An Analysis of Logistic Processes in a Chosen Company

Svetlana Hajdúková

Bachelor´s thesis
2018

Tomas Bata University in Zlín
Faculty of Humanities

Univerzita Tomáše Bati ve Zlíně
Fakulta humanitních studií
Ústav moderních jazyků a literatur
akademický rok: 2017/2018

ZADÁNÍ BAKALÁŘSKÉ PRÁCE
(PROJEKTU, UMĚLECKÉHO DÍLA, UMĚLECKÉHO VÝKONU)

Jméno a příjmení:	**Svetlana Hajdúková**
Osobní číslo:	**H15614**
Studijní program:	**B7310 Filologie**
Studijní obor:	**Anglický jazyk pro manažerskou praxi**
Forma studia:	**prezenční**

Téma práce: **Analýza logistických procesov vo vybranej spoločnosti**

Zásady pro vypracování:

Zhromaždenie odbornej literatúry k danej téme
Štúdium literatúry a formulácia východísk praktickej časti práce
Analýza logistických procesov vo vybranej spoločnosti
Vyhodnotenie analýzy
Formulácia návrhov na zlepšenie

Rozsah bakalářské práce:

Rozsah příloh:

Forma zpracování bakalářské práce: **tištěná/elektronická**

Seznam odborné literatury:

Coimbra, A. Euclides. 2013. Kaizen in Logistics and Supply Chains. New York: McGraw-Hill Education.

Gupta, Sushil, and Martin Kenneth Starr. 2014. Production and Operations Management Systems. Boca Raton: CRC Press.

Harrison, Alan, Remko I. van Hoek, and Heather Skipworth. 2014. Logistic Management and Strategy: Competing through the Supply Chain. 5th ed. Harlow: Pearson.

Macharis, Cathy, Sandra Maria de Brito Monteiro de Melo, Johan Woxenius, and Tom van Lier. 2014. Sustainable Logistics. Bingley: Emerald.

Salvendy, Gavriel. 2001. Handbook of Industrial Engineering: Technology and Operations Management. 3rd ed. New York: Wiley.

Vedoucí bakalářské práce: **Ing. Denisa Hrušecká, Ph.D.**
Ústav průmyslového inženýrství a informačních systémů

Datum zadání bakalářské práce: **10. listopadu 2017**

Termín odevzdání bakalářské práce: **4. května 2018**

Ve Zlíně dne 8. ledna 2018

L.S.

doc. Ing. Anežka Lengálová, Ph.D.
děkanka

PhDr. Katarína Nemčoková, Ph.D.
ředitelka ústavu

PROHLÁŠENÍ AUTORA BAKALÁŘSKÉ PRÁCE

Beru na vědomí, že

- odevzdáním bakalářské práce souhlasím se zveřejněním své práce podle zákona č. 111/1998 Sb. o vysokých školách a o změně a doplnění dalších zákonů (zákon o vysokých školách), ve znění pozdějších právních předpisů, bez ohledu na výsledek obhajoby [1)];
- beru na vědomí, že bakalářská práce bude uložena v elektronické podobě v univerzitním informačním systému dostupná k nahlédnutí;
- na moji bakalářskou práci se plně vztahuje zákon č. 121/2000 Sb. o právu autorském, o právech souvisejících s právem autorským a o změně některých zákonů (autorský zákon) ve znění pozdějších právních předpisů, zejm. § 35 odst. 3 [2)];
- podle § 60 [3)] odst. 1 autorského zákona má UTB ve Zlíně právo na uzavření licenční smlouvy o užití školního díla v rozsahu § 12 odst. 4 autorského zákona;
- podle § 60 [3)] odst. 2 a 3 mohu užít své dílo – bakalářskou práci - nebo poskytnout licenci k jejímu využití jen s předchozím písemným souhlasem Univerzity Tomáše Bati ve Zlíně, která je oprávněna v takovém případě ode mne požadovat přiměřený příspěvek na úhradu nákladů, které byly Univerzitou Tomáše Bati ve Zlíně na vytvoření díla vynaloženy (až do jejich skutečné výše);
- pokud bylo k vypracování bakalářské práce využito softwaru poskytnutého Univerzitou Tomáše Bati ve Zlíně nebo jinými subjekty pouze ke studijním a výzkumným účelům (tj. k nekomerčnímu využití), nelze výsledky bakalářské práce využít ke komerčním účelům.

Prohlašuji, že

- elektronická a tištěná verze bakalářské práce jsou totožné;
- na bakalářské práci jsem pracoval samostatně a použitou literaturu jsem citoval. V případě publikace výsledků budu uveden jako spoluautor.

Ve Zlíně 4. 5. 2018 ..... Hajdučová .....

1) zákon č. 111/1998 Sb. o vysokých školách a o změně a doplnění dalších zákonů (zákon o vysokých školách), ve znění pozdějších právních předpisů, § 47b Zveřejňování závěrečných prací:

(1) Vysoká škola nevýdělečně zveřejňuje disertační, diplomové, bakalářské a rigorózní práce, u kterých proběhla obhajoba, včetně posudků oponentů a výsledku obhajoby prostřednictvím databáze kvalifikačních prací, kterou spravuje. Způsob zveřejnění stanoví vnitřní předpis vysoké školy.

(2) Disertační, diplomové, bakalářské a rigorózní práce odevzdané uchazečem k obhajobě musí být též nejméně pět pracovních dnů před konáním obhajoby zveřejněny k nahlížení veřejnosti v místě určeném vnitřním předpisem vysoké školy nebo není-li tak určeno, v místě pracoviště vysoké školy, kde se má konat obhajoba práce. Každý si může ze zveřejněné práce pořizovat na své náklady výpisy, opisy nebo rozmnoženiny.
(3) Platí, že odevzdáním práce autor souhlasí se zveřejněním své práce podle tohoto zákona, bez ohledu na výsledek obhajoby.

2) zákon č. 121/2000 Sb. o právu autorském, o právech souvisejících s právem autorským a o změně některých zákonů (autorský zákon) ve znění pozdějších právních předpisů, § 35 odst. 3:
(3) Do práva autorského také nezasahuje škola nebo školské či vzdělávací zařízení, užije-li nikoli za účelem přímého nebo nepřímého hospodářského nebo obchodního prospěchu k výuce nebo k vlastní potřebě dílo vytvořené žákem nebo studentem ke splnění školních nebo studijních povinností vyplývajících z jeho právního vztahu ke škole nebo školskému či vzdělávacího zařízení (školní dílo).

3) zákon č. 121/2000 Sb. o právu autorském, o právech souvisejících s právem autorským a o změně některých zákonů (autorský zákon) ve znění pozdějších právních předpisů, § 60 Školní dílo:
(1) Škola nebo školské či vzdělávací zařízení mají za obvyklých podmínek právo na uzavření licenční smlouvy o užití školního díla (§ 35 odst. 3). Odpírá-li autor takového díla udělit svolení bez vážného důvodu, mohou se tyto osoby domáhat nahrazení chybějícího projevu jeho vůle u soudu. Ustanovení § 35 odst. 3 zůstává nedotčeno.
(2) Není-li sjednáno jinak, může autor školního díla své dílo užít či poskytnout jinému licenci, není-li to v rozporu s oprávněnými zájmy školy nebo školského či vzdělávacího zařízení.
(3) Škola nebo školské či vzdělávací zařízení jsou oprávněny požadovat, aby jim autor školního díla z výdělku jím dosaženého v souvislosti s užitím díla či poskytnutím licence podle odstavce 2 přiměřeně přispěl na úhradu nákladů, které na vytvoření díla vynaložily, a to podle okolností až do jejich skutečné výše; přitom se přihlédne k výši výdělku dosaženého školou nebo školským či vzdělávacím zařízením z užití školního díla podle odstavce 1.

ABSTRAKT

Štruktúra Bakalárskej práce pozostáva z teoretickej časti, kde je opísaná história aj definícia logistiky a zásobovacieho reťazca. Teoretická časť obsahuje definície pojmov, ktoré sú spojené s logistikou a poskytuje informácie o logistických procesoch. Druhá časť Bakalárskej práce odkazuje na zvolenú spoločnosť a vykonanú analýzu.

Táto práca sa pozerá na logistiku ako proces, ktorý poukazuje na jej využitie v organizáciách. Cieľom práce bolo objaviť lepšie spôsoby v ktorých sa logistické procesy môžu zlepšovať. Na analýzu boli použité, SWOT analýza, ABC analýza, EOQ.

Kľúčové slová: Logistika, zásobovací reťazec, logistické procesy, SWOT analýza, ABC analýza, EOQ výpočet.

ABSTRACT

The structure of the Bachelor´s thesis consist of a theoretical content, where a history and definition of logistics and supply chain is described. Theoretical part includes definitions of terms linked to the topic of logistics and provides more information about logistics processes. Second part of the Bachelor´s thesis refers to a chosen company and its analysis.

This thesis is looking into logistics as a process to show how organizations use it. The aim of the Bachelor´s thesis was to find out if there were better ways in which the logistics process can be improved. For the analysis, there were used SWOT analysis, ABC analysis, EOQ formula.

Keywords: Logistics, supply chain, logistics processes, SWOT analysis, ABC analysis, EOQ.

ACKNOWLEDGEMENTS

I would like to express my special thanks to Ing. Denisa Hrušecká, Ph. D., for her guidance and professional advices, which I appreciated and found them very useful. Secondly, I would like to thank to my parents and family, especially my mother, for their support and help.

I hereby declare that the print version of my Bachelor's thesis and the electronic version of my thesis deposited in the IS/STAG system are identical.

CONTENTS

INTRODUCTION

Logistics evolved evenly with the mankind, from the first tools and sources of livelihood to modern logistics of nowadays. (Bakešová and Křesťan 2008, 5–7) Now, logistics is embodied in every organization, where its operations deal with creating and delivering goods and services to its customers. So an organization can be viewed as taking various inputs like raw materials, people, equipment and other resources and then doing operations, such as manufacturing, transport, etc. Products passed to the customers are created outputs. (Waters 2007, 5)

The structure of the Bachelor´s thesis consists of theoretical content, where a history and definition of logistics and supply chain is described. Theoretical part includes definitions of terms linked to the topic of logistics and provides more information about levels of logistic, logistics strategies and actual trends in logistics. Logistics processes chapter covers different factors influencing suitable logistics processes for an organization. Processes, in this part of the Bachelor thesis, describes storage and warehousing, inventory, materials management and transport.

Analytical part illustrates the profile of the company and research procedures and analysis applied to provide improvement suggestions, according to findings and observations acquired. All important information and data about the company come from internal sources. A chosen company is in this Bachelor´s thesis not stated under its official name based on its request. The company represents an eligible sample of an organization where logistics processes can be researched and analyzed and student knowledge can be developed and used in practice.

In the conclusion of the Bachelor´s thesis are summarized the analysis findings and suggestions for improvements.

I. THEORY

1 LOGISTICS

Logistics is a broad term that affects us in every aspect of life. Today's logistics has been developing through the years, and its roots stem from human activity.

1.1 History of Logistics

As I mentioned above, logistics has been developing through the years. Logistics was applied in every war tactic in the form of infirmaries, supply units and also groups of blacksmiths, wheelwrights, gunsmiths who were embodied in the rear troops. Logistics predecessors arranged the whole process of building ancient temples, palaces, pyramids, and aqueducts without even knowing the term "logistics." It included supplies of slaves, like manpower, materials, tools and source of livelihood. (Bakešová and Křesťan 2008, 5–7) These supply lines were key factors in a military strategy, but its etymology derives from the Greek logistikos, meaning "skilled in calculating." (Engles 1980, 119)

The term, "logistics," was used for the first time in the book named "The Elements of the Art of War" written by Dr. William Muller. He introduced this book in the Scots Magazine, and Edinburgh Literary Miscellany in January 1810. According to lots of articles, this word has an origin in the French word "Logistique." Baron Antonine Henri de Jomini used this word in his book called The Art of War, originally published in 1862 as study material for the U.S. Army. (Benjavutr n.d.)

After the World War II. logistics was no more a military art but transformed into a civilian business science. Corporations were more focused on the cost of distribution in segments of the supply chain and costs minimization and this entailed logistics to a strategic role within the firm. This revolution and globalization propelled logistics into the omnipresent science of circulation. (Cowen 2014, 24)

1.2 Definition of Logistics

There are several definitions of logistics. I have chosen some of them to provide a general overview. Online dictionary of foreign words and phrases explained the term as "*the activity of organizing the movement, equipment, and accommodation of troops. "*or" *the commercial activity of transporting goods to customers.*" (English Oxford Living Dictionaries n.d.)

Many experts have different notions of what does the logistics concept mean. Kirsh and Rupper came up with definitions which are partially identical. They both claim the

logistics is a set of activities and tasks ensuring material and information flow in a company process. (Stehlík and Kapoun 2008, 266)

Today´s extensive technological changes have started an evolution of the logistics systems. The goal of the logistics is to be efficient, to minimize costs and make the final product match up with customer requirements. (Salvendy 2001, 2008)

Logistics also might be defined as:

"*Logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfillment of orders.*" (Christopher 2005, 4)

1.2.1 Levels of logistics

Logistics decisions are classified into three levels.

- The strategic level is concerned with long-lasting effect decisions, such as manufacturing plans, the flow of the material or capacities of a warehouse.
- The tactical level deals with decisions updated once in a quarter or once in a year. There are included purchasing and production decisions, inventories and strategies.
- The operational level includes day-to-day decisions like scheduling, directing and loading of trucks. (Salvendy 2001, 2008)

1.3 Supply chain management

The key part of the overall task of supply chain management is managing material and information flow, which is a task of logistics as was stated above. Supply chain management includes the whole process of the managing the complete chain of raw material supply, manufacture, packaging and distribution to the final customer. Definition of the supply chain can be likened to the flow of water in a river, both having its upstream, organizations near the source, and downstream, organizations near the final customer. A supply chain consists of a network of partners who collectively convert "upstream," basic commodity into "downstream," finished product. Partners are linked up together by planning and controlling all of the processes. Planning and controlling involves creating and keeping the plan that sets in an actual amount of bought, made, distributed and sold products in a certain period. (Harrison and van Hoek 2008, 7) Different processes and

activities involved in supply chain add value to the product or service. Supply chain management aims to achieve a satisfaction of the final customer in collaboration with buyers and suppliers. To avoid high-cost and low-quality products and services for the final customer in the chain, a network of partners and suppliers, who are united to achieve mutually beneficial goals, needs to be agiler and demand-driven. (Christopher 2005, 285)

1.3.1 Agile supply chain and lean production

Today´s logistics mission is to meet specific final customer needs. An agile supply chain is about focusing on end-customers rather than supply chains around a focal company. Final customer is put on first place and the supply chain is able to read and respond to his or her demand. Other components of agility are a network of partners. Viewing them as a system of *business processes* creates power and synergy. Sharing data between buyers and sellers, trough the information technology creates a virtual supply chain. These supply chains are information-based and use the internet and Electronic data interchange (EDI) to collect real data. Lean thinking stands for minimizing waste in all facets of a business. (Harrison and van Hoek 2008, 204-206) Key is to be fast, maximize quality achievements and minimize instability. Lean producers advocate minimum cycle times and prompt product development. To avoid bad scheduling and delays, time management became more important in order to reduce productivity impairing. (Gupta and Starr 2014, 69)

Agile and lean approach to logistics can be used together in any supply chain. This kind of choice is called ‘leagility’. (Harrison and von Hoek 2008, 206-207)

To compare lean and agile supply, I have chosen this chart:

Characteristic	Lean	Agile
Logistics focus	Eliminate waste	Customers and markets
Partnerships	Long-term, stable	Fluid clusters
Key measures	Output measures like productivity and cost	Measure capabilities, and focus on customer satisfaction
Process focus	Work standardisation, conformance to standards	Focus on operator self-management to maximise autonomy
Logistics planning	Stable, fixed periods	Instantaneous response

Comparison of characteristics of lean and agile supply 1

(Harrison and von Hoek 2008, 207)

1.3.2 Pull-flow principle

According to Toyota Motor Corporation, Pull-flow principle was applied to all its supply chains. The purpose is to create a flow that is pulled by customer orders. The flow represents movement of materials. Pull stands for customers purchasing products or materials. This means that in a supply chain environment everything is driven by real customer orders or consumption. (Coimbra 2013, 6)

1.4 Logistics strategies

The strategy contains set of principles and formulates a plan for the supply chain. The purpose of the strategy is to help coordinate these plans and achieve the firm's goals. (Harrison and von Hoek 2008, 26) In logistics are very important effective strategies. They are developed rationally and for efficient use of resources. (Gudehus and Kotzab 2012, 101)

Here are some short options that crafts strategies:

- Evolve strategy is not very common. This strategy usually refers to not having a strategy at all. Decisions are made regarding to actual situation, day-to-day mode. The financial goal is the primary motivation.
- Classical is the oldest one. The financial goal is again the primary motivation, but on the other hand, achievement of goals depends on planning.
- Accommodate option concerns with firm’s realities and their operating market. Decisions are back to date-to-date mode.
- Logistics strategies usually demand systemic strategy setting and realizing of goals is based on practice. It takes place through the all important parts of the business, like marketing, manufacturing and human resources. (Harrison and von Hoek 2008, 27)

1.4.1 Logistic trends

In a logistic and supply chain management, according to research and interviews are done, were revealed several trends. These represent an actual situation in a logistics and supply chain management. Trends are divided into Exogenous and Endogenous. There is a concise description of some of them.

Exogenous trends are:

- **Cost pressure**

Companies aim is to deliver orders cost-effectively. Main factors which drive them to achieve such a goal are rising logistic costs, increasing competition and higher price sensitivity.

- **Demand fluctuations**

Irregular fluctuations are harder to manage and more massive warehouses are no more a solution. Complementary logistic solutions and more flexible methods, in product or service creation, are compensation for the fluctuations.

- **Government regulations**

Government is a strong influencer and companies have to face laws and duties. These regulations determine supply chain actions.

- **Individualization**

Specific customer requirements drive demand for products and services. Companies have to be more flexible to satisfy even small individuals. Client's desires have changed as well as consumer behavior. This leads to:

- **Complexity**

A more complex demand for products, services or parts, creates dynamic and quickly developing environment. The key to managing complexity is a digitalization.

- **Staff shortages**

Shortage of qualified labor, experts and managers is the most significant challenge in logistics.

- **Risks**

Today´s age can bring many interruptions and risks into the logistics and supply chain management in a way such as cyber-attacks or global economic situation. It is important to expect and be ready to rectify failures in advance.

- **Sustainability**

This increasing trend becomes essential. Companies and entire economy should be aware of ecological and social consequences and create "greener and more social" future. (Kersten, Seiter, von See, Hackiusurer and Maurer 2017, 14-18) Part of many logistics operations are also fuel costs. Logistics sectors are already striving for improved sustainability in the form of lower CO_2 emissions resulting from lower consumption of fuel. (Macharis, Melo, Woxenius and Lier 2014, 12)

Endogenous trends are:

- **Digitalization of business processes**

These processes are hugely supported by information, communication and data exchange. The objective of digitalization is also to increase productivity.

- **Business analytics**

A current topic to achieve optimization is the analysis of logistics processes, supply chain or buying behavior of clients.

- **Supply chain transparency**

Transparency in supply chain management is one of the most important trends in logistics and digitalization creates new opportunities to reach such transparency.

- **Automation**

Human and machine interaction is a pertinent topic in the logistics system. Productivity should not be only repetitive but should increase through changing work processes of machines or software. New warehousing strategies bring new and innovative solutions, for example, a robot.

- **Networking/Collaboration**

In the last couple of years, the importance of networking increased. Companies admit the need to build networks which are flexible to changes and adjustments. Networks improve company market position and relations among partners and actors in a supply chain.

- **Decentralization**

The purpose of decentralization is to be faster and more cost-effective, for example by building of smaller warehouses in various geographical distributions. (Kersten, Seiter, von See, Hackiusurer and Maurer 2017, 14-18)

1.4.2 Components of Logistics System

Logistics system consists of many components, therefore is unlikely that one company can accomplish all the task. The main components are Customer service, Inventory management, Transportation, Storage and materials handling, Packaging, Information processing, Demand forecasting, Production planning, Purchasing. (Kumar and Shirisha 2014, 15) Some of these processes are explained in further details in the next chapter.

2 LOGISTIC PROCESSES

To ensure a business is running effectively and is reaching for its goals, suitable logistic processes are required. To develop such processes, companies should consider various requirements. Differentiating factors influencing most of the logistic operations are:

- Market segmentation: each sector may have different requirements.
- Customer types: customers may differentiate between, for example, local, national or international.
- Order type: off the shelf, partial production.

2.1 Order fulfillment

This is a typical logistic process. Customer´s order has to be received, checked, selected and delivered with no erosion or delays. (Rushton, Croucher and Baker 2014, 103-104) To be able to fulfill an order, the product or component needs to be produced and that is not possible without proper warehousing.

2.2 Storage and Warehousing

The simple definition says warehouse is "a planned space for the efficient storage and handling of goods and materials". The concept of warehousing became popular over the past decade. Companies usually use computer-based information systems to manage warehouses because it is stable and cost-effective. On the other hand, there are warehouses with a casual and unskilled workforce, using paper-based database, called field warehouses. This term refers to temporary buildings or constructions, which are not designed to be a warehouse. To keep such a warehouse in operation, employees and management team need to be active and work quickly.

Other types of warehouse space:

- Commercial: paying rent for a building.
- Transit: temporary warehouses that are usually changing locations after a short period.
- Bonded: a warehouse where goods are secured and supervised, usually by government or private company, before its export or import to another country.
- Space owned by the organization. (Logcluster 2015)

The storage facilities can differ in size, from a small store to a central warehouse.

2.2.1 Key storage activities

Material receiving and incoming inspection: While receiving a delivery, the person is visually checking packages. It is important to inspect that the right amount of products is delivered and not damaged.

Put away: In this process, the delivery is moved from the area of receiving to its right place in a warehouse. All the information should be recorded on the stock keeping record or any other inventory control system.

Picking and packing: According to picking list, products need to be pulled from inventory, packed and prepared for shipment. The whole process depends on detailed shipping requirements of a company.

Shipping: To deliver excellent shipping quality, the quantity of the delivery, transport and shipping documents need to be checked. (USAID Deliver Project 2011, 114)

2.3 Inventory and Materials management

Inventory management deals with wide range of activities related to materials. (Gupta and Starr 2014, 164) There are several methods of inventory management. For each type of material or a company, might be a different method suitable. The less conventional methods are FEFO and HIFO. The methods I am going to explain more into details are:

FIFO – The oldest received item is the first removed from the storage.

LIFO – The item received as the last one is the first removed from the storage.

JIT – This method aims to obtain a minimal amount of the inventory with the highest quality. The cooperation between supplier and client should be planned and coordinated to create no need for inventory. (Skladové Hospodárstvo 2011)

Materials management is a system of organizing and coordinating materials movements and transformations. This system is responsible for replenishment of depleted stocks. Three main types of materials that have to be purchased and managed:

1. Raw materials

Raw materials are the basic ingredients. By operations done in production processes is their value rising. Value-adding processes such as refining, processing, packaging and shipping, done in an organization, are also profit-making processes. Examples of raw materials include minded metals, chemicals, grains or natural gases.

2. Components and subassemblies

Their value is greater than raw materials because they are composed from the raw materials that already have experienced the value-adding processes. By combining them with each other or other parts made by the producer, they create the third type.

3. Work in progress

The progression of value-adding continues from raw materials, components and subassemblies to finished goods that have to be sold and shipped. (Gupta and Starr 2014, 163-164)

Reasons to carry inventory:

- Market demand: Certain items are required to be on the shelf when customers demand them. To satisfy them, distributors are forced to carry inventory on hand.
- To cover minimum run lots: To make production more economically viable, many items have to be produced in large quantities. In cases when a minimum run lot, imposed by a producer, do not meet customer requirements, the firm is still able to purchase needed inventory from its distributors. This brings advantages like lower minimum quantities, better payment conditions. A disadvantage, for such a service, might be a higher price. (Mercado 2007, 2)

2.3.1 Excess stock

In inventory management is known the term excess stock, often called overstock or stock surplus. This situation can be caused by incorrect demand forecasting and replenishment or not properly tracking the life-cycle of the product. A brief description of a product lifecycle stages is provided in the next chapter. The stage of decline best represents an excess stock. If a company does not actively monitor demand for the product in this stage, a large quantity of the product will get stuck in a warehouse due to poor reorder or replenishment. In such a case, the company can lose a small percentage of profit.

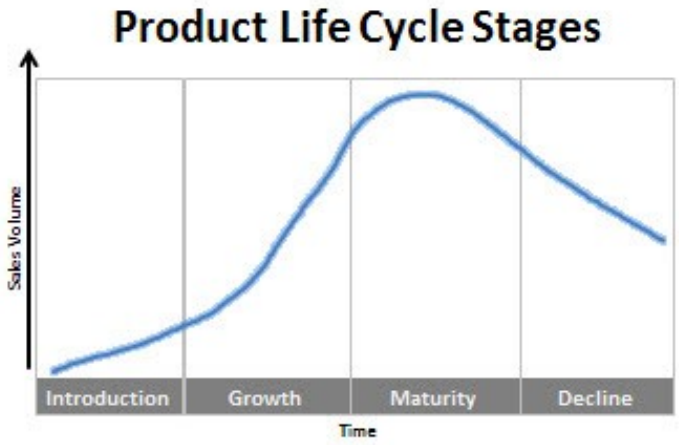
Always having inventory available brings some advantages. One of them is to be always ready to sell. When there is an inventory, the new order is easier to fulfill. The company can avoid stocks out and reduce its lead-times. On the other hand, there are also possible disadvantages. Holding high level of inventory cost money that can be used in other areas such as research or new product development and marketing. Another consequence of an excess stock is degradation or potential obsolescence of the product. (How to Deal With Excess Stock in Your Inventory 2014)

2.3.2 Insufficient inventory

Insufficient inventory can, besides the fact the company can lose profits and customers, cause production stoppage and result in delayed shipment. This leads a company to an expedited shipment that results in higher freight costs. (Mercado 2007, 5)

2.3.3 Product Life Cycle Stages

Every product has a life cycle. The demand for a newly launched product is usually higher than for older, long-established one. Each stage in a product lifecycle has a different meaning for an organization. All of them are represented in a picture below.



Product Life Cycle Stages 2 (Product Life Cycle Stages n.d.)

1. Introduction stage is a most expensive stage for a company launching a new product. Sales are low because a market for the new product is small.

2. Growth stage. In this stage, company can benefit from its increasing profit. The company can invest in products to maximize its potential.

3. Maturity stage. The product is already established and aim of the company is to maintain its position. It is initial to improve the product to increase its competitive advantage.

4. Decline stage refers to shrinkage of the market for the product. At this stage, the customers have already purchased the product or swhiched to another new product. Companies can still make a profit by changing methods or reaching a cheaper market. (Product Life Cycle Stages n.d.)

2.4 Transport

Transportation management is a backbone of the entire supply chain and a major sub-function of the logistics. Because of the long distance that usually separates the company

from its customers, the transportation is an inseparable process. Transporting affects the whole production process, from manufacturing to the delivery. The right transport system in logistics, provides the efficiency increase, reduction of operation cost and promote service quality. The main modes of transportation are:

- Rail

Railway transport is not influenced by weather conditions and has a high carrying capacity. On the other hand, essential facilities and maintenance are expensive and it takes a lot of time to organize a railway carriage.

- Road

Advantages of the road transport are high accessibility and mobility. Disadvantages are slow speed, low capacity and lower safety. Road transport can bring many problems, such as traffic jams, pollution or traffic crashes.

- Pipeline

Pipeline transport, is as railway transport, less affected by weather conditions. Other advantages are higher capacity and continuous conveyance. Disadvantages are harder supervision, expensive infrastructures and need for regular maintenance.

- Water

For on the water, transportation is used term Maritime transport. This transport can provide a cheap and high carrying capacity conveyance. Disadvantages are longer transport time, a strong influence of weather factors.

- Air

Air transportation provides the delivery with speed, flexibility, security and lower risk of damage. This type of transportation is expensive for customers. (Kumar and Shirisha 2014, 14-18)

2.4.1 Seven R's

In today´s economy, transport makes it possible to achieve a seven R's.

1. Right product

The company that knows its products and has all the important knowledge about a product can efficiently manage its time and resources.

2. Right place

The right product must be delivered to a right place. The company needs knowledgeable drivers and systematic delivery system.

3. Right price

To track company income and cover company expenses, the price must be appropriate and ample.

4. Right customer

It is essential to know your target market and understand your customer needs.

5. Right condition

To fulfill an order and meet the requirements, every product or goods must be stored and delivered with the right condition.

6. Right time

In logistics, the right time is crucial. The company has to know the right time to deliver its products and in a very effective way.

7. Right quantity

The right amount of the ordered goods is usually fixed. To be sure, the company sends the right quantity, and new modern technologies are used. (Supply Chain Management Logistics 2016)

II. ANALYSIS

3 COMPANY PROFILE

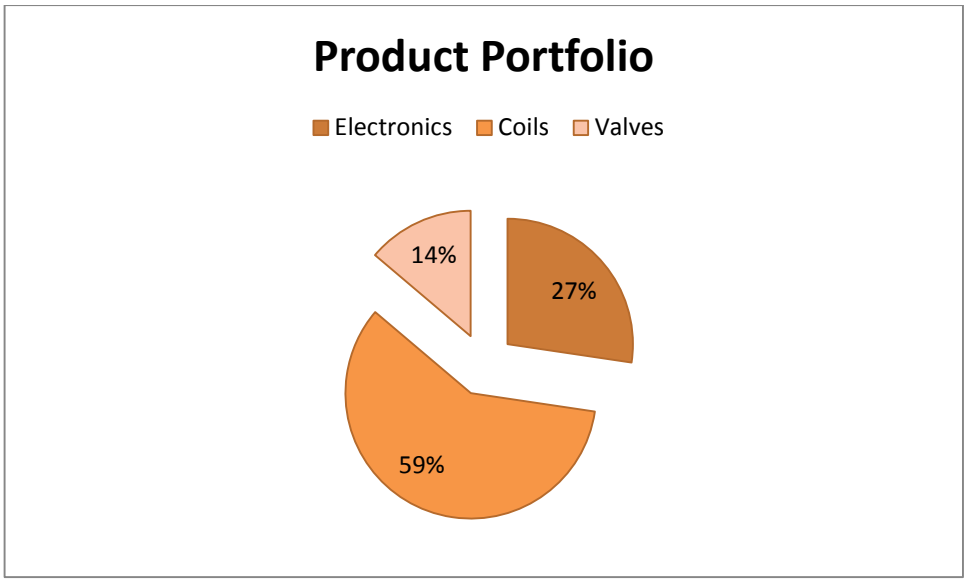
The company, I have chosen, was established in 1963. Its primary intent was to produce fixtures for a hydraulic system. The company employs more than 900 employees, has 50 subsidiaries and 500 partners all around the world. As a sales and service organization, the company provides a worldwide Fluid Controlling program using local expertise. Components and systems in electronic measurement technology, control, feedback and solenoid technology for stationary and mobile applications. Solutions for standard applications and applications with increased safety. Applications are found in mechanical engineering mobile sector energy and environmental technology offshore, shipbuilding and marine technology process technology automotive engineering. With qualified staff, engineers and technicians, the company provides custom-built solutions which are developed into products where the functionality, quality, whilst considering health & safety and environmental responsibilities, are central to its approach. Products and production processes are developed in accordance with this goal and, of course, in compliance with environmental laws, rules and regulations as well as energy efficiency. The handling and storage of products in the various production phases and during in-house transport is organized in such a way that parts and assemblies are protected from damage and the effects of the environment. The employees who are responsible for the correct handling of a product are regularly trained and instructed by the managers or supervisors. Packing, storage and shipping, including shipping inspection, are carried out according to internal guidelines and procedures if the customer has given no special instructions. The company relies on their many years of experience. A result of their strength and innovative work is a large number of patents. (Logistic officer, e-mail message, April 10, 2018)

According to online company-database, Finstat.sk, has Slovak branch of the company, in 2016, achieved these results:

- Turnover 28 077 873 €
- Profit 3 079 890 €
- Other revenue 855 553 €
- Assets 17 889 678 €
- Equity 16 305 471 €
- total indebtedness 8,86 %
- Gross margin 36,02 % (FinStat n.d.)

3.1 Product Portfolio

The basic product portfolio of the company consists of electronics, coils and valves. According to a Product Portfolio graph, electronics components stand for a major part of the production.



Product Portfolio 3 (Svetlana Hajdúková, company data 2018)

3.2 SWOT analysis

"*SWOT Analysis is a universal analytical technique focused on the evaluation of internal and external factors affecting the success of the organization*". The SWOT analysis was designed by Albert Humphrey in 1960s. (Management Mania n.d.) This analysis determines companies good and bad points. Realistic SWOT analysis should help the company to achieve its objectives and overcome obstacles to accomplish desired results.

Elements of a SWOT analysis:

- **Strengths**

Strengths of an organization are usually things that are not found in competition. These are internal factors, which are influenced by the company itself. Other internal factors are Weaknesses.

- **Weaknesses**

The areas where things need improvement. Weaknesses inhibit an organization from performing its business.

- **Opportunities**

Opportunities refer to external factors. The organization can use them to give it a competitive advantage. The next external factors are Threats.

- **Threats**

Threats have a potential to harm an organization. Other common threats can depend on state or environment, where is the company located. (Investopedia n.d.)

SWOT analysis of the company:

STRENGTHS (25%)	**WEAKNESSES (33,5%)**
years of experiences, superior products, sustainability	insufficient inventory, insufficiently qualified human resources, necessity of express delivery = high costs, fluctuation of employees
OPPORTUNITIES (16,6%)	**THREATS (25%)**
expansion of the warehouses, cooperation with universities	competition, cheap availability of technology, government regulations

SWOT analysis 1 (Svetlana Hajdúková, company data 2018)

The company is running for more than 50 years, their experiences in components and application production are indisputable. The company use materials and natural resources responsibly, in order to ensure minimal impact on the environment. This refers to an actual logistics trend of sustainability that was mentioned before. Very common and often problems are fluctuation of employees and leakage of qualified labor. This may be solved by recruiting of students from universities or by providing an internships. Insufficient inventory is caused usually by order delays. This leads the company to a situation, when an express delivery is needed and it directly increases costs.

3.3 Description of an order execution process

According to a flowchart attached to list of figures, there is a description of specific steps in an order execution process.

Placing of customer order

The logistics process of sales begins with a customer order in the SAP system. When entering an order, data such as price, a delivery date, an order number and material are important.

Ordering the necessary components for production

The saved order creates a need for SAP based on which logistics departments start ordering the components needed for production.

Placing of order into the plan

Finished production orders are based on a production plan based on SAP needs. The planning engineer in the placing of orders to the plan embraces deadlines, production capacities, faults, missing material.

Confirmation of deadline from the supplier

After receipt of an order confirmation from the supplier, this confirmation is entered into the system. It is checking the correctness of the price, quantity and date.

Delivery date and quantity approval

The logistics employee communicates with the planning department about the possible export date based on the confirmation of the input materials deliveries. In case of a change in the delivery date of input materials, the logistics employee is responsible for informing the planning department about a new delivery date.

Confirmation of order in the system

When the planning department confirms the desired deadline, the logistics employee consults the customer. After consulting the delivery date with the planning department, an order confirmation is generated in the SAP system.

Transport of input components to the receiving zone (warehouse)

The warehouseman is obligated to check whether the goods are destined for current company, if yes, they are unloaded into the revenue zone. The revenue zone serves as a temporary warehouse where the goods are waiting for further processing.

Business entrance check

Business check-up of the input material is done at first. It is necessary to check the condition of the packaging, to count the incoming material and to check the documents. The warehouseman is responsible for a business checkup.

Receipt of material to the system (warehouse)

After a business check-up, the warehouse secures the receipt of material into the SAP system. By receiving, the system generates a receipt. Upon completion of this process, the material is moved to designated locations in production halls for consumption.

Storage of materials

The FIFO method, which was briefly described in the previous chapter, applies to handling material. Storage systems are the pallet, shelf and drop shelf systems. The warehouse and

the production staff are responsible for storing goods from the receiving zone into designated production zones.

Production according to order

Based on the production plan, the planning engineer issues individual orders for the customer. They must be scheduled to be stocked in sufficient quantity and in advance of the export deadline.

Interior company transport

Semi-products are stored, according to the FIFO method, by the production workers. For storage and handling of material and packaging material are responsible storage department. Warehouse and logistics staff are responsible for ordering material.

The packaging of a finished production

Before packaging the finished product, the production worker must observe the FIFO principle. Finished production is packed by production workers.

Storage of finished product into the system

Storage of finished product into the SAP system is performed by a production worker on the basis of a production order.

Removal of finished product into the expedition zone

Finished products are stored at predetermined locations based on the FIFO principle. Finished production is ready for the expedition.

An output of production for export

An output of finished output for export is done by warehouse based on information from the SAP.

Issuance of export documents

Once the export goods are ready for export, the warehouse will issue a delivery note. This includes the dimensions, weight and number of packages.

Expedition of finished products

The expedition zone serves as a temporary warehouse for the finished product to be dispatched. On the day of export, the warehouseman is responsible for the safe loading of the cargo into the shipping company's transport.

The release of delivery notes in the system

After exporting the finished product, the logistics worker releases the delivery notes in the SAP system to remove the products from the warehouse.

Issuing an invoice

Based on released SAP delivery notes, the logistics employee issues an invoice per customer. (Warehouse manager, personal communication, March 04, 2018)

To fulfill such an order, it is vital to avoid any potential mistakes. Based on my consultations and observation, I have analyzed some of these possible mistakes that can influence the whole logistic process and I have chosen the most recent one to analyze. As I described advantages and disadvantages of an insufficient inventory in a theoretical part, the problem the company might be struggling with refers to a similar case. What influences the whole process on an order fulfillment the most, is a lead time for deliveries, due to insufficient stock. For a better understanding of a problem, lead time is a time between the new item is ordered and when it is received and able to use. (USAID Deliver Project 2011, 9) The company has set up a delivery monitoring system where stock can be controlled. In cases where on-time deliveries are not able to fulfill, the company should secure its goods and their handing by responsible care. For my improvement suggestions, I focused on the following analysis.

4 ABC ANALYSIS

ABC analysis in a technique often used in materials management. This analysis is done to help manage different items in stock that differ in value and frequency. (How to Use ABC Classification for Inventory Management 2014) The purpose of the analysis is to segregate and manage overall inventory or suppliers. These are divided into segments according to Pareto Principle. (ABC Analysis: A Critical Inventory Management Tool n.d.)

Pareto Principle was created by Italian economist in 1906. Vilfredo Pareto observed, that distribution of wealth in his country is produced only by 20% of the population. The Pareto Principle, also known as 80/20 Rule, was later applied as a useful tool in any situation. In Pareto´s case, the 20% of people owned 80% of the wealth in a country. Some other examples that refer to a Pareto Principle meaning are:

- 20% of the inputs are responsible for 80% of the outcomes.
- 80% of the revenues are attained by 20% of customers.
- 20% of the work consume 80% of the time and so on (Understanding Pareto´s Principle - The 80-20 Rule 2018)

In terms of a Pareto analysis, there are three categories in ABC analysis:

"A" category is the most important for a company. The A products are the most desired and the most frequent.

"B" creates a mid-range in inventory value and order frequency.

"C" these are only slightly frequent, usually stocked in very low quantities.

These categories represent the importance of a material for a company and the importance of monitoring specific items. (How to Use ABC Classification for Inventory Management 2014)

4.1 ABC Analysis steps

1. Collect required information (price or quality) about inventory data
2. Sort inventory from the descending order
3. Calculate accumulated impact
4. Expressed percentage-share of individual cumulative material items for total consumption
5. Find the proportion of each item in the total number of items (in %)
6. Divide items into ABC categories and make an appropriate decision (ABC Analysis: A Critical Inventory Management Tool n.d.)

According to ABC analysis steps and Pareto Principle, I have prepared and ABC analysis based on obtained data from the company, to find out, which items are the most frequent and the most important for a company. The table of my calculation is attached to my bachelor thesis. From this table, I have chosen the five most important items from the A category for further analysis.

Material	consumption/2017 (kg)	accumulation	percentage	%	category
6112355	88646,48	88646,48	0,28959655	29%	A
6112356	48092,43	136738,91	0,44670828	45%	A
605240	20665,44	157404,35	0,514219592	51%	A
605537	19357,88	176762,23	0,577459275	58%	A
605380	17542,95	194305,18	0,634769816	63%	A

ABC analysis A category 2 (Svetlana Hajdúková, company data, 2018)

Inventory management of the company depends on customers demand and is independent from other products. This kind of demand is usually random and non-conceptual which may lead to increasing costs per orders. The order quantity is even to what is needed to order, use and transport to the client. The next chapter deals with EOQ calculation where the basic prerequisite for the use of the calculation are even need for supplies and even stock replenishment. (Denisa Hrušecká, email message, April 26, 2018)

5 ECONOMIC ORDER QUANTITY

EOQ, economic order quantity, is a measurement of optimal delivery size. Logistics and supply management is using it to determine the volume and the rate of orders required to meet a given level of demand while minimizing the cost per order. (EOQ n.d.) Even if all the assumptions don't hold exactly, the EOQ gives a good indication of whether or not order quantities are reasonable. EOQ formula is also known under the name Harris- Wilson Formula

EOQ formula:

$$EOQ=\sqrt{\frac{2*D*c_p}{c_h}}$$

D - demand

c_p - cost to place a single order (€ per order)

c_h - cost to hold inventory (€ per unit) (ECONOMIC ORDER QUANTITY (EOQ) MODEL: Inventory Management Models: A Tutorial 2011)

I applied this formula on five chosen materials from the A category to measure the optimal delivery size of each product and set the ordering level of inventory. A demand for each product equals to its consumption. Average costs to place an order and costs to hold inventory are displayed in the table of my calculations.

material	consump-tion/2017 (kg) = D	c_p	c_h	EOQ per year	x times per year	every x day
6112355	88 646,48	25	0,68	2553,06	35	11
6112356	48 092,43	25	0,68	1880,50	26	14
605240	20 665,44	25	0,66	1251,22	17	22
605537	19 357,88	25	0,66	1210,10	16	23
605380	17 542,95	25	0,65	1161,70	15	24

EOQ 3 (Svetlana Hajdúková, company data, 2018)

Table of EOQ represents calculations of economic order quantity per year, based on data from 2017. Next to each result of EOQ, there are numbers that indicate how many times, per year, the EOQ is needed. This numbers calculations are based on this formula:

Consumption of the material / EOQ

The last column indicates regular intervals of EOQ in days. That means, the company will make an order of specific material every 24th day, every 23rd day and so on. This calculation was done by 365/times of EOQ per year formula.

The company has to arrange all these factors to be able to provide and deliver required products and services. In a situation where the EOQ is insufficient due to delays in delivery, the company needs a safety stock.

5.1 Safety stock

Safety stock is a great solution to prevent stock-outs. These can be caused by:

- changes in customer demand
- incorrect forecast
- instability in lead times for materials

Proper calculating of safety stock can prevent increases of stock-outs. Safety stock formula impacts the efficiency of storage space and saves costs.

Safety stock formula:

$$\sigma D * \quad Z * \quad Dt$$

σD - standard deviation

Z - desired service level (coefficient)

Dt - fluctuation of delivery time (Robinson 2016)

According to this formula, I calculated the safety stock of the company, based on the data from five A category materials. The standard deviation for each material was calculated from the internal data of the company. Desired service level, based on statistics, is usually 95%. That stands for 1,64 coefficient. Fluctuation of delivery time is in this case not existing, so the number would be 1. The interval of the company lead time is ¼ of a month. Results represent recommended number of kg in a safety stock. The company may use these results to evaluate its order quantities and prevent warehouses from stock-outs.

material	standard deviation per month	Z	Dt	safety stock per month	interval 1/4
6112355	2363	1,64	1	3876	969
6112356	948	1,64	1	1555	389
605240	548	1,64	1	899	225
605537	1262	1,64	1	2069	517
605380	788	1,64	1	1292	323

Safety Stock 4 (Svetlana Hajdúková, company data, 2018)

6 EVALUATION

ABC analysis divided company materials into three categories according to importance, value, and frequency. First five of these materials, that rank among the A category, were chosen to further analysis. I applied EOQ and Safety stock formula.

To sum up, results of the EOQ calculations show the optimal size of a delivery. That means total costs of the economic order quantity are the most efficient one.

To support my calculations, I prepared the table where I compared total costs of a chosen material with EOQ and with different order quantities. As an example, I chose the material 6112355.

material 6112355	**EOQ** (kg) per year	**lower OQ** (kg) per year	**higher OQ** (kg) per year
formula	2553,062	2000	3000
tcp=(OR/2)*cp	868,04108	680	1020
tch=x times per year*ch	868	1108,081	738,7206667
total costs	1736,08205	1788,08	1758,72

Comparison of costs 5 (Svetlana Hajdúková, company data, 2018)

Different order quantities influence the number of needed orders per year. For lower OQ 44 orders per year are needed, for higher OQ 30 orders per year. Results of total costs to place an order and total costs to hold inventory are seen in a table. This table of calculation proves the most economic order quantity has the lowest total costs. The company should be aware of this fact and may use this formula to calculate all the orders to be more economic, save money and also may invest into, for example, a warehouse expansion or better equipment and workspace environment for its employees to avoid fluctuation.

CONCLUSION

The Bachelor´s thesis defined Logistics, its history and use in a society. Terms related to the topic of logistics and terms connected to logistic strategies are explained in more details. The aim of the theoretical part of the Bachelor´s thesis was to clarify these terms and provide information about logistics processes.

The second part of the Bachelor´s thesis deals with the analysis of a chosen company. History of the company. Its main business activity provides information about the company profile. Based on research, observation and personal communication I obtained all the important facts and data about the company and its logistics activities. I analyzed external and internal factors influencing the company success in SWOT analysis. After that, I focused on the order fulfillment process of the company. The possible barriers which may cause problems in an order execution process were detected.

The further analysis was focused on the materials management and segmentation of overall inventory based on internal data of the company. ABC analysis divided materials into segments of the most important ones. According to the calculations based on examined data, results show that improvement suggestions should consist of EOQ calculation and the company should be providing a safety stock, which may prevent the company from possible delays or unsuccessful orders.

The aim of the Bachelor´s thesis was to gather professional sources about the topic, provide related information, analyze logistics processes in a chosen company and define evaluation of the analysis.

BIBLIOGRAPHY

Bakešová, Miroslava, and Vladimír Křesťan. 2008. *Základy Logistiky.* Jihlava: Vysoká škola polytechnická.

Benjavutr, Ben. n.d. "True Origin of Logistics and Supply Chain Revealed!" Accessed March 20, 2018. http://www.supplychainopz.com/2013/05/logistics.html

CFI. n.d. "EOQ." Accessed April 27, 2018. https://corporatefinanceinstitute.com/resources/knowledge/finance/what-is-eoq-formula/

Coimbra, A. Euclides. 2013. *Kaizen in Logistics and Supply Chains*. New York: McGraw-Hill Education.

Cowen, Deborah. 2014. *The Deadly Life of Logistics: Mapping the Violence of Global Trade.* Minneapolis: University of Minnesota Press.

Easy stock. 2014. "How to Deal with Excess Stock in Your Inventory." Last modified December 04, 2014. https://www.eazystock.com/blog/2014/12/04/how-to-deal-with-excess-stock/

Easy stock. 2014. "How to Use ABC Classification for Inventory Management." Last modified December 01, 2014. https://www.eazystock.com/blog/inventory-management/2014/12/01/how-to-use-abc-classification-for-inventory-management/

Engels, Donald W. 1980. *Alexander the Great and the Logistics of the Macedonian Army*. Berkeley: University of California Press.

English Oxford Living Dictionaries. n.d. "Logistics." Accessed March 20, 2018. https://en.oxforddictionaries.com/definition/logistics

FinStat. n.d. "Prehľad o firme." Accessed March 20, 2018. https://www.finstat.sk/#viac-informacii

Gudehus, Timm, and Herbert Kotzab. 2012. *Comprehensive Logistics*. 2nd ed. Berlin: Springler.

Gupta, Sushil, and Martin Kenneth Starr. 2014. *Production and Operations Management Systems*. Boca Reaton: CRC Press.

Harrison, Alan, and Remko I. van Hoek. 2008. *Logistic Management and Strategy: Competing through the Supply Chain*. 3rd ed. Harlow: Pearson.

Christopher, Martin. 2005. *Logistics and Supply Chain Management: Creating Value-adding Networks*. 3rd ed. Harlow: Pearson Education Limited.

Investomania. n.d. "SWOT analysis." Accessed April 19, 2018. https://www.investopedia.com/terms/s/swot.asp

Kersten Wolfgang, Mischa Seiter, Birgit von See, Niels Hackiusurer, and Timo Maurer. 2017. *Trends and Strategies in Logistics and Supply Chain Management – Digital Transformation Opportunities*. Translated by Caroline Woermann and Christine Anthonissen. Hamburg: DVV Media Group GmbH.

Kumar, G Santhosh, and P. Shirisha. 2014. "Transportation the Key Player In Logistics Management." *Journal of Business Management & Social Sciences Research,* No.1 (January): 14–20.

Logluster. 2015. "Warehousing and Inventory Management." Last modified August 07, 2015. http://dlca.logcluster.org/display/LOG/Warehousing+and+Inventory+Management

Macharis, Cathy, Sandra Maria de Brito Monteiro de Melo, Johan Woxenius, and Tom van Lier. 2014. *Sustainable Logistics*. Bingley: Emerald.

Management Mania. n.d. "SWOT Analysis." Accessed April 19, 2018. https://managementmania.com/en/swot-analysis

Mercado. Ed C. 2007. *Hands-On Inventory Management*. Boca Reaton: CRC Press.

Product Life Cycle Stages. n.d. "Product Life Cycle Stages." Accessed April 05, 2018. http://productlifecyclestages.com/

Purchasing and Procurement Center. n.d. "ABC Analysis: A Critical Inventory Management Tool." Accessed April 15, 2018. https://www.purchasing-procurement-center.com/abc-analysis.html

Robinson, Dominique. 2016. "How To Use a Safety Stock Formula: A Step-By-Step Guide." Uploaded June 06, 2016. https://www.skuvault.com/blog/safety-stock-formula

Rushton, Alan, Phil Croucher, and Peter Baker. 2014. *Handbook of Logistics and Distribution Management - Understanding the Supply Chain*. 5th ed. London, Philadelphia, Abu Dhabi: Kogan Page.

Salvendy, Gavriel. 2001. *Handbook of Industrial Engineering: Technology and Operations Management.* 3rd ed. New York: Wiley.

SCRC SME. 2011. "ECONOMIC ORDER QUANTITY (EOQ) MODEL: Inventory Management Models: A Tutorial." Uploaded January 28, 2011. https://scm.ncsu.edu/scm-articles/article/economic-order-quantity-eoq-model-inventory-management-models-a-tutorial

Skladové Hospodárstvo. 2011. "Metódy riadenia zásob - metóda ABC, LIFO a FIFO, Just-in-time." Last modified March 05, 2011. https://skladovehospodarstvo.webnode.sk/news/metody-riadenia-zasob-metoda-abc-lifo-a-fifo-just-in-time/

Stehlík, Antonín, and Josef Kapoun. 2008. *Logistika pro Manažery.* Praha: Ekopress

Supply Chain Management Logistics. 2016. "7 R's in Logistics Management Services." Updated June 14, 2016. http://scmlogistics.weebly.com/blog/7-rs-in-logistics-management-services

The Balance. 2018. "Understanding Pareto´s Principle - The 80-20 Rule." Updated April 12, 2018. https://www.thebalance.com/pareto-s-principle-the-80-20-rule-2275148

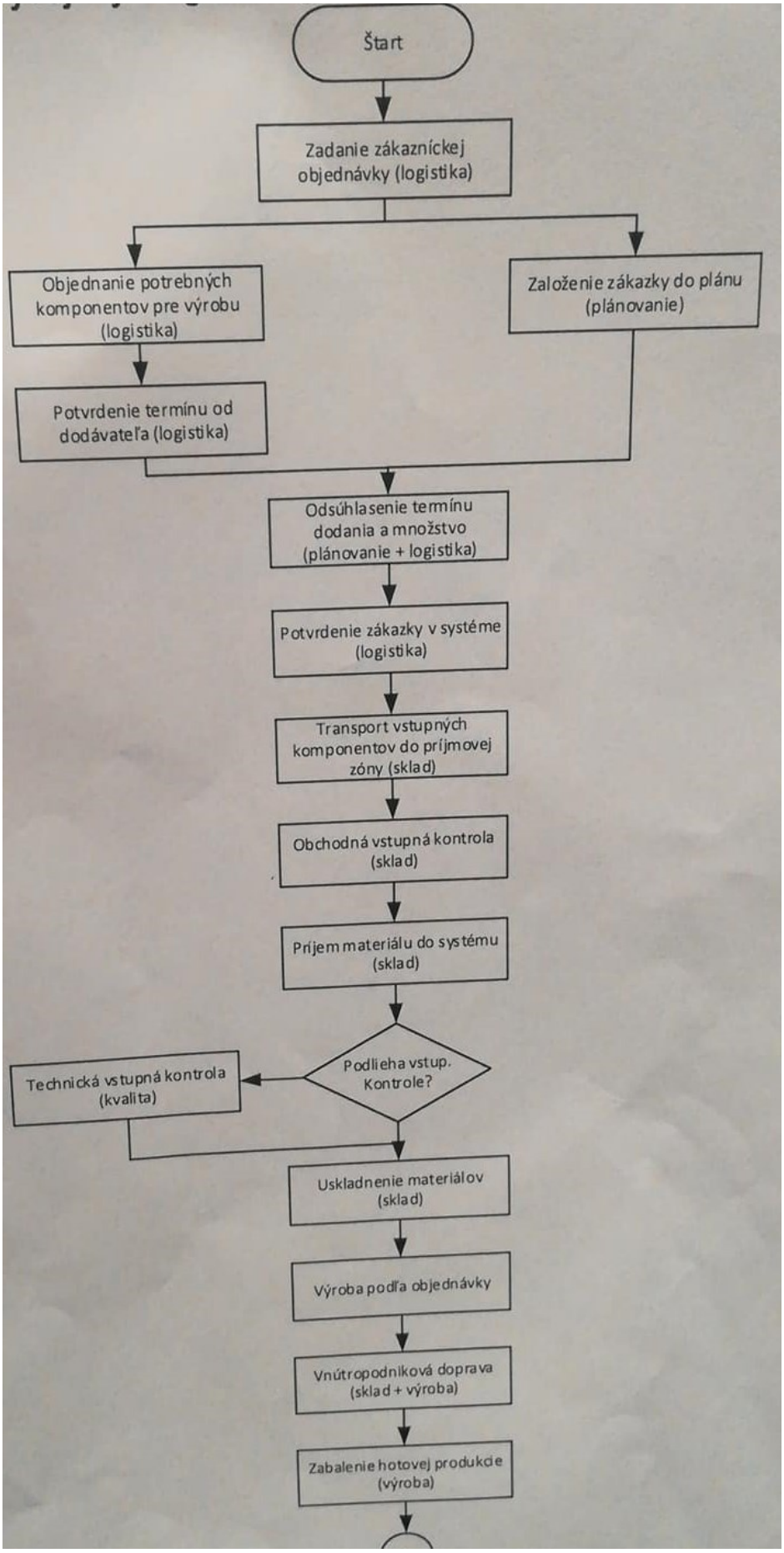
USAID | DELIVER PROJECT. 2011. *The Logistics Handbook A Practical Guide for the Supply Chain Management of Health Commodities*. 2nd ed. Arlington: USAID | DELIVER PROJECT.

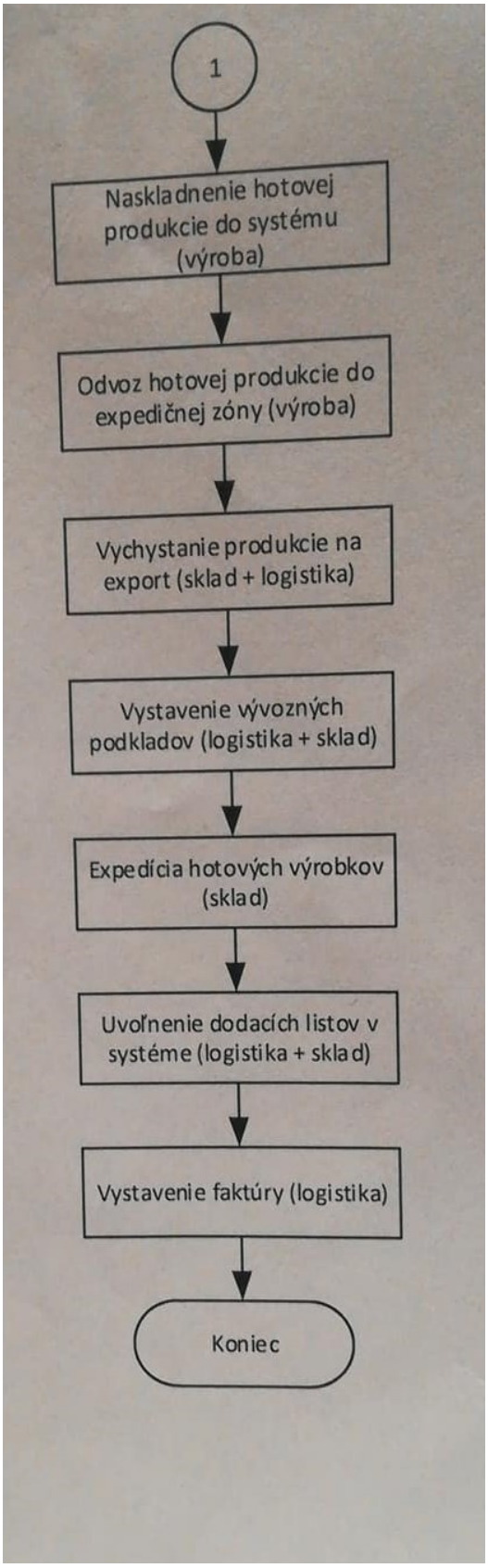
Waters, Donald. 2007. *Global Logistics: New Directions in Supply Chain Management*. 5th ed. London: Kogan Page.

Material	consumption/2017 (kg)	accumulation	percentage	%	category
6112355	88646,48	88646,48	0,28959655	29%	A
6112356	48092,43	136738,91	0,44670828	45%	A
605240	20665,44	157404,35	0,514219592	51%	A
605537	19357,88	176762,23	0,577459275	58%	A
605380	17542,95	194305,18	0,634769816	63%	A
605306	15497,8	209802,98	0,685399119	69%	A
629581	14702,04	224505,02	0,733428776	73%	A
636181	11255,83	235760,85	0,770200112	77%	A
605297	10616,47	246377,32	0,804882743	80%	B
6121219	8423,22	254800,54	0,83240031	83%	B
605199	8230,88	263031,42	0,859289527	86%	B
605295	7070,22	270101,64	0,882387018	88%	B
605291	6964,24	277065,88	0,905138287	91%	B
605242	6663,01	283728,89	0,926905476	93%	B
636442	3841,27	287570,16	0,939454407	94%	B
605313	3472,69	291042,85	0,950799235	95%	B
636711	3001,71	294044,56	0,960605432	96%	B
633737	2428,65	296473,21	0,968539517	97%	B
605230	1874,98	298348,19	0,974664833	97%	B
605273	1557,6	299905,79	0,97975331	98%	B
636734	1042,5	300948,29	0,983159022	98%	B
605358	841,8	301790,09	0,985909074	99%	C
630224	745,7	302535,79	0,988345179	99%	C
605301	672,88	303208,67	0,990543391	99%	C
605353	629,3	303837,97	0,992599232	99%	C
605232	502,47	304340,44	0,994240736	99%	C
605361	476,02	304816,46	0,995795832	100%	C
6063287	378,82	305195,28	0,997033388	100%	C
635834	217,83	305413,11	0,99774501	100%	C

605518	203,65	305616,76	0,998410308	100%	C
605315	185,38	305802,14	0,999015921	100%	C
605277	90,17	305892,31	0,999310494	100%	C
605286	51,97	305944,28	0,999480274	100%	C
633909	33,76	305978,04	0,999590563	100%	C
633679	32,77	306010,81	0,999697618	100%	C
637935	31,26	306042,07	0,999799741	100%	C
605294	27,72	306069,79	0,999890298	100%	C
605424	20,87	306090,66	0,999958478	100%	C
605351	7,7	306098,36	0,999983633	100%	C
631630	3,66	306102,02	0,99999559	100%	C
605314	1,35	306103,37	1	100%	C
sum	306103,37				

ABC analysis 6 (Svetlana Hajdúková, company data, 2018)


Štart
Zadanie zákazníckej objednávky (logistika)
Objednanie potrebných komponentov pre výrobu (logistika)
Založenie zákazky do plánu (plánovanie)
Potvrdenie termínu od dodávateľa (logistika)
Odsúhlasenie termínu dodania a množstvo (plánovanie + logistika)
Potvrdenie zákazky v systéme (logistika)
Transport vstupných komponentov do príjmovej zóny (sklad)
Obchodná vstupná kontrola (sklad)
Príjem materiálu do systému (sklad)
Podlieha vstup. Kontrole?
Technická vstupná kontrola (kvalita)
Uskladnenie materiálov (sklad)
Výroba podľa objednávky
Vnútropodniková doprava (sklad + výroba)
Zabalenie hotovej produkcie (výroba)



(Warehouse Manager, email message, March 04, 2018)

Flowchart of the Logistic process 4

List of abbreviations

FEFO – First Expired, First Out

HIFO – Highest In, First Out

FIFO – First In, First Out

LIFO – Last In, First out

ABC – An analysis that divides items into three categories, according to its turnover

EOQ – Economic order quantity

SWOT – An Analysis of strengths, weaknesses, opportunities, threats to the organization

JIT – Just In Time

LIST OF FIGURES

LIST OF TABLES