identifies this perspective as personnel (company potential). The goals of this perspective indicate what needs to be done to have a well-trained and motivated workforce, how the organization can quickly change, and how the

company's IT potential is. The ability to maintain the required level of staff preparation and proper IT potential enables the company to survive and develop its activities. Examples of Staff Perspective Indicators:

- Staff turnover;
- Average investment per employee;
- Number of training hours;
- Employee satisfaction;
- Motivation index;
- Evaluation of the effectiveness of document and knowledge; management in the company;
- Effectiveness of employee problem solving;
- Efficiency of unit cooperation;
- Discussion of the objectives and results of the chapter.

After taking all of the perspectives into the consideration, the next step is to formulate a set of indicators to implement the set indicators. By following the above actions, we can combine management and specific operational actions, a strategic map is also used to achieve this goal, which is a representation of the ways in which the enterprise's strategy is implemented, with causal links and linked goals.

Then, following the steps outlined above, a strategic plan is formulated, and you can move on to tactical and operational planning that will be based on specific images, specific goals and requirements (Lueg, 2015).

Overall, according to Bacala (2014) and the other authors who were discussed before, the strategic plan of the Balanced Scorecard System and its multiple facets allow the managers of businesses to balance the financial and nonfinancial results and benefits, while at the same time evaluate the performance through the four perspectives that were discusses above. Before choosing a benchmark for an enterprise, it is necessary to set the objectives of the analysis and the prospects for the development of the company. The basis for any activity, including analysis, is setting specific goals. Thus, it is necessary to determine whether the aim is to perform a complex analysis of the company's activity or to evaluate its profitability, or perhaps its ability to cover its financial obligations, etc.

As it is already known, the Balanced Scorecard System is the most developed and worldwide accepted enterprise efficiency assessment tool (Lueg, 2015), however as all of the systems, it also has a few limitations that affect the enterprises' development and growth and these limitations could be indicated through using the activity prism model. Hence, the activity prism model is considered to be the second-generation performance evaluation model and this

model proposes to modernize the evaluation systems developed on the basis of unified performance assessment model and addresses the possible limitations of the Balanced Scorecard System that could affect its measures. However, as with all models, the activity prism model also has limitations, that could affect its measures, such as only taking the possible limitations of the Balances Scorecard System into account and eliminating the other ones that might be less frequent, but important as well. The most frequent limitations of the Balanced Scorecard System (however not necessarily important) are represented in the figure 7.

Top – Satisfaction of a Stakeholder
Side 1 – Strategies
Side 2 – Processes
Side 3 – Capabilities
Bottom – Contribution of a Stakeholder
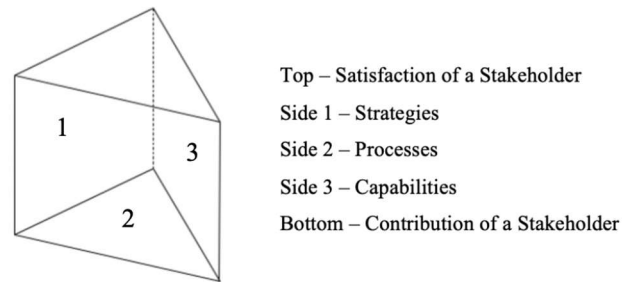
Figure 7. The performance prism model for Balanced Scorecard System
Source: made by the author according to Nelly and Adams (2002)

According to figure 7, it can be seen that the performance prism model particularly takes the stakeholders satisfaction and values into consideration. And therefore, the Balanced Scorecard System aims to satisfy the shareholders and its customers regardless of the wishes of other stakeholders, such as employees, providers or other agencies that work together. That is why, as mentioned before, the Balanced Scorecard System focuses on four main perspectives and tries to use the right approach as an end rather of a route itself.

Ultimately, from this prims model, it can be concluded that the Balanced Scorecard System avoids using the suitable method of smoothness and well considered processes for the development of a firm, which leads this system to having a huge limitation when talking about the growth of it.

Nonetheless, according to M. Balaji, S.N. Dinesh and V. Veera Parthiban (2018) the Balanced Scorecard System is a very versatile system; therefore, it can be used in many ways. However, the following authors performed the SWOT analysis, which stands for strengths, weaknesses, opportunities and threats, for the Balanced Scorecard System. This allowed them to highlight the main indicators in each of the SWOT aspects and therefore, highlight the further

possible limitations of the Balanced Scorecard System. The SWOT analysis is represented in figure 8.
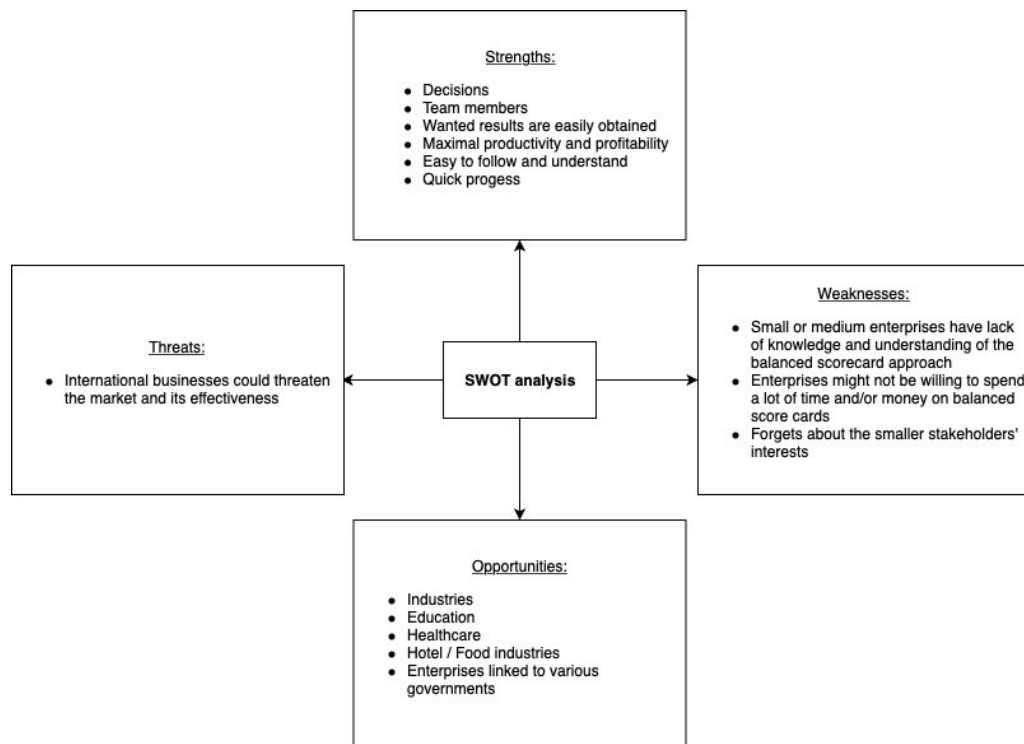
Figure 8. SWOT analysis for the Balanced Scorecard approach

Source: made by the author according to M. Balaji, S.N. Dinesh and V. Veera Parthiban (2018)

According to figure 8, it can be seen that the SWOT analysis is a simple framework that allows this scorecard system to fit within a wanted enterprise. Nonetheless, this particular analysis can be used in the rebuilding of the organization or developing it so it can grow even further and increase its efficiency. Therefore, SWOT analysis also reveals the main limitations of this measurement system. In figure 8, it is mentioned that there is a lack of knowledge in many enterprises about the Balanced Scorecard System, which causes ignorance of the employees and therefore their requirement to get educated about this system. This requirement leads to the enterprises spending more money to hire educators and the need for extra time, so employees have time to get educated. Another limitation from the SWOT analysis was similar to that of the performance prism model, which was that the Balanced Scorecard System forgets to fulfill the interests of the smaller stakeholders, including the staffs, suppliers (partners) or other co-working enterprises. Ultimately, this SWOT analysis reveals the main limitations of the Balanced Scorecard System and allows the enterprises to avoid the unpleasant weaknesses of it, as efficiency management is a very huge requirement for the enterprises.

Ultimately, not only do the prism model and the SWOT analysis reveal some important limitations of the Balanced Scorecard System, but they are also addressed by Yahanpath and

Islam (2016) and by Lueg (2015). They both agree that the well-known four perspectives of this system (financial, customer, internal business process, and learning and growth), regardless of their benefits, can also have a negative impact on the enterprise. They say that these perspectives were very useful in the 1990s, however when the business world started to change more dramatically and become more complex and globalized, economists began seeing them as somewhat limiting. Today, companies have to start seeing their businesses through not only these four perspectives, but other viewpoints have to be taken into the consideration. In that case, they both agree, that the company would start growing more as a unite enterprise.

Therefore, the other perspectives that are not mentioned in the four main ones, similarly to the prism model, could be the perspective of the employees that work for the enterprise. This limitation raised by Yahanpath and Islam state that the Balanced Scorecard System is incomplete, since it does not take its employees into the consideration. They also say that the suppliers (partners) and the community or the environment are also not taken into the consideration of the perspectives, and therefore the system fails to measure the performance to assess the stakeholder's contribution.

To conclude all of the limitations of the Balanced Scorecard System, the information has been gathered and for simplicity represented in figure 9 below.
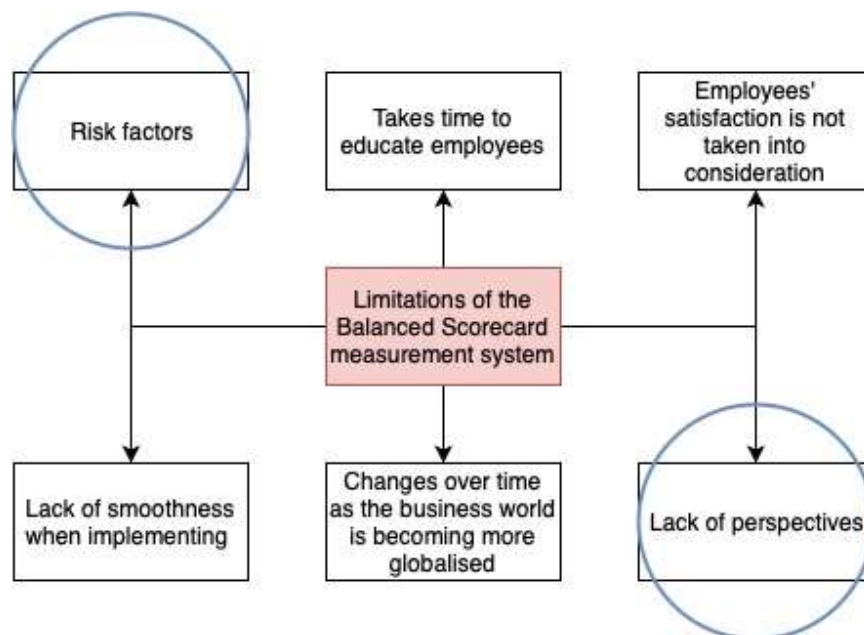
Figure 9. Main limitations of the Balanced Scorecard System

Source: made by the author according to the Yahanpath and Islam (2016) and Lueg (2015)

Literature analysis revealed the limitations of the Balanced Scorecard System (figure 9), that highlight the need to find a complex efficiency measurement system that could guide independent enterprises towards achieving its goals and visions, and therefore develop in a maintainable way. As Kaplan himself has stated that "Balanced Scorecard System will probably

be around but there will have been developments... we will also see… a culture more geared towards using performance management because it matters more to organizations, stakeholders and society" Yahanpath and Islam (2016). Overall, all of the mentioned limitations above address different aspects of efficiency, however due to them, the Balanced Scorecard System is not considered to be efficient enough to be used as a performance measuring system in the 21st century. Therefore, a sustainable system has to be created that would hide the main limitations of this system and could be used by business enterprises.

The sustainable performance measurement system of an enterprise has a capacity to maintain its performance for a long-term and has considered all of the most necessary aspects in improving efficiency. However, all of the performance measurement systems have a few limitations that could affect the efficiency of the enterprise. The two most significant limitations of the Balanced Scorecard System are the lack of perspectives involved in the development of the system and therefore the enterprise, and risk factors that could be avoided so a performance measurement system is developed.

Lack of perspectives. All of the enterprises are seen as a huge web of relationships between stakeholders and their allies. Hence, an important aspect that can ensure the measurement system's sustainability are the inclusion of key stakeholders and their perspectives (Awadallah, 2015). This would allow to see the fullest efficiency measurement of all stakeholders, including social, environmental and economic. This minimization of the lack of perspectives limitations is necessary, as stakeholders include and share different perspectives and objectives within each other and therefore further towards each branch of the business web. The elimination of this limitation would allow the measurement system to address other ideas and see how the stakeholders could allow the performance to increase. This performance of the stakeholders could be measured by using the indicators of performance, sustainability and profit (Robu, 2019).

Additionally, eliminating this limitation would also allow the satisfaction of the stakeholders and employees to be taken into the consideration, which would create a trustworthy environment within the business web, and would therefore also allow more perspectives to be thought about when measuring the business performance.

Risk factors (Yahanpath and Islam, 2016). Business risk factors could include anything that leads a business to the collapse or somehow threatens its ability to meet its intentional goals and achievements. There are a few main types of business risks, such as:

- Strategic risk;
- Working risk;
- Agreement risk;

- Economic risk;
- Title risk.

Taking particular risk factors into concern and incorporating them also ensures the sustainability of the Balanced Scorecard measurement system. This is due to the fact that when judging particular company's performance, usually the risk factors are left unspoken about, however risk assessment is a very important aspect of decisions of an enterprise and its overall development. According to Yahanpath and Islam (2016), risk assessment has received a huge attention since the collapse of huge enterprise companies, such as Polaroid, WorldCom and Lehman Brothers, which supports the fact that risk factors have to be involved into performance measures of the company's efficiency. Eliminating this limitation would allow the measurement system to indicate when business is moving towards the lower profits and therefore to the collapse.

Overall, the two main limitations of the Balanced Scorecard System, which are the lack of perspectives and consideration of the risk factors, have to be considered when trying to implement the Balanced Scorecard System into the enterprise as an efficiency measurement system.

1.4. Application of the Balanced Scorecard System

In the sections before, the aspects of efficiency measurement systems were discussed, and it was decided that according to Lueg (2015) the Balanced Scorecard System is considered one of the most productive measurement systems that enterprises could use. Nonetheless, the limitations of the Balanced Scorecard System were also highlighted and using the performance prism model and SWOT analysis. Therefore, the deepen the knowledge of efficiency and measurement systems, this section is going to analyze how the Balanced Scorecard System can be applied in every-day life as this will allow to visualize more aspects of this system and thus create a better conceptual model.

The leading companies have started to enable the Balanced Scorecard System as the main approach for them to measure their efficiency, as this system "transforms the main missions and strategic objectives into actions" (Quesado, Guzman & Rodrigues 2018). This is usually due to the Balanced Scorecard System having a lot of contributions to the development of the business. According to the same economists, the first main contribution of the measurement system is its acting as a base for many business predictions, since the system contains many indicators of predicting the outcomes in the future. The system also focuses on

critical activities for the formation of the worth understanding, and therefore includes tangible and intangible assets.

The system also assesses and regulates the approach and action plans by studying deviances, as it balances out the objectives of different managers and sectors, and it also includes mission, vision and ultimate strategy into account (Lueg, 2015). Hence, when implementing this measuring system into an enterprise, it allows improvements in value and efficiency with effects, while also specifying the business model and enabling the accomplishment of the consensus in an overall enterprise.

Another important contribution of the Balanced Scorecard System is the reduction of traditional planning and budgeting, while also assigning people responsible for many business objectives, since this system includes information about the company's setting and surroundings.

To understand the benefits and contributions of the Balanced Scorecard System when it is being applied to an enterprise, Quesado, Aibar Guzman and Lima Rodrigues (2018) conducted a survey, where each of the investigated enterprise reveals the true benefits of the Balanced Scorecard System (table 4).

Table 4. Benefits of the Balanced Scorecard System in Portuguese private enterprises

Benefits	Private enterprises (%)
Improvement of reliable system of intentions and indicators	74.4
Improving the efficiency and productivity of the enterprise	53.8
Facilitates application of the strategy	51.3
Emphasis on non-financial indicators	51.3
Growth in learning of the enterprise system	48.7
Efficiency comparison with other enterprises	33.3
Improvement of quality of the service	23.1
Increase in finances	17.9
Development in making judgments with decrease of inside disagreements	15.4

Source: made by the author according to Quesado, Aibar Guzman and Lima Rodrigues (2018)

Therefore, according to table 4, it can be seen that most of the enterprises said that the Balanced Scorecard System is an improved and reliable system of indicators (74.4%), which reveals that they are happy about having applied this measurement system to their enterprise. Nonetheless, other benefits of the system, such as improvement of quality of the service or

increase in finances of the enterprise were also beneficial to the enterprises that were conducting the survey. This survey was important to include in this master Thesis, because it reveals how different aspects of an enterprises could benefit after implementing the Balanced Scorecard System into their business world.

Ultimately, after analyzing the research within the scope of the Balanced Scorecard System, we can create a model for conducting a research on organizations and aiming to improve the strategy through this system by addressing both its strengths and weaknesses. The study is seeking to learn how to improve the company's strategic management by applying a well-balanced system of indicators. Through looking at applications of this system worldwide, it is also possible to identify the main problem encountered in the balanced indicators. This also shows the possibilities to avoid these problems in a timely manner and its main causes.

According to the four business perspectives highlighted by Robert Kaplan and David P. Norton and the study by M. Balaji, S.N. Dinesh and V. Veera Parthiban (2018), which showed the interaction of the four perspectives, in a research conducted by Rozhan Othman (2006), a model of this system can be illustrated that will help identify how this system could be applied using balanced indicators (figure 10).
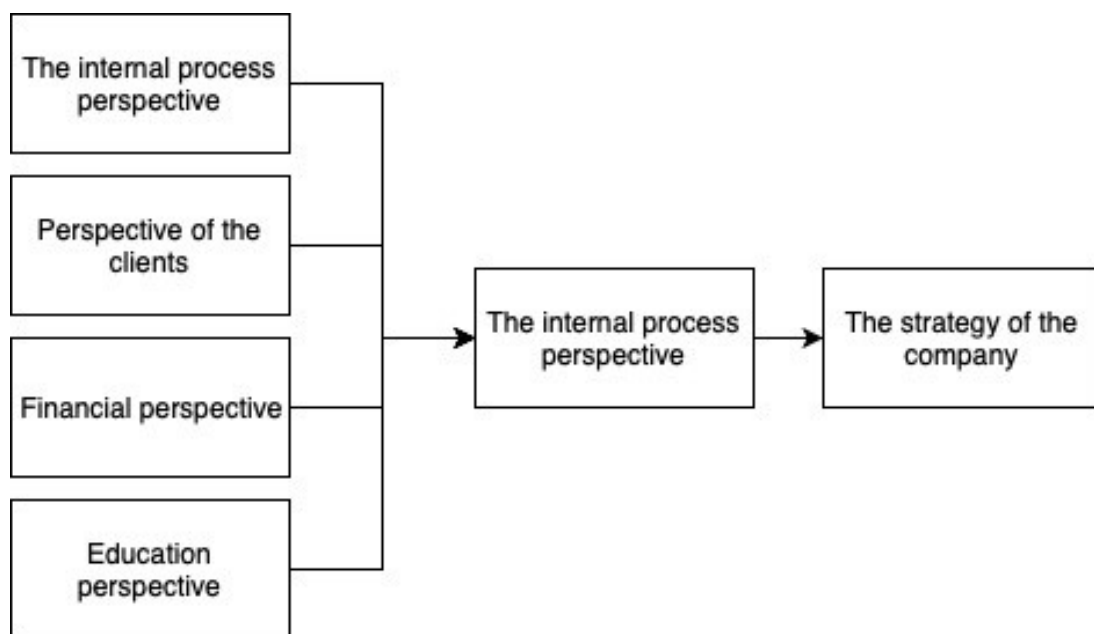
Figure 10. Model of the Balanced Scorecard System of indicators application
Source: made by the author according to Robert S. Kaplan ir David P. Norton

This model (figure 10) is based on the literature analysis and the system of balanced indicators is currently the most effective strategic management model. Therefore, according to Yahanpath and Islam (2016), it has been statistically calculated that more than 50% of the US enterprises have adopted the Balanced Scorecard System. According to another survey

conducted again by Yahanpath and Islam (2016) it is seen that about 50% of North America, 40% of Europe and up to 30% of Australia have integrated the changes in their enterprises after getting introduced to the Balanced Scorecard System. Unfortunately, the situation in the public sector is somewhat different, which is important in nowadays.

Taking into account the thoughts of economists, such as Lueg (2015) or M. Balaji, S.N. Dinesh and V. Veera Parthiban (2018), it can be stated that the model of the system of balanced indicators is described in detail and is widely used in companies. There are examples where this model is useful for the company, but there is a lack of systematic, empirical research-based system of adaptation of the system of indicators and relevant issues for logistics enterprises. Overall, companies that want to operate successfully in a competitive market need to apply optimization techniques to improve their financial performance, while additionally take the company's performance management that works effectively into account.

1.5. Conceptual Model of Enterprise Efficiency Assessment and Improvement

According to all of the advantages of the Balanced Scorecard System, and to the limitations that may limit the capability of the measurement system to meet the requirements of the development of a transport and logistic enterprise, it was finally concluded that a new conceptual map has to be created.

Therefore, to highlight the advantages of the Balanced Scorecard System and to overcome its limitations, this new conceptual map will be a unique presentation of the authors ideas of how the most appropriate approach of measuring the efficiency of an enterprise could be applied in the business environment today. Other than that, it is agreed that the Balanced Scorecard System does not include different performance measures, however each of this system measure has to drive and represent the strategy and goals of the enterprise (Yahanpath and Islam, 2016). Therefore, a new map is created to systemize the gathered knowledge and ideas and to highlight the main limitations which would allow to create an empirical strategic map.

To fulfill the requirements of the performance measurement system, a beforehand established theory is used as a guide. The Balanced Scorecard System will be used as a guide, since it is "one of the most widely diffused performance measurement systems" (Lueg, 2015) with the fewer amount of limitations that could interfere with the purpose of measuring the efficiency.

As mentioned in section 1.3 of this master Thesis, the main limitations of the Balanced Scorecard System are the lack of perspectives and risk factors that are not taken into account when implementing the efficiency measurement system to an enterprise. Therefore, to avoid these limitations, this new conceptual map is addressing the four main perspectives of the Balanced Scorecard System and is also taking more perspectives such as stakeholder, suppliers (partners), employees, government and environment into account. In this case, the inner and outer perspectives can also be considered, and the leaders of an enterprise can make sure to benefit those additional perspectives as well. Consequently, after addressing more perspectives, more risk factors are created. As already mentioned by Yahanpath and Islam (2016), there are risk factors in the business world today, therefore they all have to be taken into consideration and measured by specific indicators known as the key risk indicators (KRIs). The KRIs provide a warning sign for any increased risks of an enterprise periodically, and they vary for each enterprise. Therefore, risk metrics require a specific goal and have to be set particularly for that one enterprise and are monitored by the risk indicators. For example, credit costs risk, could be measured by change in the interest rate on debts indicator, while timeworn technology risk could be measured by the network interruption risk and etc.

Overall, this new empirical strategic map would allow the main limitations to be eliminated as a new conceptual map is created. This new conceptual map is represented in figure 11.
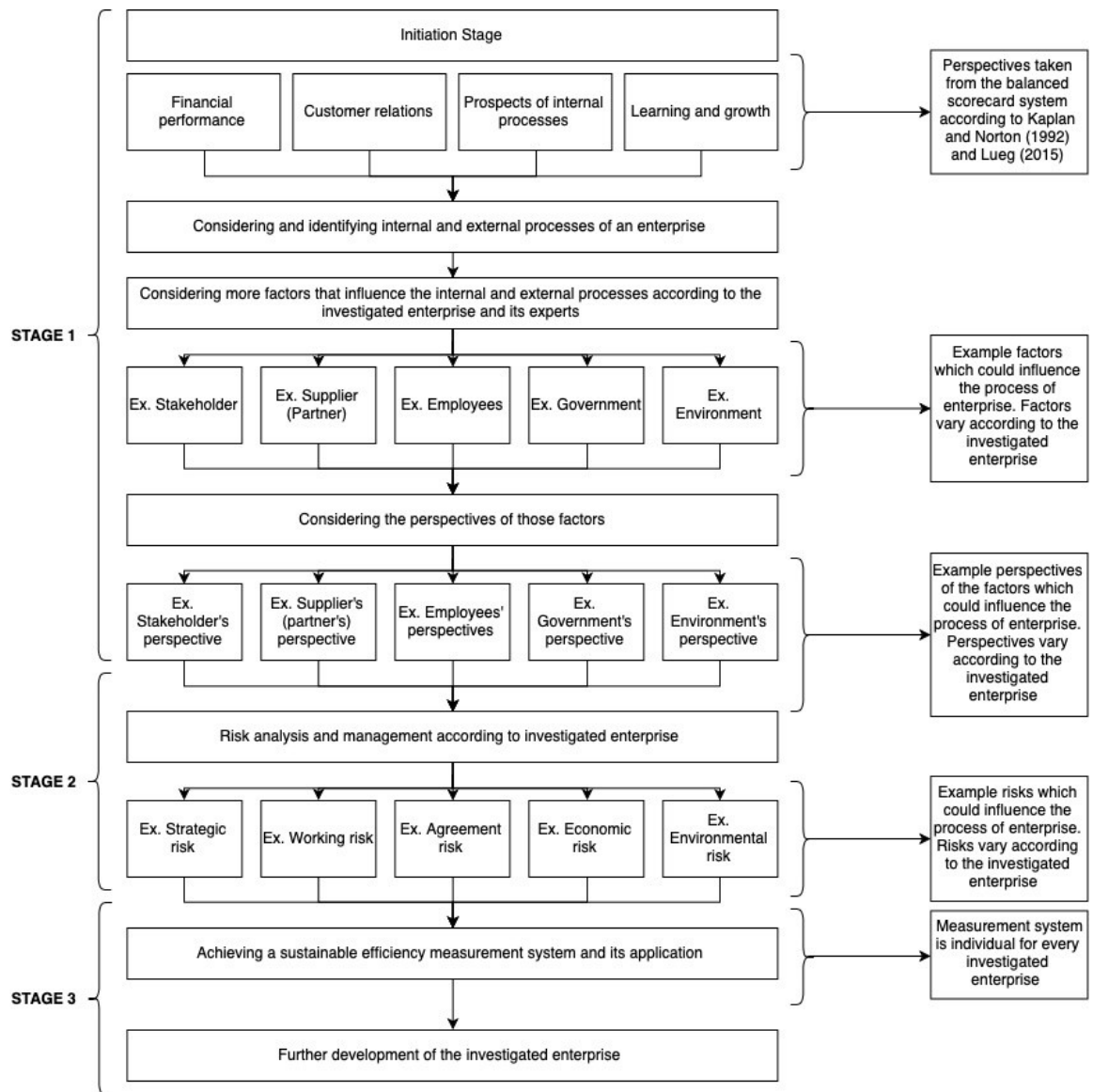
Figure 11. Conceptual model of enterprise efficiency assessment and improvement

Source: made by the author

The Conceptual model of Enterprise efficiency assessment and improvement represented in figure 11 reveals a system that is used in measuring the efficiency of an enterprise as it avoids the main limitations of the Balanced Scorecard System and at the same time helps the business to manage risk factors that could affect its performance. The different stages in the model represent steps that need to be taken in order to fulfill the requirements of the new model, where:

STAGE 1 – is the first step that has to be taken, which only focuses on the identification of the perspectives that would benefit the enterprise

STAGE 2 – is the second step that is related only to the identification of the risks that the enterprise could face by applying the KPI indicators

STAGE 3 – is the third and final step that is associated to the development of the new conceptual model of enterprise efficiency assessment in order for that enterprise to improve.

As mentioned before, the Balanced Scorecard System includes four main perspectives that are mentioned in STAGE 1 (Lueg, 2015), which are financial performance, customer relations, prospects of internal processes and learning and growth. However, the economists in the 21st century argue that these perspectives are not enough for a business to actually reach its goals and develop, and thus they should not be seen as different phenomena that affects business (Awadallah, 2015). Therefore, more perspectives, such as government, environment, stakeholder's and some more should be included in the new conceptual map of a new measurement system (STAGE 1).

Hence, as it is seen in the figure 11, all of the important perspectives, including stakeholder, customer and environment's perspectives, are taken into the consideration together with their impact on the internal process development.

Not only the perspective of a government could be important, but also environmental perspective could play a role on the logistics company (Meilong, 2018). In this example, the rapid growth of transportation caused the changes in the environment and its pollution. Therefore, to avoid these unpleasant environmental changes, a well-developed logistics company should take this perspective into consideration and introduce a low-carbon and eco-friendly transportations. In this approach, an enterprise would effectively accomplish emission decrease and energy saving, while at the same time achieving an efficient business environment. Ultimately, an investigation made by Meilong in 2018 in China, suggests that environmental pollution could be avoided if logistic enterprises focus on improving the low-carbon logistics.

Enterprise has to identify its own personal perspectives that play a huge role on their development and thus could have either advantageous or disadvantageous impact on it (Awadallah, 2015).

After developing required inner and outer processes that provide benefit to all of the perspectives and stakeholders, the organization has to take resourcefulness to create the required indicators that would measure the efficiency, this would lead in achieving the wanted financial and non-financial growth in a tough manner. While addressing this aspect, the limitation of the Balanced Scorecard System was that it created the efficiency indicators for the customers only, which was only a short-term benefit.

When the enterprise classifies its relevant perspectives in STAGE 1, it needs to define the inner and outer processes to fully create the risk indicators for each perspective to enter STAGE 2 (Awadallah, 2015).

STAGE 2 allows the identification of the KPIs and the risks that could be indicated by those particular KPIs (Yahanpath and Islam, 2016). Henceforth, to avoid the unpleasant indicators that could limit the efficiency of an enterprise the risk factor filter is introduced. The risk factor filter (STAGE 2), that clarifies the risks of the indicator system, is taken into account between different perspectives and the overall growth of an enterprise. As shown in figure 11, once the efficiency indicators (also known as raw indicators) for all relevant perspectives are indicated, the management team discuss all of the possible risk factors that could be introduced and creates and finest risk modification strategy. If the strategy is right and in place, the raw indicators become the actual indicators that guide the enterprise, and if the strategy is not in place, new risk factors have to be addressed. The new risk factors are addressed by revising the raw indicators or adding some new ones (STAGE 2).

Lastly, when all of the risk factors that are indicated by the efficiency indicators are addressed, a new performance measurement system is created leading to STAGE 3. This new system can be called a sustainable system, as it reflects on all of the aspects of an organization, and also takes all of the risk factors into the account by allowing the enterprise to view its limitations and threats and thus avoid them. These benefits of the new conceptual map create its purpose, which is the improved model for efficiency measurement that can be applied to e enterprises and has fewer limitations that the Balanced Scorecard System does.

On the right-hand side of the new conceptual model (figure 11) explanations are included. These explanations explain that the fours initiative perspectives are taken from the Balanced Scorecard System model that was discussed to be so far the most appropriate efficiency measurement model in the business world (Lueg, 2015). Nonetheless, the explanations also include which parts of the conceptual model of enterprise efficiency assessment and improvement are inconstant as they change according to the enterprise that the measurement system is being created for. Therefore, the figure 11 model is not a final version of the new conceptual model and cannot be yet applied to the enterprises, as further investigations need to be done to make it individual for that one specific enterprise.

Nonetheless, the conceptual model of enterprise efficiency assessment and improvement will reveal the new perspectives, new KPIs and risks of the investigated enterprise, that would benefit its overall function in the future. The conceptual model has to be adjusted particularly for that one enterprise by the managers who construct connection that is enterprise specific (Lueg, 2015).

Therefore, according to the theories that Balanced Scorecard System lacks broader perspectives that could be personalized by the needs of an investigated enterprise, and that this measurement system need to identify the threatening KPIs and clarify them through the risk

assessment, the new conceptual model of enterprise efficiency assessment and improvement has been made (Yahanpath and Islam, 2016 and Lueg, 2015). The purpose of this new conceptual model is to analyze the profounder efficiency measurement system of the global transport and logistics enterprises. The model consists of three stages (figure 11), where each stage focuses on excluding the main limitations of the Balanced Scorecard System. Stage 1 identifies new perspectives that could be addressed particularly to that one enterprise. Similarly, Stage 2 identifies the risks that could be faced by the enterprise. And lastly, Stage 3 focuses on the development of the enterprise and takes its financial indicators into account.

However, the performed literature analysis reveals that there is no knowledge of the factors involved in evaluating the efficiency of transportation and logistics companies of the three stages. Therefore, to further the analysis, the empirical research is going to be performed in order to collect the obligatory information about the particular stage of the conceptual model of enterprise efficiency assessment and improvement according to the investigated enterprises.

2. RESEARCH METHODOLOGY OF GLOBAL TRANSPORT AND LOGISTICS ENTERPRISE EFFICIENCY IMPROVEMENT

This section of the Master Thesis provides methodology, required to fulfill the missing information of the model represented in section 1.5. This section discusses in detail what specific methods were applied and rationalized throughout the course of the investigation.

Therefore, the purpose of this empirical investigation is to gather information about internal and external perspectives and risk factors from logistics enterprises. This will allow to fulfill the missing details of the new model of enterprise efficiency assessment and improvement illustrated in figure 11.

To achieve the purpose, Master Thesis tasks were formulated, that are as follows:

1. analyze the sector of logistics and its importance in the country;
2. analyze internal perspectives and risks factors of logistics enterprise;
3. analyze external perspectives and risk factors of logistics enterprise;
4. analyze the effect of the four main perspectives from the Balanced Scorecard System on the enterprise.

Henceforth, to fulfill the tasks of the Master Thesis a detailed methodology needs to be identified at first. For every task a different method is going to be approached, therefore:

1. to analyze the importance of transport and logistics, analysis of Lithuanian sector will be conducted through statistical data analysis;
2. to analyze the internal perspectives and risks according to managers, an in-depth interview with the managers will be conducted, as they are responsible for internal processes of the enterprise;
3. to analyze the external perspectives and risks according to customers, a quantitative survey of the customers will be conducted, as they are responsible for external processes of the enterprise;
4. to identify perspectives and risks of an enterprise, the multiple criteria decision making (MCDM) will be performed.

Analysis of the logistics sector and its importance. To make sure that this Master Thesis is appropriate for transport and logistics enterprises, a brief statistical data analysis will be conducted that will investigate what effect does transport have on Lithuania's yearly GDP.

Analysis of the perspectives and risks through studying internal relations of managers and enterprise (APPENDIX 1). An in-depth interview is a personal questionnaire that is directed to an individual and includes multiple steps (Brounéus, 2011). This approach was chosen because

the main advantage of an in-depth interview is its positive opportunity to get more detailed and substantive answers to questions than to those questions that appear in a questionnaire with a standardized question (Brounéus, 2011). The interview will question five traffic managers in particular, who are described to be leaders that "must be responsible and conscientious when making decisions, courageous when assuming business risks and must have a strong will" (Urosevic, 2017). Nonetheless, traffic managers were chosen due to their importance in controlling logistics sector of an enterprise, and because, only they can identify the most important internal perspectives and risks of the enterprise that play the biggest role in internal processes. This data can then be used in the new map, in order to avoid its limitations, which are the lack of perspectives and risk factors addressed.

Analysis of the perspectives and risks through studying the external relations between customers and enterprise (APPENDIX 2). Customers of an enterprise make the biggest impact to the efficiency of an enterprise and its development; their happiness is positively proportional to the growth of their loyalty (Tolmie, 2011). This development of loyalty allows the enterprise to become more profitable and more beneficial. However, in today's growing business world, to get customer's loyalty is way harder than to gain their satisfaction. Therefore, to address these problems, a quantitative research is going to investigate the satisfaction of the customers and analyze how their loyalty contributes to efficiency.

The quantitative research will be managed by asking customers of an enterprise to identify the main perspectives that the enterprise could focus on more, and the main risks that should be eliminated to develop their satisfaction. According to Tolmie (2011), this systematic gathering of data would allow an unbiased and clear picture of the wanted aspects and would also reveal some patterns that could be used in the analysis of an enterprise.

For this questionnaire, there will be two question, where first question investigates the importance of perspectives and their according to the customers, and the second question investigates the importance of risk factors and their identification using the Likert scale (see APPENDIX 2). Likert scale is a questionnaire measurement tool, where 1 point will be given for Not Important, 4 points will be giver for Somewhat Important and so on, until 5 points will be given for Extremely Important answers (Kardelis, 2002). Nonetheless, the questionnaire will take 10-20 minutes of the interviewee's time.

Particularly in quantitative surveys an appropriate number of interviewees needs to be calculated according to the formula

$$n = \frac{z^2 * s^2}{\Delta^2},$$ (Equation 1)

where:

n is a number of interviewees required;

z is a coefficient according to what percentage of reliability is required (ex. when probability is 95% then z = 1.96, whereas when probability is 99% then z = 2.6. In this research precise results are needed, thus z = 2.6); Δ is allowable inaccuracy (to maintain precision and avoid division by 0, in this research, it is appropriate that the average is not different from the population average by 0.1, thus Δ = 0.1);

s is a mean square deviation of the sample, which can be determined by previously done research or calculated using a formula

$$s = \frac{X_{max} - X_{min}}{K},$$ (Equation 2)

where:

X_{max} is the maximum value of the answers (in this research X_{max} = 5);

X_{min} is the minimum values of the answers (in this research X_{min} = 1);

K is a constant coefficient to when more than 100 people are interviewed (in this research K = 6).

Therefore, to find n from the equation 1:

1) $s = \frac{X_{max} - X_{min}}{K} = \frac{5-1}{6} = \frac{4}{6} = 0.6$

2) $n = \frac{z^2 * s^2}{\Delta^2} = \frac{2.6^2 * 0.6^2}{0.1^2} = \frac{6.76 * 0.36}{0.01} = 243.36 = \sim 244$

Based on the calculations, approximately 244 people need to be interviewed to receive a 99% reliable data which will have an inaccuracy of 0.1, meaning 10% (Kardelis, 2002).

The research is done from June to September of 2019 and is completed through the online questionnaire called www.apklausa.lt. In order to achieve a well understandable questionnaire, a brief explanation is included at the beginning, that addresses the main purpose and aims of the research. Nonetheless, the first part of the questions is easy to follow and understand, however they become harder and more addresses to the enterprise as they progress further. After conducting this study, the results, of which perspective and risk factor was the most favored by the customers, will be calculated in a computer program called Excel.

Since customer and enterprise relation is an important factor in enterprises development and efficiency, this data will be useful in the map as it will help the enterprise to consider new external perspectives that it might not have addressed yet and eliminate the risks that are frightful by the customers. This quantitative research method allows to gather unbiased information about the external perspectives and risks that are identified by the customers.

Analysis of the effect of the four main perspectives from the Balanced Scorecard System on the enterprise (APPENDIX 3). According to Misheva (2017), the expert assessment is used to identify and control the forms of risks in the business. This assessment allows the management of risks and is based on the indicators that are related to the achievement of the enterprise's ultimate goal. The method of expert assessment allows to improve the quality and rationality of decision making.

In the Thesis proposed model, the four main perspectives of the Balanced Scorecard System, which are Financial, Prospects of internal processes, Customer and Learning and growth (see section 1.3), are going to be assessed by the experts of the enterprise of that particular area to which the perspective is related. For example, the indicators of financial perspective are going to be assessed by the financial manager. Similar to customer, prospects of internal processes and learning and growth perspectives. The indicators of each perspective will be taken from section 1.3 of the Master Thesis.

According to B. Huber (n. d.) experts are people "who have deep, specialized knowledge of a subject" and should have international reputation and sociable skills, so they can interact with other employees. Therefore, in order to fulfill the requirements of an expert assessment method, experts are going to be chosen according to their particular exploratory perspective that they work in, their experience, which is measured in years and should be no shorter than 10 years (Erricsson et al, 1993). Education is also going to be required, where Masters Diploma is the lowest they can have as a proof of sufficient education. Nonetheless, experts will also need to be internationally recognized by other countries outside of Lithuania.

The expert assessment consists of the steps that are goal formation, formation of a team of experts, organization survey, where experts asses indicators of each perspective, and analysis of expert information based on the indicator weight system, where the most important is with the highest weight (Urosevic, 2017).

Twelve experts will participate in the study (Urosevic, 2017). Details of the experts are given in Table 5

Table 5. Information on the experts involved in the study

Exploratory perspective	Expert		
Financial environment	A1	A2	A3
Customer environment	B1	B2	B3
Prospects of internal processes	C1	C2	C3
Learning and growth	D1	D2	D3

Source: made by the author according to the requirements of Huber (n.d.) and Erricsson (1993)

The chosen experts are shown in table 5 and the study is conducted through a structured questionnaire that is provided, where experts are asked to compile the presented indicators according to their importance (APPENDIX 3), assessing the significance of the indicators for the company's efficiency. The essence of the method of expert evaluations is that it allows for a rational organization of the problem, using quantitative evaluation of the opinions and analysis of their results. It is also very important to establish the compatibility of expert opinions using multi-criteria assessment methods. Therefore, the comparative evaluation on the stepwise weight assessment ratio analysis (SWARA), that is an assessment method, was used. According to Keshavarz-Ghorabaee (2018) and Karabasevic (2016), SWARA is an effective method to receive the subjective weights of criteria in the multi-criteria decision-making issues. As Zolfani (2019) says, that in SWARA, experts choose the importance of each of the perspective and rank them in order of preference by using their own knowledge and understanding, where the most important indicator is marker with a 1, and the lowest indicator is ranked to be the lowest. The ranks to the group of experts are calculated agreeing to the average values. The method is easy to apply in practice, but it should be emphasized that the method has little accuracy.

Henceforth, after sorting the criteria based on the experts, regardless of the assessment methods used, the expert assessments are marked by

$$c_{ik} = (i = 1, \ldots, m; k = 1, \ldots, r), m \qquad \text{(Equation 3)}$$

where r is the number of experts.

The results of the evaluations are placed in matrix $C = \|c_{ik}\|$.

There are several criteria weight calculation algorithms that use criteria weight ranges. The purpose of conversion is to assign weights in descending order of rank. In this way, the highest rank (first) would be assigned the highest value. The most accurate result is the linear

transformation of the evaluations. In this case, the weight values of the criteria can be calculated by the equation 1 (Kersuliene, 2010).

$$\left[\omega i = \frac{\sum_{k=1}^{r} \frac{(m+1-c_{ik})}{r}}{\sum_{i=1}^{m} \sum_{k=1}(m+1-c_{ik})}\right] \qquad \text{(Equation 4)}$$

, where, ωi is an indicator weight; c_{ik} ($i = 1, ..., m$; $k = 1, ..., r$); r is a number of experts; m is a number of criteria applied; i is the number of experts; k is a criterion; $\sum x$ is an average.

Using equation 1.5, will allow to calculate each indicator (see Appendix). Nonetheless, based on the weights of each indicator, the indicators with the highest weights are selected for further analysis in the later chapters.

Ultimately, according to Keshavarz-Ghorabaee (2018), SWARA method is being applied more and more commonly to enterprises to measure the dimensions and components of capital and profit of an enterprise, which allows the enterprise to address its problems through specifying the indicators that are problematic according to the experts that have been working in that particular environment for an extended amount of time.

To conclude the methodology, the three methods for analyzing the efficiency of the chosen enterprise serve the sole purpose of finding the needed internal and external perspectives and risks and analyze the four main perspectives according to the experts, as this data fulfills the lack of perspectives and risk factors of the new model. This methodology summary is represented in figure 12 for clarity.
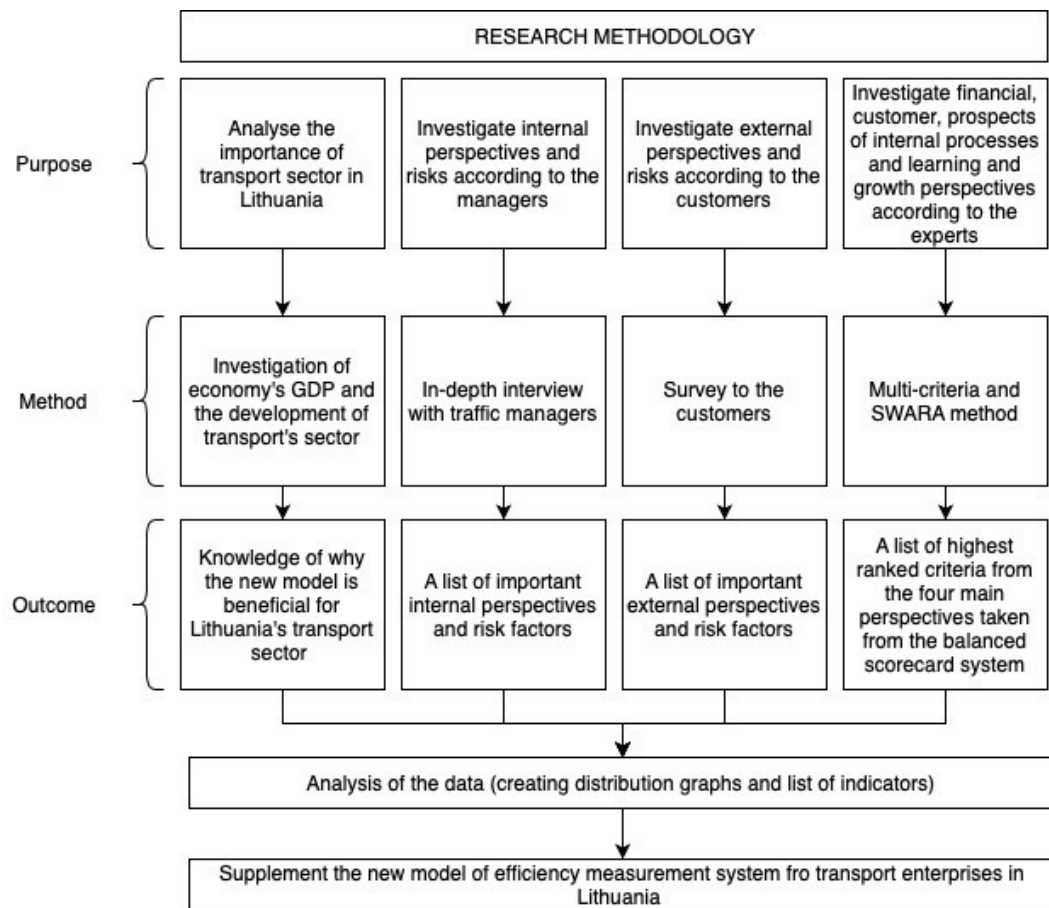
Figure 12. The purpose of using selected methods in this research

Source: made by the author

Therefore, according to figure 12, it can be seen the relation between the tasks and selected research methods. Thus, after achieving each purpose, the methods identify the most important internal and external perspectives and risk factors, and also asses the indicators of the main four perspectives of the Balanced Scorecard System. This new data will supplement the new model, as the research that will be done particularly investigates experts and interviews employees who have experience working in transport and logistics sector.

3. RESEARCH OF GLOBALTRANSPORT AND LOGISTICS ENTERPRISE EFFICIENCY EVALUATION

This part of the Master Thesis discusses the results that were obtained from the empirical research. The research was performed using the methodology discussed in part 2. The main purpose of the research was to investigate the significance of transport's sector in Lithuania, analyze the most important internal and external perspectives and risk factors, and, lastly, rank the most valuable criteria from the four main perspectives of the Balanced Scorecard System according to the experts. The data was gathered together to build a new model for measuring efficiency that could help logistics enterprises to increase their efficiency. The outcome is a new model for efficiency improvement of a logistics enterprise that could be used by logistics enterprises. Through the use of the following new model, it allows logistics enterprises to improve their efficiency and productivity by thereby minimizing costs and risks.

3.1. Current Situation of Transport and Logistics Sector of Lithuania

Lithuania is an eastern European country, located in a favorable location at the crossroad of North, East and West. The current situation of transport and logistics sector will be analyzed through the impact of transport on Lithuania's yearly GDP and capability of this sector's development according to the employees.

Consequently, approximately 80% of freight pass through Lithuania to Eastern countries, leading to logistics sector being responsible of about 12.3% GDP in 2016. This significant contribution to the country's GDP, makes Lithuania to be a 29th country in the world with logistics high performance index (Bazaras and Palsaitis, 2017). Looking at the overview of transport market statistics of 2018 January to December, the statistics show that in the years of 2016 – 2018, there has been a 18.4% increase in transport services revenue, while 21.4% percent increase was also seen in the export sector of transport and logistics. Ultimately, about 9.54% more logistics companies were created in only two years period, and therefore more employees started to work in this sector as well. This increase shows that particularly in Lithuania, there is an appropriate environment for the creation of the new transport enterprises, and hence all of those newly made enterprise contribute to the GDP of the country. The increase also represents that, with a high probability, there are going to be further increases and therefore now it is promising for the transport enterprises to expand in Lithuania.

Bazaras and Palsaitis (2017), have also agreed that "logistics situation in Lithuania is enough positive and had good tendencies of expansion", as they have performed a research that

investigated logistics enterprises in Lithuania and their capability of developing further through the use of surveys that questioned different logistics companies. The main and most important themes of the surveys were current logistics and their growth. Hence, this survey was conducted in 2006 and revealed that most of the enterprises predict failure and decline in the future, however as it can be seen by today's facts that predictions were wrong. Comparing today's data with that of the year of 2006:

- amount of service packages has increased by 46%;
- number of warehouses increased twice;
- amount of transportation services through the East-West corridor has increased by 56%;
- international trade grew by 30%.

Therefore, according to the increased percentages of four different aspects of logistics enterprise since 2006 and to Bazaras and Palsaitis (2017), it could be seen that that particular logistics enterprises and their contribution to Lithuania's GDP will continue to develop and benefit the economy of the country. These standardizations that are growing can improve quality since more logistics companies are trying to extend their own services into countries of good locations, such as Lithuania. Consequently, to achieve the continuous growth and transports contribution to Lithuania's GDP, more logistic clusters are being integrated into the country, which also builds around the current transport infrastructure (Juozapaitis and Palsaitis,2016). Therefore, this continuous growth requires the transport enterprises to maintain their efficiency or even become more productive, since together with the growth of enterprises, the competition between them expands as well. And thus, to maintain a well-balanced enterprise, they are required to be more efficient than the others.

According to the "Transport and Logistics in Lithuania: Alchemistry of crossroads" (n.d.) transport experts, Bazaras and Palsaitis (2017), and the overview of transport market statistics of 2018 January to December, it can be concluded that in 2019 the development of transport sector and its impact of Lithuania's GDP will continue to grow, even though extraordinary benefits are not expected. Particularly transport sectors of Eastern and Western Europe have some promising benefits for Lithuania's transport and the growth of its economy. Therefore, with the following facts and conclusions, transport sector's importance to the economy of Lithuania is visible, as this sector brings benefits to the GDP of the country and keeps developing. Henceforth, to benefit logistics sector, the new model of efficiency measurement system could be used as a measurement tool by the logistics enterprise located in Lithuania to develop their productivity, by therefore helping the GDP of Lithuania to increase.

Therefore, to maintain the development of logistics enterprises in the increasing transport sector of Lithuania and to further develop their productivity, enterprises should work more efficiently than they were before. More efficient logistics enterprises could provide the economy with more profit, variety of international businesses and an overall growth of the country. Thus, to achieve that, this model of enterprise efficiency assessment and improvement would allow to assess the existing logistic enterprises in the country, highlight their weaknesses that might downregulate their performance and, in this way, create new methods of increasing their efficiency and limiting disadvantages, as logistics sector is one of the most important sectors of Lithuania's economy.

3.2. Identification of Internal Perspectives and Risk Factors in Transport and Logistics Enterprises

Identifying the internal perspectives and risk factors is an important tool when investigating the internal processed of the enterprise. The purpose of the empirical research is to identify and asses by ranking the most important perspectives and harmful risk factors that the enterprise should consider more when thinking about its efficiency. This list will be made by experts (in this case it will be professional traffic managers), and therefore will provide an insight of what perspectives they think the enterprise should take into account more, and what risk factors should they consider by creating indicators accordingly. Indicators will help measure the risks and will not bring the enterprise unsuspected and unpleasant downfalls. Overall, both lists will be used when creating a new model for efficiency improvement of a logistics enterprise, as other transport enterprises will be able to utilize this knowledge and focus on the right perspectives and risk factors since at the very beginning.

The responsibilities of the managers are an important aspect in the overall function of the logistics enterprise (Urosevic, 2017). Managers are responsible for interpreting the requirements of customers and translating them to precise measurements, through focusing on internal processes of an enterprise (Bohoris and Vorria, 2008). Therefore, interviewing traffic managers would allow this research to include thoughts of the leaders who understand the internal processes of an enterprise and are responsible for setting its objectives (Tapera, 2014). The knowledge of traffic managers will then be used to identify the most valuable internal perspectives and risk factors that according to them require more attention and focus when aiming to develop an efficient enterprise.

Therefore, in total there were five managers were interviewed (M1, M2, M3, M4 and M5). In particular, all traffic managers were chosen, due to their abilities to focus specifically

on logistics sector of the enterprise, while at the same time take financial success or customer satisfaction. Nonetheless, another purpose of choosing traffic managers instead of any other managers, was because this Master Thesis focuses on the efficiency of logistics and global transport, and thus aims to develop a better efficiency measurement system in particular for enterprises of transport and traffic sector. Henceforth, the knowledge of traffic managers on internal perspectives and risk factors are highly important and allows the research to further develop its understanding of what is needed to improve the model of efficiency measurement system.

In this interview, a list of perspectives and risk factors was provided to the managers which they could choose when answering the questions. A list of perspectives was gathered according to Awadallah (2015), and the list of risk factors was gathered according to Yahanpath and Islam (2016). Due to the limited amount of perspectives and risk factors provided, managers were welcome to come up with the newer ones that they believe should be incorporated in this research. Nonetheless, each expert had a possibility of distinguishing more than one perspective and risk as the one that plays an important role in the enterprise that they work in, this approach allowed the experts to discuss more than one aspect that needs attention instead of focusing on just only one.
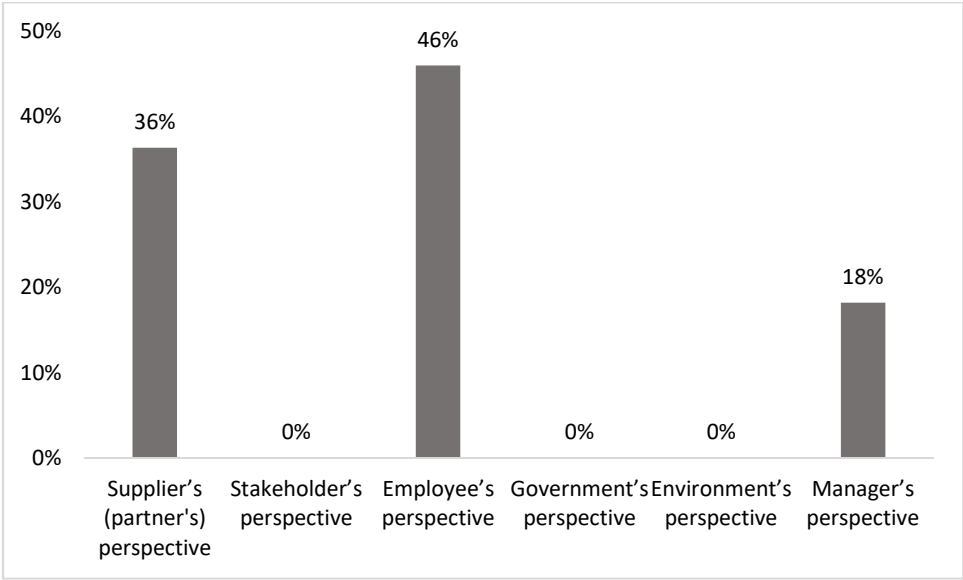
Figure 13. Distribution of internal perspectives according to the managers

Source: interview results

Figure 13 represents the percentage distribution of the importance of perspectives according to traffic managers that understand the internal structure of the enterprise. According to the results, it can be seen that none of the managers decided to incorporate new perspectives that were not provided and agreed that the provided ones was enough to answer the important

questions. Therefore, looking back at figure 13, employee's perspective was the most important one chosen by the managers, as it received 45% of managers' supports. The perspective of employees is very important internal perspective, since the whole enterprise depends on the employees. Employees must do their job on time, they must fulfill all of the agreement requirements, and they are also the only tool that connects the enterprise to the customers, therefore communication between the customers and employees is very important to maintain stability and efficiency in the enterprise. On the other hand, the second most important perspective was supplier's (partner's) perspective, as 36% of managers decided that it is important. Suppliers (partners) are considered to be one of the most important aspect of the enterprise, as they are responsible for production, time and distribution of materials. These materials could include vehicle loans, hiring of new drivers or distribution of goods. Enterprises rely on their suppliers (partners) as they dictate the rules and increase the productivity of the enterprise by producing more goods and therefore raising the profit of the enterprise. Nonetheless, because this was an in-depth interview, the explanations of managers choosing particularly these perspectives can also be incorporated in the discussion of the results, table 6.

Table 6. Main perspectives according to the managers and their citations

Perspective	Citation
Supplier's (partner's) perspective	M1: "Good suppliers mean good service for an appropriate price" M3: "Good supplier allows the efficiency of an enterprise to grow, and without them the enterprise cannot function"
Employee's perspective	M1*: "Right employees lead to right work outcome" M4: "Employees combine services together"
Manager's perspective	M3: "Suitable manager bring good results to the enterprise"

*M – manager number

Source: made by the author

Controversial to employee and supplier's (partner's) perspective perspectives, the perspectives of stakeholder, government and environment did not play a huge role in the decisions made by the managers, leading to the conclusion that employee and supplier's (partner's) perspectives, and to some extent manager's perspective, are the base of the logistics enterprise. These three perspectives are the most important ones, since employees are responsible for communicating to the customers and for meeting their expectations and requirements. Additionally, employees also communicate managers with the customers if there

are any issues that need to be fixed. Similarly, suppliers (partners) are also considered to be an important aspect of the enterprise, as they bring in more goods and therefore profit to the enterprise. Lastly, manager's perspective is required for an efficient enterprise, since managers are the leaders who dictate the rules to the employees and fix any problems with the customers. Overall, all five of the interviewees agreed that addressing the top three perspectives more would benefit the efficiency of the enterprise.

After analysis of the distribution of perspectives according to the managers, risk factors can be analyzed next. Looking at the results from the in-depth interview, one can see that the distribution of the risk factors was more diverse than that of the perspectives. In total, five of the seven risk factors were mentioned the managers and considered to be important at affecting the efficiency of that enterprise in which the manager works. Similar to those questions of perspectives, together with these questions a list of risk factors was provided as a reference for the interviewees. Naturally managers were able to add any of additional risk factors that they think should be important mentioning, however none of the did and agreed with the following list. Thus figure 14 represents the importance of risk factors according to the managers.
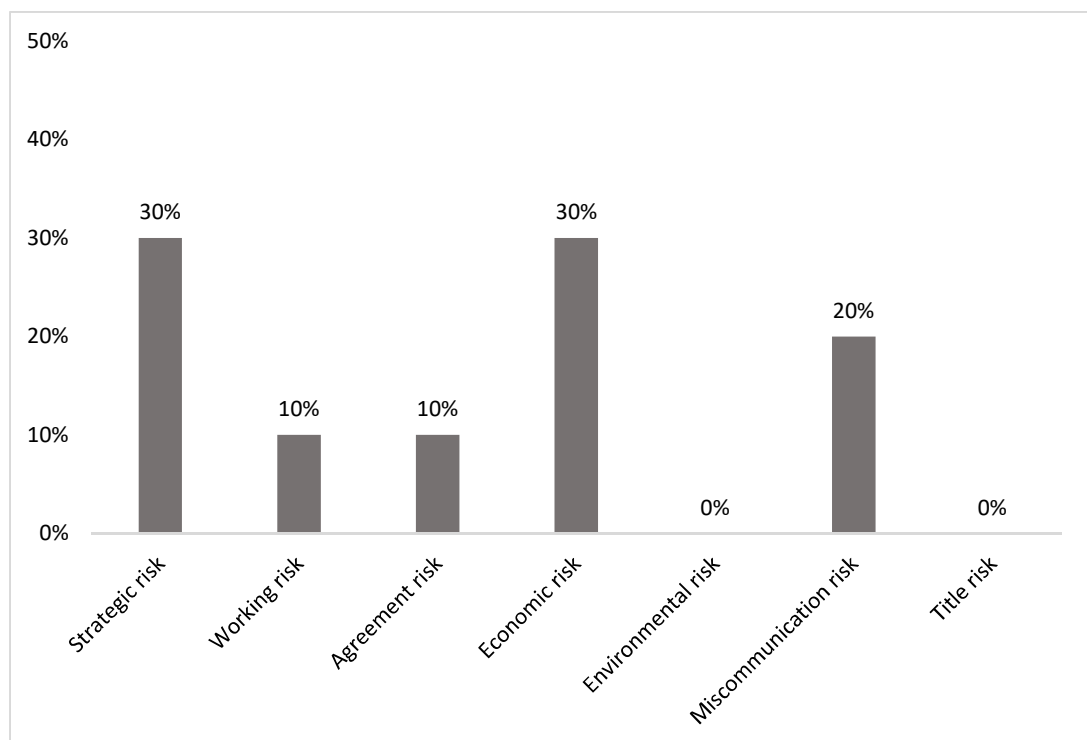

Figure 14. Distribution of internal risk factors according to the managers

Source: interview results

Managers were able to choose more than one important risk factor according to their working strategies and knowledge of efficiency, and therefore, 30% of managers decided that strategic and economic risks are the most important ones. They justified their decisions for

strategic risk by agreeing that strategies need to be exact and precise, and therefore a lot of work is required to create a flawless strategy plan. Additionally, managers said that economic risk is also an important aspect in logistics enterprise, since all of the internal costs depend on the economy of the country, and thus once the economy falls, the prices and services, and therefore profit, also decrease. Other risk factors also received a lot of consideration, where miscommunication risk got 20% of the votes, and working and agreement risks got 10% of the votes equally. Additionally, all of the traffic managers agreed that addressing or eliminating these risks would benefit the efficiency of the enterprise that they work in.

Table 7. Main risk factors according to the managers and their citations

Risk factor	Citation
Strategic risk	M1*: "Correct choice of strategy would allow right indicators"
Working risk	M3: "Efficiency depends on the working force"
Agreement risk	M1: "Wrong agreements could bring risks"
Economic risk	M1: "Logistic enterprises grow directly through the economic growth" M5: "Logistics enterprises relay on economy of the country"
Miscommunication risk	M4: "Miscommunication leads to low service, low efficiency, extra costs and business loss" M5: "Customers, employees and managers need to communicate with each other"

*M – manager number

Source: made by the author

Unfortunately, environmental and title risks were not considered to be important by the managers, as they received 0% of interest, meaning that managers with a sufficient amount of experience all agree that these two risk factors are not as important in building the enterprise as the ones mentioned before, because like 2 managers mentioned that environmental interest is kind on trend thing.

To conclude, most of the managers think that employee and supplier's (partner's) perspective perspectives, and strategic and economic risks are the most important qualities of the enterprise that should be considered and taken into account the most by the enterprise and its managers. Employee perspective is important in maintaining a good communication between the customer and the enterprise, whereas supplier's (partner's) perspectives is important in maintaining an appropriate supply of goods and therefore increasing enterprise's

profit. On the other hand, flaws in strategic plans could be damaging to the internal processes of the enterprise and therefore strategic risk needs to be taken into consideration through the creation of appropriate key risk indicators (KRIs). Lastly, economic risk also needs appropriate KRIs in every logistics enterprise, since the costs of transportation services depend on the country's economy. Considering all four of these aspects would allow the transport enterprise to become more efficient and avoid unpleasant damages in the future.

3.3. Identification of External Perspectives and Risk Factors in Transport and Logistics Enterprises

In order to find the appropriate external perspectives and risk factors, that have to be addressed and taken into consideration by the logistics enterprise, a customer survey was conducted. This survey was made of two questions (Appendex 2), each focusing on either external perspectives or risk factors, respectively. Each question provided the customers with the same list of perspectives (Awadallah, 2015) and risk factors (Yahanpath and Islam, 2016) that were given to the managers for their in-depth interview. They were asked to choose which perspective and risk is more important in their relationship with the logistics enterprise and sequence them according to the Likert scale, where possible marks were as follows - not important, slightly important, moderately important, important and very important.

Nonetheless, the desired outcomes of this survey were identifying the most important perspectives that benefit the customer and enterprise relationship and recognizing which risk factors should be taken into consideration more, as according to the customers, they might damage their customer and enterprise relationship later on in their cooperation. 248 customers were interviewed in total, where all of them are either constant or one-time customers of some sort of a logistics company and have a reliable background to be interviewed for this research. The survey was performed from August to November of 2019.

The received data was then gathered together, the results were calculated, and percentage distribution was analyzed. [The external perspectives and risk factors, that were given to the customers were taken to further analysis. This additional examination allows to focus on the perspectives and risk factors that should be addressed by the logistics enterprises as they appeared to be the most important to the customers.
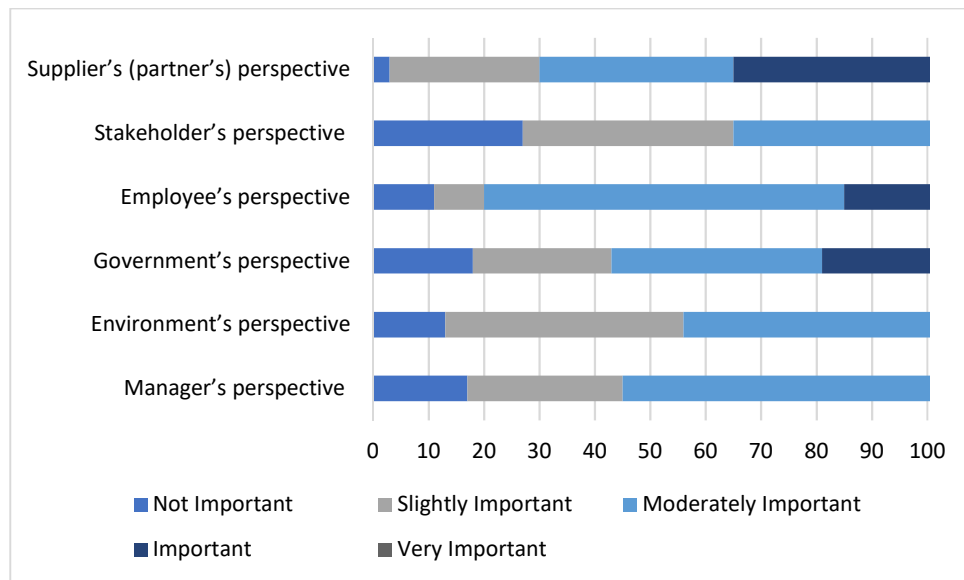
Figure 15. Distribution of external perspectives according to the customers

Source: survey results (appendixes B and D)

Analyzing the distribution of customers' choices on whether or not the provided perspective is very important in the customer and enterprise relationship, it can be seen that the most important perspective is the supplier's (partner's) perspectives (see Figure 15). About 46.0% of the customers agreed that particularly the perspective of the supplier (partner) is very important and should be taken into consideration more by the logistics enterprise. This high percentage could be a result of customers knowing that suppliers (partners) increase the efficiency of the enterprise by bringing in more goods and profit, and therefore, increased efficiency of the enterprise means better costs to their customers in the future. Similarly, the perspective of the government and the perspective of the employee are the following most important perspectives after manager's, getting 42.8% and 31.2% of all customers' votes respectively. Therefore, looking at this data, it means that customers agree that the perspectives of suppliers (partners), government and employees are the most important ones for the customers, which lead to further analysis. The perspective of suppliers (partners) is important to customers due to enterprise's dependence on their suppliers (partners). Suppliers (partners) have a direct impact on the internal processes of the enterprise, for example its punctuality, damages and pace of work, therefore the changes in internal processes could result in external alterations that would affect the customers. Additionally, customers sometimes might choose an enterprise company according to their suppliers (partners), for example if customer prefers a company that is pollution-free, they would look for suppliers (partners) that take care of the environment. Whereas government's perspective is also important, since government dictates the prices of transport goods, controls import and export of the transportation services, and aims to increase its GDP through as many services as possible through taxes. Lastly, employee's

60

perspective is important in the relationship of customer and enterprise, because the entire communication goes through them. The employee is responsible for satisfying the needs of the customer and offering them the best prices in the market. Overall, these three perspectives should be constantly taken into account by the managers and leaders of the enterprise, to meet customer's expectations. Nonetheless, regardless of the logistics company, these three perspectives should be developed in every logistics enterprise in order to increase their efficiency and relations with the customers, since customers bring the most profit to the enterprise and maintains its efficiency.

On the other hand, looking back at figure 15, the least important perspectives were considered to be those of the environment, manager and stakeholder, which received 22.4%, 18.4% and 16.4% of all of the customer votes respectively. These results show that logistics enterprises have well developed the following perspectives and therefore the customers do not see them as possible risks in the future. However, even though these perspectives appeared in the most important list less frequent, the enterprise should not neglect their development.

Henceforth, using the results it could be said that logistic enterprises could develop a broader range of perspectives, other than the four main ones that were suggested by Kaplan and Norton in the Balanced Scorecard System, which were financial perspective, prospects of internal processes, customer perspective and learning and growth. The creation of broader variety of perspectives would allow the enterprise to consider more factors that could influence its efficiency. These perspectives could be the ones that were used in the survey, which were the perspectives of supplier (partner), stakeholder, employee, government, environment and manager, however each should be given a different level of consideration and attention accordingly.

This level could be determined using this survey results as an example, where from 248 customers almost 50% agreed that the perspective of the supplier (partner) is the most important one. Nonetheless, perspectives of the government and employees are also important and play a big role in the satisfaction of the customers and therefore the development of the enterprise, since without customers the enterprise does not work. Therefore, instead of focusing on the perspectives of the environment, manager and stakeholder, enterprises should pay more attention to perspectives of the suppliers (partners), government and employees since they are the ones that were chosen to be the most important ones by the customers.
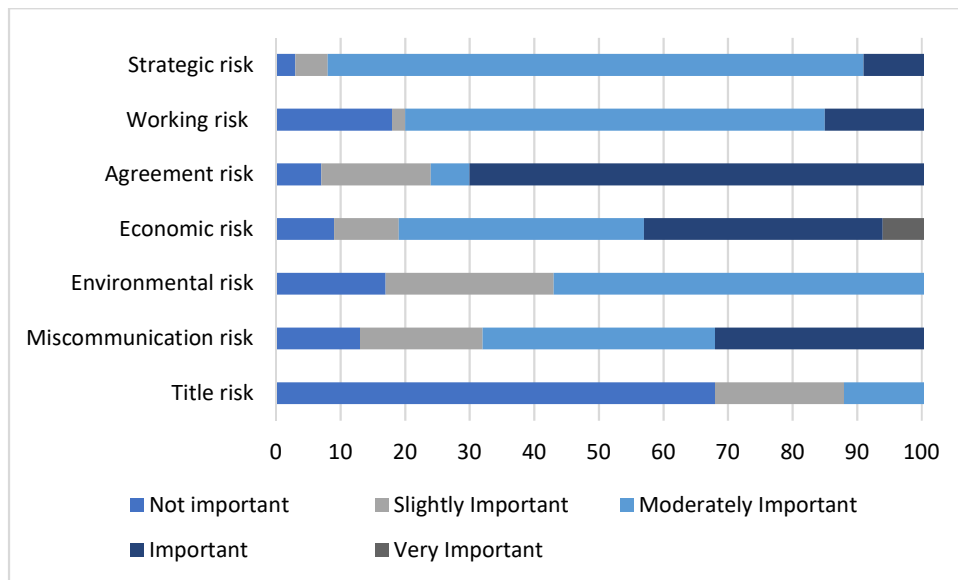
Figure 16. Distribution of risks according to the customers

Source: survey results (appendixes B and D)

The bar graphs represent the results obtained from the survey that interviewed 248 people. Customers were asked to evaluate the importance of enterprise's risk factors, whose consideration or elimination would benefit them the most in the future work with the same enterprise (see APPENDIX 2). In particular, results represent only the distribution of the answers of the customers for which they chose the "very important" risk factor. Thus, the most important risk factor that was said to be very important by 61.6% of the customers was the economic risk. Economy plays a huge role in today's business world, as it depends on that particular economy of the country. Therefore, customers said that this risk should be considered and developed the most, as if not, it would damage their relationship with the logistics enterprise. Similarly, the second and third important risk factors were agreement risk and miscommunication risk, where they both received 47.2% and 43.6% correspondingly. Therefore, by looking at this data, customers have supported the need of an enterprise to think about the risks of economy, agreement and miscommunication the most, as these play a crucial role in the well-defined relationship of the enterprise and the customer. Economy risk is a great risk to the customer, since the costs of logistics services relay on the current country's economy. In particular, a wealthy economy can result in benefiting the logistics enterprise, by decreasing its import and export costs, and thus those costs have a direct impact on the prices of their services to the customers, where the prices become more attractive and appealing to the customers. Agreement risk is another big factor in the relationship of customer and the enterprise, as customers relay on the agreement they are given by the company, and any changes in the agreement could alter the future satisfaction of the customer and their trust that they have on the enterprise. Lastly, communication is very important in a sustainable enterprise, as

miscommunication could lead to damages, higher costs and impairments of both the customer and the enterprise. Enterprises must meet the needs of their customers, however, to know those needs they must first comprehensively communicate with the customer and only then take according actions.

On the other hand, customers have also chosen the risks that are not that important and could be less considered by the enterprise as they do not bring any damage to the satisfaction of the customer. The risks that was considered to be the least important is the title risk, as it received only 1.6% votes from customers that thought that it was an important risk. Additionally, risks of environment and working, which received 20.0% and 24.8% respectively, were also to be considered less important than the risks that were discussed in the paragraph above.

Henceforth, looking at the percentage distribution of the customers' choices of whether or not the risk is important to be considered by the enterprise, it can be concluded that there are many risks that might bring a downhill to the relationship of customers and enterprise in the future, however some of the risks are more important than the others and should be talked about and considered or eliminated more. Nonetheless, more than 50% of customers agreed that the economic risk was very important, meaning that enterprises should develop more key risk indicators (KRIs) that could measure this risk, and try to avoid the unpleasant damages that it could bring to the satisfaction of the customers. These KRIs provide a warning sign for any increased risks of an enterprise periodically, and particularly for this economic risk, KRIs could be developed by the economists. More indicators should be developed for the agreement risk between the customer and the enterprise and miscommunication risk between the two, since these risk factors were also suggested to be very important by the customers.

Overall, the data gathered from the customers' survey that investigated the importance of external perspectives and risk factors according to them reveal results that can be incorporated into the model for efficiency improvement of a logistics enterprise. The analysis of research results reveals that not only the four main perspectives from the Balanced Scorecard System could be used, but also perspectives of suppliers (partners), government and employees should be considered to benefit enterprise's efficiency and its relationship with the customers more. Nonetheless, the same data from the survey, also suggests that key risk indicators (KRI) should be developed for risk factors of economy, agreement and miscommunication risks between the customer and the enterprise, as this would allow to avoid the unpleasant downhills and damage of customers' satisfaction in the future. Thus, after completing the survey and analyzing the data, the results can be incorporated into the model to make it more effective and appropriate to use by global logistics and transport enterprise in order to benefit their efficiency.

3.4. Impact of the Balanced Scorecard Perspectives on Transport and Logistics Enterprises

The following section of results is going to focus on the criteria of the four main perspectives through the use of the expert assessment method as a tool. The expert survey is going to include twelve different experts, since three from each of the perspective is enough, who have been working in the areas of finance, customer service, internal processes and learning and growth, for more than 10 years and have Master's degree, as these two traits are important in defining an employee as an expert. Therefore, the following graphic, figure 17, represents all of the experts that participated in the expert assessment method and were interviewed.
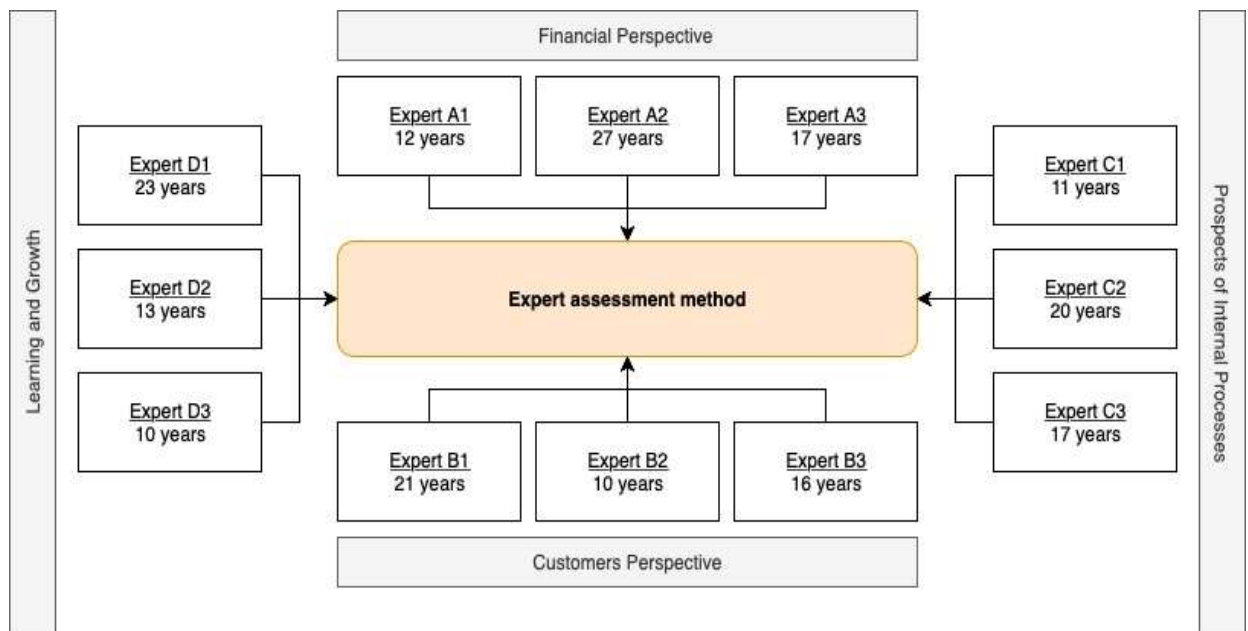

Figure 17. Experts' areas of expertise and experience (in years)

Source: made by the author

Using the knowledge of the experts, the four main perspectives of the Balanced Scorecard System are going to be analyzed in more detail, through the ranking of their criteria by the experts (section 1.3). The following perspectives are highly important in the development of the enterprise and should also be investigated together with the other perspectives that were provided to the managers and customers during interviews with them. However, since these four perspectives are the main ones, experts rank each of the perspective criteria according to their knowledge base and understanding of the enterprise and its development.

To begin, each expert was responsible for giving an indicator weight to each of the criteria of that perspective. All of the criteria were described in section 1.3 of the Master Thesis.

Then, using the Stepwise Weight Assessment Ratio Analysis (SWARA) equation, the weight of criteria was calculated and ranked according to the most important one being in the first place. APPENDIX 6 includes the received results for each of the criteria form different perspectives, however only the first five are highly important for the development of the model for efficiency measurement system, and thus table 8 represents them.

Table 8. Criteria ranking of each perspective according to expert assessment method (for detailed calculations see APPENDIX 6)

Perspective	Criteria	Criteria Weight	Rank
Financial perspective (m = 14)	Turnover	0.130	1
	Cost optimization	0.120	2
	Profit	0.117	3
	Net profit growth	0.107	4
	Profitability of one employee	0.085	5
Customer perspective (m = 10)	Number of new customers	0.175	1
	Number of customers	0.163	2
	Number of lost customers	0.139	3
	Customer satisfaction	0.115	4
	Average turnover per customer	0.121	5
Prospects of internal processes (m = 8)	Average response time to customer inquiries	0.104	1
	Damages Percentage	0.099	2
	Reducing the carrier's loss	0.099	3
	Planning accuracy	0.094	4
	Delays on delivery place	0.059	5
Learning and growth (m = 9)	Motivation index	0.087	1
	Staff change	0.087	2
	Average investment per employee	0.084	3
	Employee satisfaction	0.069	4
	Number of training hours	0.058	5

Source: made by the author

Table 8 represents the most important criteria from each of the perspective according to the expert assessment method and SWARA calculations, where m is the value of criteria used in the research for each perspective, and criteria weight is a calculated number from the

SWARA equation according to the decisions of the experts. To visualize each perspective clearer, four graphs (figures 18, 19, 20 and 21) have been made for each perspective, and they all represent the distribution of criteria according to their ranks.
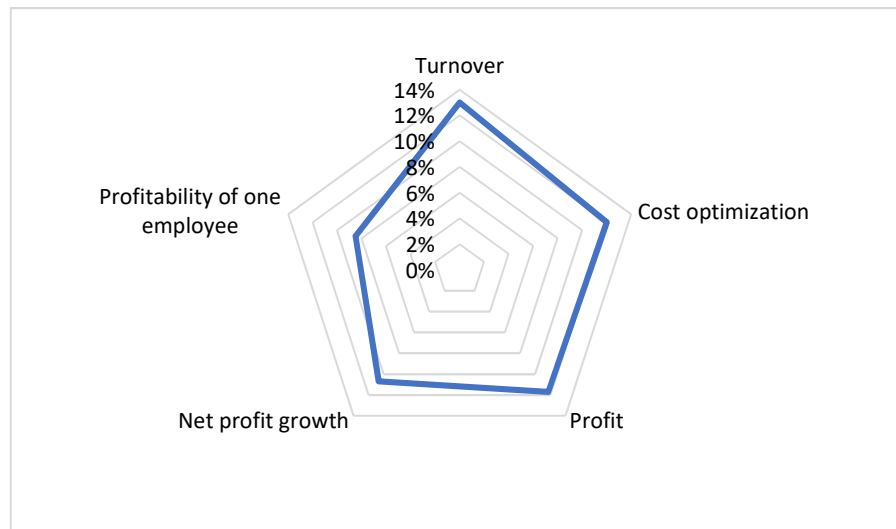

Figure 18. Distribution of the criteria for financial perspective according to the experts

Source: made by the author according to APPENDIX 6 and table 8

Looking at the results and their distribution, it can be seen that the highest ranked criteria was turnover, as it is the more profitable aspect of financial perspective to the enterprise. Turnover includes all of the net sales made by the enterprise and is therefore considered to be the most important by the experts. On the other hand, the least important of the five criteria is profitability of the employee, since enterprise functions as one unit and needs to profit as a whole and not individually according to the employees.
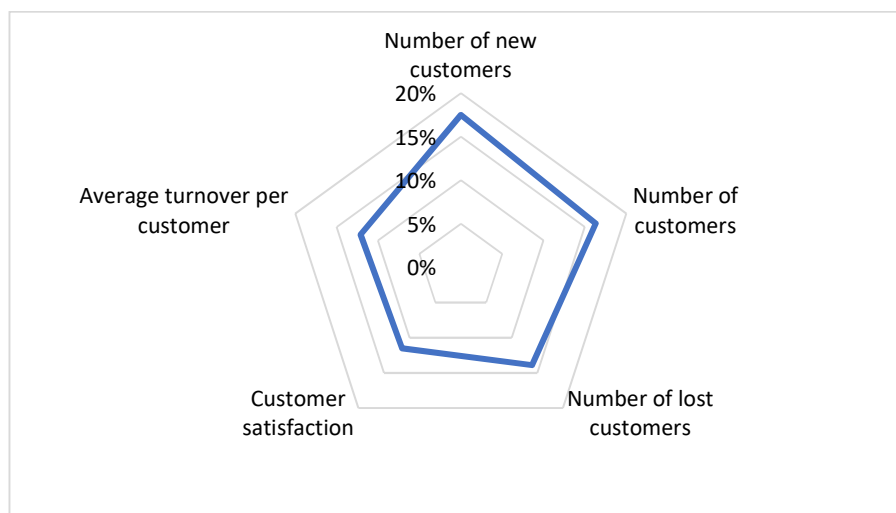

Figure 19. Distribution of the criteria for customer perspective according to the experts

Source: made by the author according to APPENDIX 6 and table 8

Looking at the results, the number of new customers is the most important aspect in the perspective of the customers. New customers bring in new ideas and new offers, and thus

without the growing circle of customers, it is hard for the enterprise to develop, thus this criterion has been ranked to be the most appealing by the experts in customers sector. Controversially, average turnover per customer has been ranked to the fifth place, since individual customers could bring different amounts of turnover to the enterprise, depending on their relationships with each other.

Figure 20. Distribution of the criteria for internal processes perspective according to the experts

Source: made by the author according to APPENDIX 6 and table 8

Results represents the distribution of criteria for internal processes perspective and reveals that average response time to customer inquiries has been the leading criteria. To maintain a healthy relationship with the customer, the enterprise needs to communicate with it as much as possible to avoid any unpleasant misunderstandings and customer unsatisfaction.
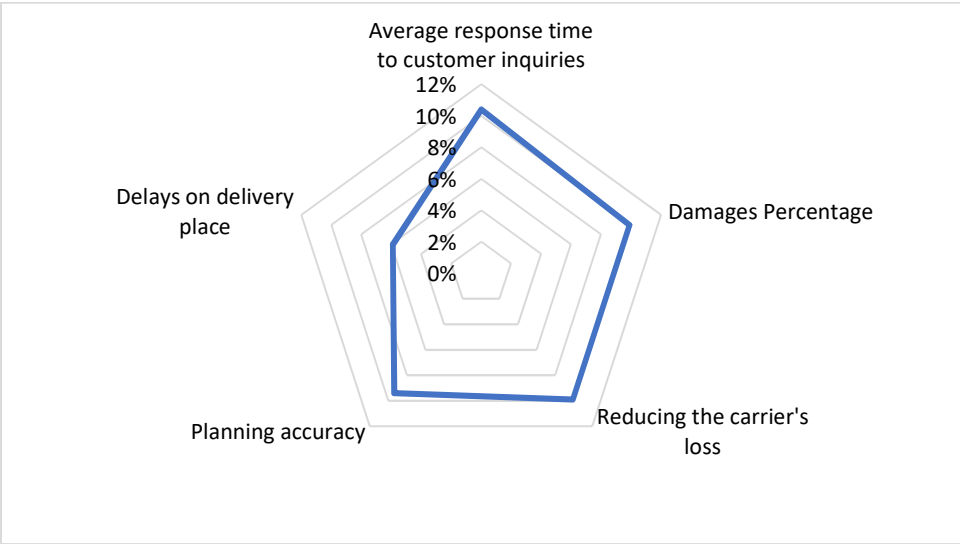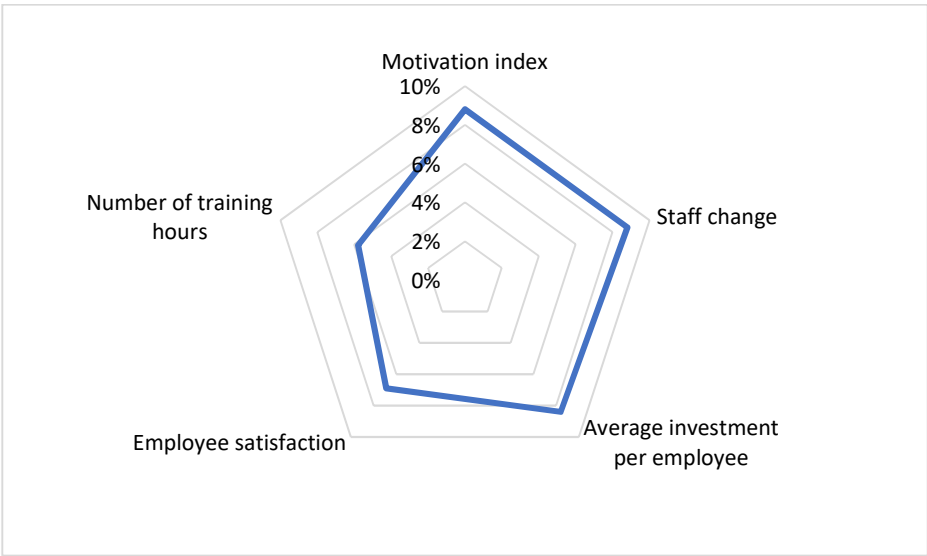

Figure 21. Distribution of the criteria for learning and growth perspective according to the experts

Source: made by the author according to APPENDIX 6 and table 8

According to the results, staff change has been the most important criteria for learning and growth perspective, as new staff always brings in new ideas, new knowledge and experience to the existing staff committee, which allows the enterprise to grow and develop. Other criteria that was also very valuable by the experts, that work in the learning and growth sector, was motivation index, as all of the working body in the enterprise needs to constantly be motivated to move forward and develop more. These two criteria received the same amount of support from the experts, and therefore both are considered to be highly important in this perspective. Controversially, number of training hours is considered to be the least important of the five criteria, due to the many exceptions that many managers experience when training the new employees, which are for example that some employees learn the material faster than the others, or maybe that some employees need practical and every-day life education other than just theoretical teaching. Therefore, the number of training hours can vary greatly according to the individual and his or her background information and already built up knowledge.

Overall, with the purpose of ranking each perspective's criteria according to importance, the expert assessment method provided an insight of which aspects should be considered by the enterprise more when developing its efficiency. The gathered data says that the criteria of turnover, number of new customers, average response time to inquiries and motivation index are the most important indicators of the financial, customer, internal processes and learning and growth perspectives respectively. These four main criteria can be used as an indicator tool that would measure the efficiency of the enterprise, since the development of these criteria aspects will proportionally bring more benefits to the enterprise too. Nonetheless, these highly valued criteria will allow other enterprises to focus on important aspects which will not only allow the enterprise to grow, but the needs of customers and employees will also be addressed.

4. FORMATION OF A MODEL FOR EFFICIENCY IMPROVEMENT OF A GLOBAL TRANSPORT AND LOGISTICS ENTERPRISE

This final part of the Master Thesis discusses the main outcomes received from the empirical research and how these outcomes contribute to the created model of the efficiency assessment and improvement for global logistics enterprises. This part of the Thesis includes eight sub-parts of the model for efficiency improvement of a logistics enterprise, where the first sub-part is a detailed explanation of the process for model creation. The second and third parts are purpose of the model and its novelty respectively. Consequently, another sub-part is application of the model, that discussed the new aspects of the efficiency measurement system and the structure of the model. Then, the following parts are the strengths and limitations of the newly created model, whereas lastly, the last part is future research directions of the model, including its requirements and possible difficulties.

Process of model creation. To form a model for the efficiency measuring system that could be applied to transport and logistics enterprises, a process of model creation had to be performed. The process began with gathering of literature analysis about forms of efficiency measurement systems and how they are applied in the modern business world (Awadallah, 2015, Lueg, 2015, Meilong, 2018). Consequently, the most appealing measuring system was identified based on criteria of stakeholder's interest, financial indicators and returns, costumer's satisfaction, internal and external processes and performance as a measurement system. According to the management theory, the Balanced Scorecard System includes four main perspectives of the enterprise when developing its efficiency. However, it was identified the Balanced Scorecard System also had a few limitations, that were a lack of consideration of risk factors, such as the risk of strategy, work, agreement, economy, environment, miscommunication and title. Similar to the risk factors, there is a lack of perspectives in the Balanced Scorecard System model, and those lacking perspectives are the perspectives of suppliers (partners), stakeholders, employees, government, environment and managers. Both the lack of risk factors and the lack of perspectives due to the fact that the Balanced Scorecard System was created in 1992, and therefore the aspects of that system are no longer appropriate and applicable to the enterprises of the modern business world. Therefore, the Balanced Scorecard System was used as a base for the creation of the conceptual model (figure 11), that was later used as a framework for empirical research aimed at gathering the data for the overall efficiency measurement model.

In the empirical research, to investigate the appropriateness of the model for the transport and logistics enterprises that are global and thus depend on governments, the analysis of Lithuania's GDP and the importance of transport for that GDP were analyzed. Lithuanian transport sector was analyzed to investigate what importance does transport have on Lithuania's economy. To fully investigate the sector, Lithuania's GDP and statistics were considered. Nonetheless, surveys and in-depth interviews were created for the empirical research as well. These surveys and interviews asked the customers and traffic managers to rank the given risk factors and perspectives according to their importance in the enterprise's external and internal processes respectively. The list was made according to the literature sources (Awadallah, 2015, Lueg, 2015, Meilong, 2018). Lastly, to make the efficiency model more appropriate, the four perspectives of the Balanced Scorecard were also included, and their criteria were ranked by the experts according to the expert assessment method and SWARA calculations. The highest ranked criteria are included in the part 1 of the new model, as the experts believe that their consideration by the logistics enterprise is also important.

Overall, the Balanced Scorecard System, conceptual model (figure 11) and the empirical research allowed the creation of a new model for efficiency improvement of an enterprise that could be applied by global logistics enterprise. Additionally, due to the presence of the knowledge from the logistics experts who were involved in this research, the information presented in this model is reliable and accurate.

Purpose of the model. The new efficiency measurement model for global transport and logistics enterprises is a tool, that allows to manage the efficiency of the enterprise through its internal and external processes.

Novelty. After the empirical research, new aspects have supplemented the efficiency measurement model. Firstly, a list of highest ranked criteria from all four of the perspectives from the Balanced Scorecard have been incorporated in the initiation stage of the model. These criteria allow an enterprise to understand on what criterial aspects should it focus on more, when aiming to develop its efficiency. Additionally, a list of internal and external risk factors supplements the model, which provide a list of harmful risks to which the enterprise could create corresponding key risk indicators (KRIs). Lastly, a list of internal and external perspectives is also a new incorporation to the model, that provides a good insight of the aspects that should be considered when integrating new management areas.

Application process. The new model for efficiency measurement system can be incorporated into logistic and transport enterprise, whether it is starting its development or is already in the process of the development. However, before the application of the efficiency measuring model, mission and vision of the enterprise have to be considered and clearly stated.

After the consideration of mission and vision, the leaders of the enterprise can apply the measurement system and work towards achieving the goals. It is also important to mention that the development and application of the efficiency measurement system depend on the stated mission and vision approaches, as the model includes the aspects of these approaches as the perspectives and risk factors.

The model of enterprise efficiency assessment and improvement is a tool that allows global logistic enterprises to achieve better results in a more efficient way. The application process and purpose of the model are achieved, when the model is applied as a tool for:

1. decision making;
2. communication and tactical decision making;
3. research framework for the internal and external processes;
4. research framework for evaluating the efficiency of an enterprise;
5. improving communication and relations between the customers an and enterprise;
6. developing a more productive enterprise and working environment;
7. investigating changed internal and external environments and processes.

Nonetheless, there are also some difficulties in the application process of the model. To begin with the application process, a leader needs to review the measurement system and inform employees of every department about the upcoming changes. Then, training time needs to start, where employees will be taught to focus on each of the required criteria and perspective, and KRIs will be created by the risk department according to the list of major risk factors on the model. Hence, since this is a long-term model, it is going to require time to see results and changes in the efficiency of an enterprise, thus the leader needs to maintain in his or her position throughout the entire process. Nonetheless, an IT tool also needs to be created, which would allow different departments to contact with each other and in that way the enterprise to avoid miscommunication.

Ultimately, to apply the new conceptual model for efficiency improvement of a logistics enterprise and maintain the new efficiency measurement model in the enterprise, a strong leader is needed who is willing to monitor the entire process of applying this measurement system. It can be hard to keep all of the employees on the same page at first, as some of the material might not be understandable and therefore long teaching hours are needed, therefore that is why a strong leader is needed.

Communication is also very important in the application process between the departments. The new model is only going to be most helpful if departments keep communicating with each other. This is highly important, as one department needs to know what approaches and results another department is getting, therefore an appropriate data mining

is needed, since in today's world with technology, communication will be easier through using technologies and data analysis.

Structure of the model. The new model contains two stages, initiation and elongation. The initiation stage addresses the four main perspectives of the Balanced Scorecard System and the corresponding highest ranked criteria of the four perspectives according to the experts, the second part includes the most important internal and external risk factors, whereas the third part includes the most important internal and external perspectives. All stages are interconnected by the logical relations and interconnected arrows, as they all are supplementing the model and serve a purpose of achieving a new efficiency measurement model.

Primarily, in the initiation stage, the Financial, Customer, Prospects of internal processes and Learning and growth perspectives of the Balanced Scorecard System are discussed. The main criteria from the four perspectives were ranked by the experts according to the expert assessment method and later were calculated by SWARA calculations according to the indicator weights, that were given to each criterion by the experts of a logistics enterprise. From the list of ranked criteria of each perspective, the three highest ranked criteria were taken, and considered to be the most important in functioning of the perspective. Therefore, as discussed before, the highest three ranked criteria are included in the model and are as follows (parenthesis represent the ranking number according to the corresponding criteria weight indicator):

1. *Financial perspective:*
    a. Turnover (1);
    b. cost optimization (2);
    c. profit (3).
2. *Customer perspective:*
    a. number of new customers (1);
    b. number of customers (2);
    c. number of old customers (3).
3. *Prospects of internal processes:*
    a. average response time to customer inquiries (1);
    b. damages percentage (2);
    c. reducing the carrier's loss (3).
4. *Learning and growth:*
    a. motivation index (1);
    b. staff change (2);
    c. average investment per employee (3).

Secondly, for the elongation stage there are two parts created. The first part discussed risk factors, whereas the second part discusses the perspectives. Therefore, in the first part of the elongation stage, the model includes a consideration of the risk factors, that determines the most appropriate and common internal and external risk factors that should be considered by the enterprise workers. The most important risk factors were taken from the quantitative survey with the customers and an in-depth interview with the traffic managers, where both, the customers and the managers, were asked to rank the risk factors based on their importance in negatively affecting the internal and external processes of the enterprise. Customers and managers were also asked to consider would the elimination and consideration of these risk factors benefit the efficacy of the enterprise in the future. However, when considering internal and external risk factors according to the customers and managers, there are multiple recurrences of the factors, therefore a filter is created thought which a list of common risk factors is made to avoid repetition. The most common risk factors in phase one, where as follows (the percentage in parenthesis represents the mean percentage value from both, the customer survey and an in-depth interview with the traffic managers):

1. *Economic risk* (45.8%) – risk of having unstable economy;
2. *Agreement risk* (28.6%) – risk of a flawed agreement between the customer and enterprise;
3. *Strategic risk* (15%) – risk of an enterprise having a flawed strategy;
4. *Working risk* (5%) – risk of having insufficient employees and resources.

The presence of these risks in the new model allows the enterprise to right away take actions and consider these risks as harmful. To avoid the unpleasant outcomes of these risks, the enterprise can create the right key risk indicators (KRIs), that will determine if the risk is harmful to the efficiency of the enterprise beforehand.
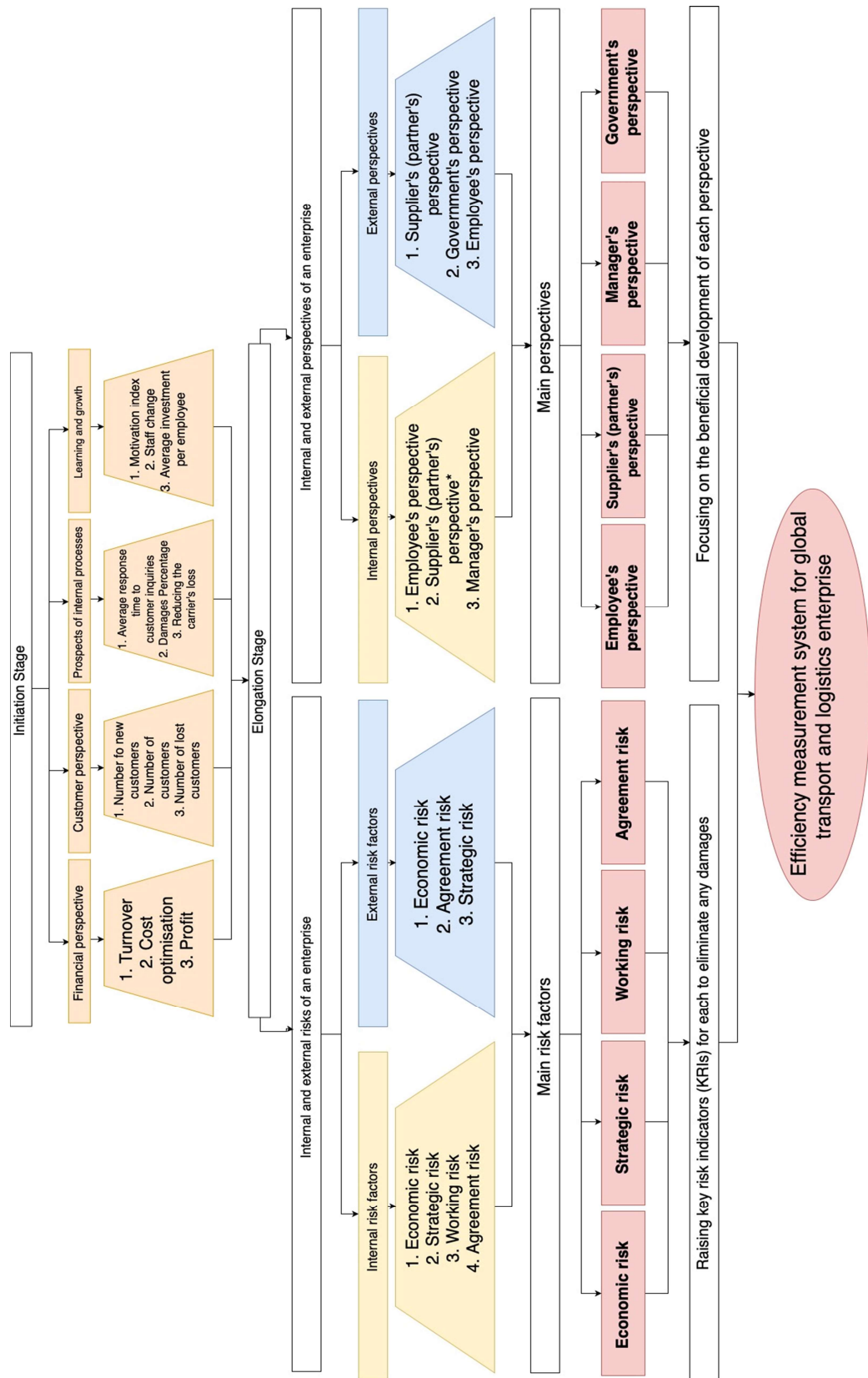
Part two of the elongation stage, on the other hand, focuses on the consideration of perspectives, and is analogous to part one. The information in this part of the model was gathered in a same manner, as for the part two. Customers and traffic managers were asked to rank the most important external and internal perspectives respectively that have the most effect on the development and efficiency of the enterprise that they work with. Some of the received perspectives from the results also repeated, therefore another filter was created that excluded the recurring perspectives and a consistent list of important perspectives was created. The four main perspectives that are important in building the efficiency of an enterprise are as follows (the percentage in parenthesis represents the mean percentage value from both, the customer survey and an in-depth interview with the traffic managers):

1. *Employee's perspective* (38.6%) – a perspective of a person who is working in a logistics enterprise and understand its internal strategy;
2. *Manager's perspective* (32%) – a person who is responsible for the employees of the enterprise and its internal processes;
3. *Government's perspective* (21.4%) – a government under whose control the company works and follows their laws;
4. *Supplier's (partner's) perspective* (18%) – a person or a company that supplies services (vehicles, trailers, drivers, warehouse space) to the enterprise and benefit the enterprise externally.

The inclusion of these perspectives in the new model allow the enterprise to address the development of these sectors, by thereby focusing on their issues and not allowing their collapse, since these perspectives are the base of a wealthy, efficient and stable logistics enterprise. Additionally, the new perspectives allow a new integration of the management system to these areas.

Lastly, all of the parts are integrated in order to form an efficiency measurement system, that can be used by a global transport and logistics enterprise to improve their efficiency and at the same time lower their resources.

It is important to visualize the main stages of the new efficiency measurement model in order to make it clearer, more identifiable and therefore easier to apply. Nonetheless, visualization allows a more appropriate way of receiving the information and understanding the concepts that the visual image is trying to represent. Thus, the visual representation of the overall model of enterprise efficiency assessment and improvement in figure 22, represents the new model of efficiency measurement system, where each different color represents a method that was used to approach the needed results to fulfill the requirements of this model.

Figure 22. Model for efficiency improvement of a global transport and logistics enterprise

Source: made by the author

Strengths of the model. A major strength of this model is its complexity, as it considers more than one aspect of the enterprise. The model takes aspects of finance, customers, learning, growth and internal and external processes of the transport enterprise into consideration. Nonetheless, the model also includes possible aspects of internal and external risks and perspectives that influence the enterprise's processes. These aspects are also subdivided into smaller parts, which include the most important criteria in detail and discuss internal and external processes of the enterprise. The internal and external processes of the enterprise are discussed using risk factors and perspectives as indicators. Therefore, this model is of a broad scope and allows the enterprise that utilizes it to consider factors in developing a more efficient enterprise, which is important in today's business world.

Limitations of the model. The creation of model is a complex process, during which there have been used a series of approaches according to the author of the model, therefore due to this issue of one person decisions, the model contains a few limitations that should be addressed. A list of limitations is as follows:

1. logistics sector was analyzed only in Lithuania;
2. choosing Balanced Scorecard System as a base for the empirical research;
3. the need of financial investments when applying the model.

The broad scope of the new model leads to a corresponding weakness of the model, which is that since only the logistics sector was analyzed in Lithuania, the model is the most appropriate to be used by logistics enterprises located in Lithuania, however it is still applicable in other countries globally, since the principle of efficiency remains the same throughout the globe. This limitation is due to varying government politics and economics in countries around the world, and therefore the appropriate criteria, risk factors and perspectives could be different in other countries.

Another limitation is choosing the Balanced Scorecard System of being the base for the empirical research. The Balanced Scorecard System itself has many limitations that are other that the lack of perspectives or many risk factors, that were eliminated by the new efficiency model. Limitations such as time and cost investments, appropriate stakeholder's usage, strategy planning or lack of external focus, are also considered to be the main restrictions of the Balanced Scorecard System and should therefore be analyzed in other empirical researches.

Application of the model could also bring some suspected financial investments and costs. These investments result from the employee training, manager training, creation of new KRIs that would help with the risk factors or selecting a leader who is willing to be responsible for applying the new measuring system. The costs would be suspected, since there is an assumption being made that there is an appropriate planning process.

Future research directions. Currently, an appropriate future direction is a more detailed analysis of other possible limitations of the Balanced Scorecard System. This deeper analysis could then supplement by bringing in new aspects to the system for the activity efficiency improvement of a global logistics enterprise. Ultimately, this approach in the future would allow a more precise and usable efficiency measurement model that could be easier applied by transport and logistics enterprise globally.

Nonetheless, another future research direction could include the analysis of other global transport sectors of different countries, that might be economically stronger or weaker than Lithuania, where the economically stronger countries would include countries whose transport sector has a higher yearly GDP supplement to the country's economy, whereas the weaker countries would include those of lower GDP supplement to the country's economy. This approach would supplement the model with more insights of its application to the correct enterprises according to their country's economy.

The expansion of model through the inclusion of other GDPs lead to another future research direction. This approach could include the analysis of other efficiency measurement systems, orientated at the eco-efficiency system, which would allow a newly incorporated orientation into the research. Using eco-efficiency system for an in-depth analysis and empirical research, would highlight the main limitations of the system, however it will also provide new insights of the environmental factors that might affect the efficiency of the logistics enterprises globally. Overall, incorporation of a new system that deals with other aspect than the current efficiency measurement model dealt with, would allow the model's expansion and therefore increase its beneficial outcomes.

The model expansion due to the eco-efficiency system, could result into the implementation of a new green logistics concept in the efficiency measurement model. This concept represents an efficient system and can be divided into three levels, which are ecologic level, economic level and social level (Vasiliauskas, Zinkeviciute and Simonyte, 2013). Therefore, meaning that the implementation of the new concept should be supported by the three levels, where economic level deals with optimal routes and savings of energy resources, ecologic level deals with decrease in pollution and utilization of renewable sources, and lastly, the social level deals with decrease in the accident numbers and increase in security of favorable working environment for the employees. Therefore, the application of the green logistics concept to the efficiency measurement model would provide a broader scope of applications and would be approved by more transport and logistics enterprises due to its promotion of green logistics.

Overall, the future directions of deeper analysis of the Balanced Scorecard System, analysis of other countries' GDPs, analysis of eco-efficiency system and the incorporation of the green logistics concept into the model would increase the beneficial outcome of the model by thereby increasing its application and utilization by more globally diverse transport and logistics enterprises.

CONCLUSIONS AND SUGGESTIONS

After analyzing scientific literature, performing an empirical research on the activity of global transport and logistics enterprises and creating a model for efficiency measurement, the conclusions of the Master Thesis can be formed:

1. Efficiency is a measurement that "measures how well a business converts inputs such as capital, labor and materials into outputs like revenue, products and services" (Spacey, 2017). Efficiency allows to increase the productivity of an enterprise, while at the same time limit its resources and work force in a most productive manner. The performed literature analysis analyzed four efficiency measurement systems in total. The five systems were financial model, the AHP model, the eco-efficiency system, the PMS system and the Balanced Scorecard System. According to the criteria of stakeholder's interest, financial indicators and returns, costumer's satisfaction, internal and external processes and performance, it was chosen that the Balanced Scorecard System is the most appropriate measurement system to use as a base for the creation of the measurement system model for transport and logistics enterprises. The Balanced Scorecard System was created in 1992, therefore in the modern business world it has limitations that could affect the efficiency development of an enterprise. The main limitations of the Balanced Scorecard System were found to be lack of risk factors and lack of perspectives. To eliminate these limitations and address the main internal and external risk factors and perspectives of an enterprise, a conceptual model was made. The conceptual model was used as a base for the empirical research.

2. With a purpose of determining the internal and external aspects that affect the efficiency development in global? transport and logistics enterprises, an empirical research methodology was formed. The empirical research was used to gather the needed data to fulfill the requirements of the conceptual model and eliminate the limitations of the Balanced Scorecard System. Firstly, criteria from the four main perspectives of the Balanced Scorecard was ranked according to the importance. A list of the four main perspectives and their corresponding criteria (in the parenthesis according to the ranking order) were analyzed according to the experts, which were financial perspective (turnover (1), cost optimization (2), profit (3)), customer perspective (number of new customers (1), number of customers (2), number of old customers (3)), prospects of internal processes (average response time to customer inquiries (1), damages percentage (2), reducing the carrier's loss (3)) and learning and growth perspective (motivation index (1), staff change (2), average investment per employee (3)). Consequently,

according to the customers and traffic managers (the mean value of percentages form customers and managers is shown in parenthesis respectively), it was also analyzed that the main risk factors of a transport and logistics enterprise are economic (45.8%), agreement (28.6%), strategic (15%) and working (5%) risks. Therefore, to avoid these risks, an enterprise can develop corresponding key risk indicators. On the other hand, according to the customers and traffic managers (the mean value of percentages form customers and managers is shown in parenthesis respectively) the main perspectives were analyzed to be the perspectives of employee (38.6%), manager (32%), government (21.4%) and supplier (partner) (18%). To develop these areas of perspectives, a new integration of the management system of these areas must be considered.

3. An innovative global transport and logistics enterprise efficiency assessment model was created, which includes the main criteria of the four main Balanced Scorecard System perspectives, as an initiation stage, and internal risks and perspectives, as an elongation stage. The model serves a purpose of being a tool, that allows to manage the efficiency of the enterprise through the internal and external criteria, risk factors and perspectives. This model helps in decision making processes or can be used as a research framework for the internal and external processes or as a framework for evaluating the efficiency of an enterprise. Nonetheless, the model helps in improving communication and relations between the customers an and enterprise and developing a more productive enterprise and working environment. The model can be incorporated into logistic and transport enterprise, whether it is starting its development or is already in the process of the development, however, primarily the mission and vision of the enterprise have to be considered and clearly stated. For the future research directions, the deeper analysis of the Balanced Scorecard System, analysis of other countries' GDPs, analysis of eco-efficiency system and the incorporation of the green logistics concept into the model would increase the beneficial outcome of the model by thereby increasing its application and utilization by more globally diverse transport and logistics enterprises.

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APPENDIXES

	QUESTIONS	LITERATURE
Introductory question	• What are your responsibilities in this enterprise?	Yahanpath and Islam (2016), Lueg (2015), Robu (2019) and Awadallah (2015)
STAGE 1 of a conceptual model of enterprise efficiency assessment and improvement	1. What are the most important perspectives of this enterprise according to you (see example perspectives below)?	
	2. How do these perspectives influence the internal process of the enterprise?	
	3. Could addressing these perspectives benefit the efficiency of the enterprise?	
STAGE 2 of a conceptual model of enterprise efficiency assessment and improvement	4. What are the main risks of the enterprise (see example risk factors below)?	
	5. How do these risks affect the efficiency of an enterprise right now?	
	6. Would the addressing or eliminating these risks benefit the efficiency of an enterprise?	
Concluding question	• Is there anything else you would like to add?	

Possible perspectives in logistics enterprises:

- Supplier's (partner's) perspective,
- Stakeholder's perspective,
- Employee's perspective,
- Government's perspective,
- Environment's perspective,
- Manager's perspective.

Possible risk factors in logistics enterprises:

- Strategic risk,
- Working risk,
- Agreement risk,
- Economic risk,
- Environmental risk,
- Miscommunication risk,
- Title risk.

Questions made by the author according Yahanpath and Islam (2016), Lueg (2015), Robu (2019) and Awadallah (2015), and the interviewing instructions of Showkat and Parveen (2017) and Brounéus (2011).

Dear madam / sir,

Martin Stesko, a student of an International Business Master's program, is conducting his final dissertation project and therefore investigating the customer's external viewpoint about an enterprise. The purpose of this research is to investigate what external perspectives and risk factors could be addressed by the customers. Nonetheless, the questionnaire is anonymous and will only be used for the purposes of this research.

1. According to your recent work experience with a logistics enterprise, evaluate the importance of each perspective*, whose development would benefit you the most in the future work with the same enterprise (mark the correct answer on each line)

Perspective	Not Important	Slightly Important	Moderately Important	Important	Very Important
Supplier's (partner's) perspective					
Stakeholder's perspective					
Employee's perspective					
Government's perspective					
Environment's perspective					
Manager's perspective					

2. According to your recent work with a logistics enterprise, evaluate the importance of each risk factor** of an enterprise, whose elimination would benefit you the most in the future work with the same enterprise (mark the correct answer on each line)

Risk factor	Not important	Slightly Important	Moderately Important	Important	Very Important
Strategic risk					
Working risk					
Agreement risk					
Economic risk					
Environmental risk					
Miscommunication risk					
Title risk					

*Explanation of possible perspectives:
- Supplier's (partner's) perspective – a person or a company that supplies goods to the enterprise
- Stakeholder's perspective – a person or a company that invests in the company
- Employee's perspective – a person who works in a company
- Government's perspective – a governments under whose control the company works
- Environment's perspective – environmental satisfaction, for example aiming to reduce pollution
- Manager's perspective – a person who is responsible for the employees of the enterprise

** Explanation of possible risk factors:
- Strategic risk – risks of having a flawed strategy
- Working risk – risks of having insufficient employees and resources

- Agreement risk – risks of having a flawed agreement between the customer and enterprise
- Economic risk – risks of having unstable economy
- Environmental risk – risks of polluting environment
- Miscommunication risk – risks of having miscommunication between the employees of the enterprise
- Title risk – risks of having hard or hard to understand title

THANK YOU!

Table 3.1. List of criteria of each perspective that is provided to the experts for assessment

Perspective	Index	Criterion (k)	Measurement (i_1, i_2, i_3)			Indicator weight (ω_i)
Financial (m=14)	k_1	Turnover				
	k_2	Profit				
	k_3	Product group mark-up				
	k_4	Profitability per employee				
	k_5	Profit from new products				
	k_6	Dividends				
	k_7	Credit assessment				
	k_8	Cost optimization				
	k_9	Net profit growth				
	k_{10}	Assessment of creditworthiness				
	k_{11}	Debt to equity ratio				
	k_{12}	Return on equity				
	k_{13}	Return on capital employed				
	k_{14}	Return on investment				
Customer (m=10)	k_{15}	Number of customers				
	k_{16}	Number of new clients				
	k_{17}	Deploying new services				

	k_{18}	Customer satisfaction				
	k_{19}	Number of regular customers				
	k_{20}	Number of lost customers				
	k_{21}	Average turnover per customer				
	k_{22}	Average customer service costs				
	k_{23}	Contact efficiency				
	k_{24}	Average customer group profitability				
Prospects of internal processes (m=8)	k_{25}	Brock percentage				
	k_{26}	Reduction of shuttle defect				
	k_{27}	Average time to respond to customer inquiries				
	k_{28}	Downtime				
	k_{29}	Planning accuracy				
	k_{30}	Increasing competitive advantage				
	k_{31}	Stock turnover				
	k_{32}	Maximizing business processes				
	k_{33}	Staff turnover				

Improvement and learning (m=9)	k_{34}	Average investment in training per employee				
	k_{35}	Number of teaching hours				
	k_{36}	Employee satisfaction				
	k_{37}	Motivation Index				
	k_{38}	Evaluation of the effectiveness of document and knowledge management in the company				
	k_{39}	Effectiveness of employee problem solving				
	k_{40}	Efficiency of unit cooperation				
	k_{41}	Discussion of the objectives and results of the chapter				

Source: made by the author

	QUESTIONS	LITERATURE
Introductory question	• What are your responsibilities in this enterprise?	*FTL; CIS (RU, BY, UA) DOMESTIC - DISTRIBUTION DP*
STAGE 1 of a conceptual model of Enterprise efficiency assessment and improvement	1. What are the most important perspectives of this enterprise according to you (see explanation below)?	*1. DARBUOTOJAI 2. TIEKĖJAI 3. TEISINGAS VADOVAVIMAS*
	2. How do these perspectives influence the internal process of the enterprise?	*TINKAMI DARBUOTOJAI - TINKAMAS REZULTATAS TEISINGI TIEKĖJAI - GERAS SERVISAS už TEISINGĄ KAINĄ*
	3. Could addressing these perspectives benefit the efficiency of the enterprise?	*1 EKONOMINIS 2. SUTARČ*
STAGE 2 of a conceptual model of Enterprise efficiency assessment and improvement	4. What are the main internal risks of the enterprise?	*1. EKONOMINIS 2 SUTARČIŲ UŽGODIMAS 3. BLOGAS STRATEGIJOS PASIRINKIMAS*
	5. How do these risks affect the efficiency of an enterprise right now?	*1. TIESIOGIAI - AUGA EKONOMIKA AUGAM MOVES 2. ŠIUO METU VYKDOMA, BET YRA RIZIKŲ 3.*
	6. Would the addressing or eliminating these risks benefit the efficiency of an enterprise?	*1 EKONOMIKOS AUGIMO NEITAKOT 2. APSIDRAUSTI, STEBĖTI NUMATYTI 3 TEISINGOS STRATEGIJOS, SEGMENTO PASIRINKIMAS*
Concluding question	• Is there anything else you would like to add?	*LABAI PADĖTŲ*

	QUESTIONS	LITERATURE
Introductory question	• What are your responsibilities in this enterprise?	*Department Manager*
STAGE 1 of a conceptual model of Enterprise efficiency assessment and improvement	1. What are the most important perspectives of this enterprise according to you (see explanation below)?	*Global company, high possibilities to invest – into business into systems. Growing business. International experience for employees and managers. Could perfectly serve global clients.*
	2. How do these perspectives influence the internal process of the enterprise?	*A lot of internal processes are being centralised, systemised and standardized. Saving time, costs. Quality of our service to clients gets better.*
	3. Could addressing these perspectives benefit the efficiency of the enterprise?	*Yes, these perspectives benefit to the efficiency of the company. They have to be stressed in order to gain the most from it.*
STAGE 2 of a conceptual model of Enterprise efficiency assessment and improvement	4. What are the main internal risks of the enterprise?	*Flexibility – risk to loose flexibility Creativity – there may be less space for creative solutions Loosing small clients, who can not adopt to the system*
	5. How do these risks affect the efficiency of an enterprise right now?	*Loosing some business, clients Having "non standard" situation may take a lot of time*
	6. Would the addressing or eliminating these risks benefit the efficiency of an enterprise?	*Yes, but i dont know how, now.*
Concluding question	• Is there anything else you would like to add?	*Ačiū :)*

	QUESTIONS	LITERATURE
Introductory question	• What are your responsibilities in this enterprise?	Truffic monoger
STAGE 1 of a conceptual model of Enterprise efficiency assessment and improvement	1. What are the most important perspectives of this enterprise according to you (see explanation below)?	Supplier; Managers; Employees;
	2. How do these perspectives influence the internal process of the enterprise?	Costs; Efficiency; Results on customers; Results
	3. Could addressing these perspectives benefit the efficiency of the enterprise?	Deffinetely
STAGE 2 of a conceptual model of Enterprise efficiency assessment and improvement	4. What are the main internal risks of the enterprise?	Economic risk; Working risk; Strateţiy risk;
	5. How do these risks affect the efficiency of an enterprise right now?	Bigger/smaller amount of shipments; Bad efficiency of workers Mistakes, Result
	6. Would the addressing or eliminating these risks benefit the efficiency of an enterprise?	Yes
Concluding question	• Is there anything else you would like to add?	Perspetives and risks are always changind and it depends on country economic and political situation.

	QUESTIONS	LITERATURE
Introductory question	• What are your responsibilities in this enterprise?	*Department manager*
STAGE 1 of a conceptual model of Enterprise efficiency assessment and improvement	1. What are the most important perspectives of this enterprise according to you (see explanation below)?	*Supplier's persp. Employee's persp.*
	2. How do these perspectives influence the internal process of the enterprise?	*Without them, company cannot offer any service to customer*
	3. Could addressing these perspectives benefit the efficiency of the enterprise?	*Yes*
STAGE 2 of a conceptual model of Enterprise efficiency assessment and improvement	4. What are the main internal risks of the enterprise?	*Miscommunication ~~strategic~~ strategic*
	5. How do these risks affect the efficiency of an enterprise right now?	*Miscommunication leads to low service, low efficiency, extra cost, business loss and little risk.*
	6. Would the addressing or eliminating these risks benefit the efficiency of an enterprise?	*Better service → better title Efficiency → bigger GP, higher EBITA Business growth – better decision making, bigger part of market share.*
Concluding question	• Is there anything else you would like to add?	—

	QUESTIONS	LITERATURE
Introductory question	• What are your responsibilities in this enterprise?	Traffic manager
STAGE 1 of a conceptual model of Enterprise efficiency assessment and improvement	1. What are the most important perspectives of this enterprise according to you (see explanation below)?	Supplie's, Employee's
	2. How do these perspectives influence the internal process of the enterprise?	They allow the enterprise to consider other perspectives other than the ones related to finances and customers
	3. Could addressing these perspectives benefit the efficiency of the enterprise?	Definitely YES
STAGE 2 of a conceptual model of Enterprise efficiency assessment and improvement	4. What are the main internal risks of the enterprise?	Economic and miscommunication
	5. How do these risks affect the efficiency of an enterprise right now?	logistic enterprises rely on economy of the country; therefore this risk is important. Additionally miscommunication risk is also important as customers, employees and managers need to communicate with each other.
	6. Would the addressing or eliminating these risks benefit the efficiency of an enterprise?	YES
Concluding question	• Is there anything else you would like to add?	

This appendix represents the data that was gathered after conducting a survey of important external perspectives and risks according to 248 customers that have recently used logistics and transportation services in Lithuania.

Data gathered from customer survey about what perspectives and risk factors according to them are the most important ones in developing their satisfaction and maintain a stable relationship between them and the enterprise.

Table 5.1. Data from customer survey on the importance of perspectives

Perspective	Not Important	Slightly Important	Moderately Important	Important	Very Important
Supplier's (partner's) perspective	3	27	35	68	115
Stakeholder's perspective	27	38	69	73	41
Employee's perspective	11	9	65	85	78
Government's perspective	18	25	38	60	107
Environment's perspective	13	43	78	58	56
Manager's perspective	17	28	84	73	46

Source: made by the author

Table 5.2. Data from customer survey on the importance of risk factors

Risk factor	Not important	Slightly Important	Moderately Important	Important	Very Important
Strategic risk	3	5	83	49	108
Working risk	18	2	65	101	62
Agreement risk	7	17	6	100	118
Economic risk	9	10	38	37	154
Environmental risk	17	26	75	80	50
Miscommunication risk	13	19	36	71	109
Title risk	68	20	73	83	4

Source: made by the author

The following tables represent the same data, except in percentages to make it easier to visualize what 248 interviewees chose for their responses.

Table 5.3. Percentage distribution of customer survey results on the importance of perspectives

Perspective	Not Important	Slightly Important	Moderately Important	Important	Very Important
Supplier's (partner's) perspective	1.2%	10.8%	14.0%	27.2%	46.0%
Stakeholder's perspective	10.8%	15.2%	27.6%	29.2%	16.4%
Employee's perspective	4.4%	3.6%	26.0%	34.0%	31.2%
Government's perspective	7.2%	10.0%	15.2%	24.0%	42.8%
Environment's perspective	5.2%	17.2%	31.2%	23.2%	22.4%
Manager's perspective	6.8%	11.2%	33.6%	29.2%	18.4%

Source: made by the author

Table 5.4. Percentage distribution of customer survey results on the importance of risk factors

Risk factor	Not important	Slightly Important	Moderately Important	Important	Very Important
Strategic risk	1.2%	2.0%	33.2%	19.6%	43.2%
Working risk	7.2%	0.8%	26.0%	40.4%	24.8%
Agreement risk	2.8%	6.8%	2.4%	40.0%	47.2%
Economic risk	3.6%	4.0%	15.2%	14.8%	61.6%
Environmental risk	6.8%	10.4%	30.0%	32.0%	20.0%
Miscommunication risk	5.2%	7.6%	14.4%	28.4%	43.6%
Title risk	27.2%	8.0%	29.2%	33.2%	1.6%

Source: made by the author

The following two graphs are the graphical representations of the customer distribution in percentage according to the importance they chose for that particular perspective or risk factor.

Figure 23 represents the importance of external perspectives according to the customers. In total there were 248 customers interviewed, therefore the distribution is very broad. The maximum response that was chosen most frequently is supplier's perspective, as 46.0% of customers said that it was very important. Error bars on the bar graph represent the percentage error that could have resulted from the factors such as faulty calculations or rounding up to three significant figures only.
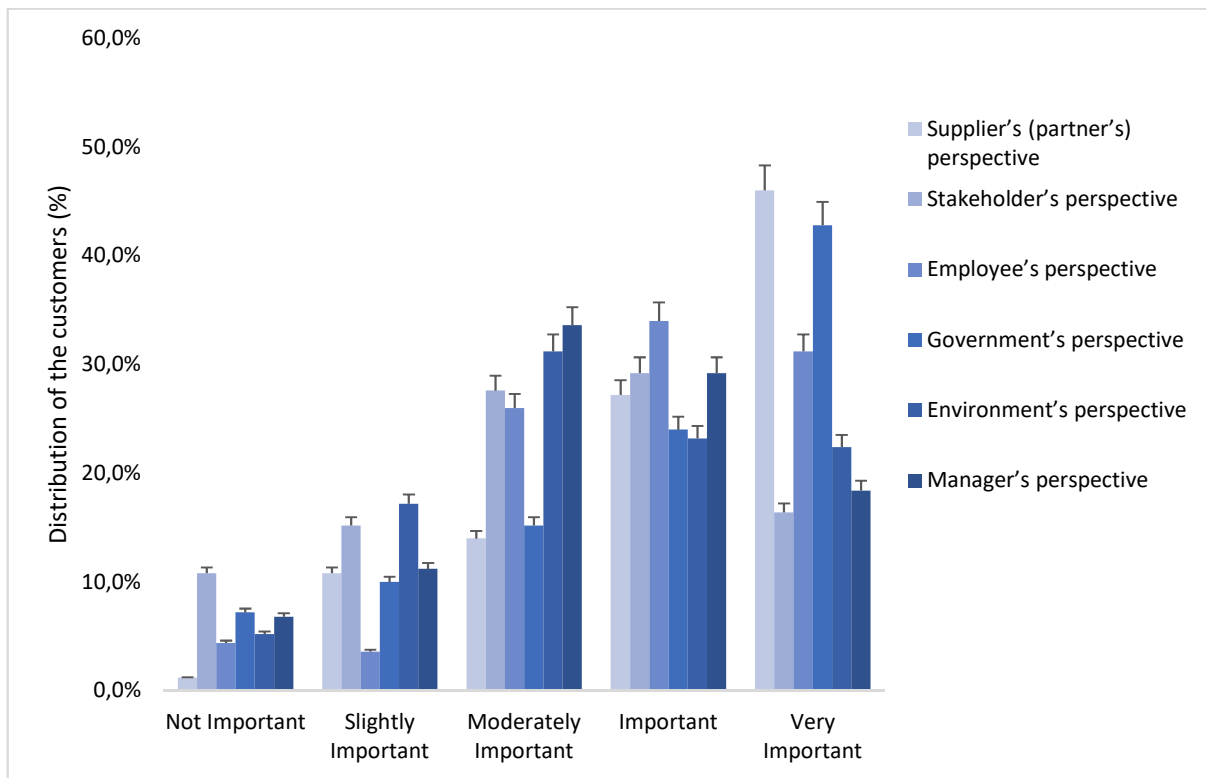
Figure 5.1. Percentage distribution of customer survey results on the importance of perspectives

Source: made by the author

Figure 24, on the other hand, represents the external risk factors that are said by the customers that should be addressed or eliminated by the enterprise because of the fears that customers' have and the chance of these risks to downhill the relationship of the customer and enterprise. Similarly, to graph 23, 248 customers were interviewed again, therefore the distribution is very broad. The maximum response was chosen to be economic risk, as 61% of customers chose that this risk is very important in their relationship with the enterprise. Error bars on the bar graph represent the percentage error that could have resulted from the factors such as faulty calculations or rounding up to three significant figures only.
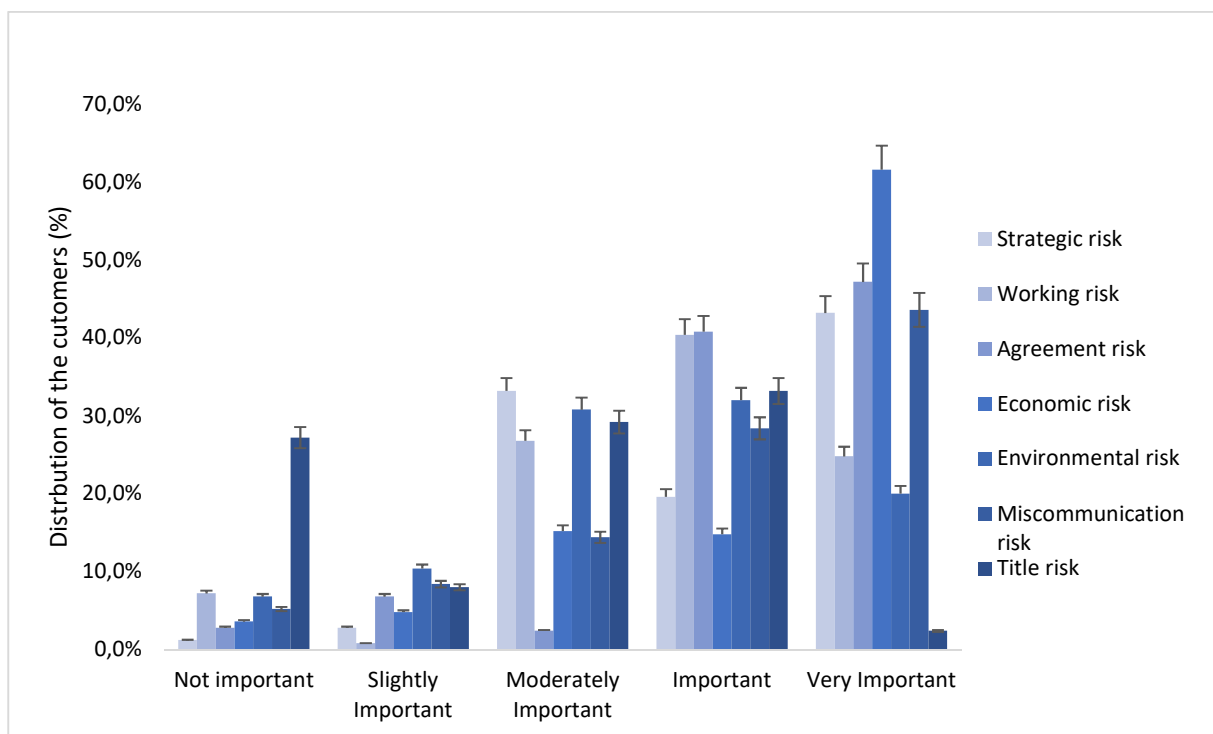
Figure 5.1. Percentage distribution of customer survey results on the importance of risk factors

Source: made by the author

Table 6.1. Expert criteria assessment and ranking according to the weight indicator system

Perspective	Index	Criterion (k)	Measurement (i_1, i_2, i_3)			Indicator weight (ωi)
Financial (m=14)	k_1	Turnover	1	1	2	0.13
	k_2	Profit	3	4	1	0.117
	k_3	Product group mark-up	5	7	6	0.085
	k_4	Profitability per employee	6	5	7	0.085
	k_5	Profit from new products	9	6	8	0.069
	k_6	Dividends	7	9	5	0.076
	k_7	Credit assessment	8	8		0.063
	k_8	Cost optimization	2	2	3	0.12
	k_9	Net profit growth	4	3	4	0.107
	k_{10}	Assessment of creditworthiness	12	11	11	0.034
	k_{11}	Debt to equity ratio	11	10	10	0.038
	k_{12}	Return on equity	10	12	12	0.031
	k_{13}	Return on capital employed	14	13	9	0.025
	k_{14}	Return on investment	13	14	13	0.012
Customer (m=10)	k_{15}	Number of customers	3	2	1	0.163
	k_{16}	Number of new clients	1	1	2	0.175
	k_{17}	Deploying new services	8	10	6	0.054

	k_{18}	Customer satisfaction	4	3	7	0.115
	k_{19}	Number of regular customers	7	6	8	0.072
	k_{20}	Number of lost customers	2	5	3	0.139
	k_{21}	Average turnover per customer	5	4	4	0.121
	k_{22}	Average customer service costs	6	7	5	0.090
	k_{23}	Contact efficiency	9	8	9	0.042
	k_{24}	Average customer group profitability	10	9	10	0.024
Prospects of internal processes (m=8)	k_{25}	Brock percentage	3	4	3	0.099
	k_{26}	Reduction of shuttle defect	1	2	4	0.099
	k_{27}	Average time to respond to customer inquiries	2	3	1	0.104
	k_{28}	Downtime	4	6	5	0.059
	k_{29}	Planning accuracy	5	1	2	0.094
	k_{30}	Increasing competitive advantage	6	7	6	0.039
	k_{31}	Stock turnover	8	8	8	0.015
	k_{32}	Maximizing business processes	7	5	7	0.039
Improvement and learning (m=9)	k_{33}	Staff turnover	1	2	3	0.087
	k_{34}	Average investment in training per employee	4	1	2	0.084
	k_{35}	Number of teaching hours	5	5	6	0.058

k_{36}	Employee satisfaction	3	4	4	0.069
k_{37}	Motivation Index	2	3	1	0.087
k_{38}	Evaluation of the effectiveness of document and knowledge management in the company	6	6	7	0.040
k_{39}	Effectiveness of employee problem solving	7	9	5	0.033
k_{40}	Efficiency of unit cooperation	8	7	9	0.022
k_{41}	Discussion of the objectives and results of the chapter	9	8	8	0.018

Source: made by the author

Financial Perspective (m = 14) calculations:

$$w_1 = \frac{(14 + 1 - 1) + (15 - 1) + (15 - 2)}{41 + 37 + 27 + 27 + 22 + 24 + 20 + 38 + 34 + 11 + 12 + 10 + 8 + 4} = \frac{41}{315} = x_1$$

$$w_2 = \frac{(14 + 1 - 3) + (15 - 4) + (15 - 1)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{37}{315}$$
$$= x_2$$

$$w_3 = \frac{(14 + 1 - 5) + (15 - 7) + (15 - 6)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{27}{315}$$
$$= x_3$$

$$w_4 = \frac{(14 + 1 - 6) + (15 - 5) + (15 - 7)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{27}{315}$$

$$= x_4$$

$$w_5 = \frac{(14 + 1 - 9) + (15 - 6) + (15 - 8)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{22}{315}$$

$$= x_5$$

$$w_6 = \frac{(14 + 1 - 7) + (15 - 9) + (15 - 5)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{24}{315}$$

$$= x_6$$

$$w_7 = \frac{(14 + 1 - 8) + (15 - 8) + (15 - 9)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{20}{315}$$

$$= x_7$$

$$w_8 = \frac{(14 + 1 - 2) + (15 - 2) + (15 - 3)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{38}{315}$$

$$= x_8$$

$$w_9 = \frac{(14 + 1 - 4) + (15 - 3) + (15 - 4)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{34}{315}$$

$$= x_9$$

$$w_{10} = \frac{(14 + 1 - 12) + (15 - 11) + (15 - 11)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{11}{315}$$

$$= x_{10}$$

$$w_{11} = \frac{(14 + 1 - 11) + (15 - 10) + (15 - 12)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{12}{315}$$

$$= x_{11}$$

$$w_{12} = \frac{(14 + 1 - 10) + (15 - 12) + (15 - 13)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{10}{315}$$

$$= x_{12}$$

$$w_{13} = \frac{(14 + 1 - 14) + (15 - 13) + (15 - 10)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{8}{315}$$

$$= x_{13}$$

$$w_{14} = \frac{(14 + 1 - 13) + (15 - 14) + (15 - 14)}{77 + 75 + 34 + 56 + 47 + 18 + 25 + 78 + 70 + 35 + 26 + 27 + 31 + 39} = \frac{4}{315}$$

$$= x_{14}$$

Customer Perspective (m = 10) calculations:

$$w_{15} = \frac{(10 + 1 - 3) + (11 - 2) + (11 - 1)}{27 + 29 + 9 + 19 + 12 + 23 + 20 + 15 + 7 + 4} = \frac{27}{165} = x_{15}$$

$$w_{16} = \frac{(10 + 1 - 1) + (11 - 1) + (11 - 2)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{29}{165} = x_16$$

$$w_{17} = \frac{(10 + 1 - 8) + (11 - 10) + (11 - 6)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{9}{165} = x_{17}$$

$$w_{18} = \frac{(10 + 1 - 4) + (11 - 3) + (11 - 7)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{19}{165} = x_{18}$$

$$w_{19} = \frac{(10 + 1 - 7) + (11 - 6) + (11 - 8)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{12}{165} = x_{19}$$

$$w_{20} = \frac{(10 + 1 - 2) + (11 - 5) + (11 - 3)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{23}{165} = x_{20}$$

$$w_{21} = \frac{(10 + 1 - 5) + (11 - 4) + (11 - 4)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{20}{165} = x_{21}$$

$$w_{22} = \frac{(10 + 1 - 6) + (11 - 7) + (11 - 5)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{15}{165} = x_{22}$$

$$w_{23} = \frac{(10 + 1 - 9) + (11 - 8) + (11 - 9)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{7}{165} = x_{23}$$

$$w_{24} = \frac{(10 + 1 - 10) + (11 - 9) + (11 - 10)}{26 + 52 + 45 + 48 + 22 + 18 + 33 + 18 + 48 + 10} = \frac{4}{165} = x_{24}$$

Prospects of internal processes (m = 8) calculations:

$$w_{25} = \frac{(8 + 1 - 3) + (9 - 4) + (9 - 3)}{13 + 37 + 22 + 34 + 20 + 38 + 38} = \frac{20}{202} = x_{25}$$

$$w_{26} = \frac{(8 + 1 - 1) + (9 - 2) + (9 - 4)}{13 + 37 + 22 + 34 + 20 + 38 + 38} = \frac{20}{202} = x_{26}$$

$$w_{27} = \frac{(8 + 1 - 2) + (9 - 3) + (9 - 1)}{13 + 37 + 22 + 34 + 20 + 38 + 38} = \frac{21}{202} = x_{27}$$

$$w_{28} = \frac{(8+1-4)+(9-6)+(9-5)}{13+37+22+34+20+38+38} = \frac{12}{202} = x_{28}$$

$$w_{29} = \frac{(8+1-5)+(9-1)+(9-2)}{13+37+22+34+20+38+38} = \frac{19}{202} = x_{29}$$

$$w_{30} = \frac{(8+1-6)+(9-7)+(9-6)}{13+37+22+34+20+38+38} = \frac{8}{202} = x_{30}$$

$$w_{31} = \frac{(8+1-8)+(9-8)+(9-8)}{13+37+22+34+20+38+38} = \frac{3}{202} = x_{31}$$

$$w_{32} = \frac{(8+1-7)+(9-5)+(9-7)}{13+37+22+34+20+38+38} = \frac{8}{202} = x_{32}$$

Improvement and Learning (m = 9) calculations:

$$w_{33} = \frac{(9+1-1)+(10-2)+(10-3)}{41+41+29+25+45+16+14+17+45} = \frac{24}{273} = x_{33}$$

$$w_{34} = \frac{(9+1-4)+(10-1)+(10-2)}{41+41+29+25+45+16+14+17+45} = \frac{23}{273} = x_{34}$$

$$w_{35} = \frac{(9+1-5)+(10-5)+(10-6)}{41+41+29+25+45+16+14+17+45} = \frac{16}{273} = x_{35}$$

$$w_{36} = \frac{(9+1-3)+(10-4)+(10-4)}{41+41+29+25+45+16+14+17+45} = \frac{19}{273} = x_{36}$$

$$w_{37} = \frac{(9+1-2)+(10-3)+(10-1)}{41+41+29+25+45+16+14+17+45} = \frac{24}{273} = x_{37}$$

$$w_{38} = \frac{(9+1-6)+(10-6)+(10-7)}{41+41+29+25+45+16+14+17+45} = \frac{11}{273} = x_{38}$$

$$w_{39} = \frac{(9+1-7)+(10-9)+(10-5)}{41+41+29+25+45+16+14+17+45} = \frac{9}{273} = x_{39}$$

$$w_{40} = \frac{(9+1-8)+(10-7)+(10-9)}{41+41+29+25+45+16+14+17+45} = \frac{6}{273} = x_{40}$$

$$w_{41} = \frac{(9+1-9)+(10-8)+(10-8)}{41+41+29+25+45+16+14+17+45} = \frac{5}{273} = x_{41}$$