

Czech University of Life Sciences Prague
Faculty of Economics and Management
Department of Systems Engineering



Bachelor Thesis

Analysis of processes in selected company

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

Tairlan Kuralbek

Informatics

Thesis title

Analysis of processes in selected company

Objectives of thesis

The goal of the research in the bachelor's thesis is to analyze business processes in an organization and develop recommendations for their improvement.

I would also like to determine additional goals that will be solved in the process:

- to investigate the main directions of optimization of the company's business processes;
- to analyze the company's business processes;
- to develop recommendations for optimizing the company's business processes.

Methodology

The thesis will consist of two parts: Theoretical part will contain research of available methods and their evaluation with respect to the aim of the thesis solved in the second (practical) part of the thesis. The second part will consist of application of chosen method(s) onto a particular business process. This part will include a proposal of an improvement and analysis and economical assessment of proposed solutions.

The proposed extent of the thesis

30 – 40 pages

Keywords

process, business process, BPMN, UML

Recommended information sources

- ANTONUCCI, Yvonne. (2015). Business Process Management Curriculum. In J. vom Brocke & M. Rosemann (Eds.), Handbook on Business Process Management II (pp. 547-572). Springer Berlin Heidelberg.
- DUMAS, Marlon, Marsello LA ROSA, Jan MENDLING and H. A. REIJERS. Fundamentals of business process management. Second edition. Berlin: Springer, 2018. xxxii, 527. ISBN 9783662565087.
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- Handbook on business process management.. Edited by Jan Vom Brocke – Michael Rosemann. Second edition. Berlin: Springer, 2015. xvii, 727. ISBN 9783642450990.
- KRISHNAMOORTHY, Raja. A First Course in Quality Engineering: Integrating Statistical and Management Methods to Quality. Third edition. Boca Raton: Taylor & Francis, CRC Press, 2018. ISBN 978-1-4987-6420-9.

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Declaration

I declare that I have worked on my bachelor thesis titled "**Analysis of Business processes of a selected company**" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on _____

Acknowledgement:

I would like to thank my thesis supervisor for his advice and support. I appreciate the time of **Ing. Petr Burdych** spent correcting my work and directing my thoughts back on track. I am happy to study from such a great teacher, and qualified specialist as

Analysis of Business processes of a selected company.

Abstract

The bachelor thesis is devoted to the topic of “Analysis of Business processes”. Even though there are numerous studies that are devoted to business processes and its modeling. However, in reality, those models rarely meet the these high demands, leading either to an informal way of business processes that deviate from original or being too strict across all departments. In this particular research, the author covers the theoretical part with different theories that related to business processes and its procedures.

In the Empirical part, the author applies the Analytical Hierarchy process for prioritizing different criteria across all departments in the organization. The method of personal interviewing and evaluating was performed to state the criteria across such departments.

Eventually, the author evaluates the business focus with the stated criteria to assess whether the managers properly assigned each criteria among departments and based on the results, the recommendations will be provided.

Keywords: Processes, business processes, BPMN, UML.

Analýza podnikových procesů vybrané společnosti.

Abstrakt

Bakalářská práce je věnována tématu „Analýza podnikových procesů“. I když existuje řada studií, které se věnují podnikovým procesům a jejich modelování. Ve skutečnosti však tyto modely jen zřídka splňují tyto vysoké požadavky, což vede buď k neformálnímu způsobu obchodních procesů, které se odchyľují od původních, nebo jsou přísné napříč všemi odděleními. V tomto konkrétním výzkumu autor pokrývá teoretickou část různými teoriemi, které se týkají podnikových procesů a jejich postupů.

V empirické části autor aplikuje proces analytické hierarchie pro upřednostňování různých kritérií napříč všemi odděleními v organizaci. Pro stanovení kritérií napříč těmito útvary byla provedena metoda osobního dotazování a hodnocení.

Nakonec autor zhodnotí obchodní zaměření podle uvedených kritérií, aby posoudil, zda manažeři správně přiřadili jednotlivá kritéria mezi útvary a na základě výsledků budou poskytnuta doporučení.

Klíčová slova: Procesy, podnikové procesy, BPMN, UML.

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Introduction

Today's world consists of so many uncertainties where businesses try to survive in a highly competitive environment where each firm constantly improves its business processes to get customer's attention and expand its business growth. However, some companies lack resources to improve its innovative processes within the business process management (here and after BPM). The BPM has the potential to shift the focus from managing departments to business processes. It is however, highly important to overlook through the whole departments across the company and assess its effectiveness and productivity and constraints that are usually being parts of any business processes. The so-called business process model is an essential part of business strategic planning (BPM). This model is a methodical explanation of a business operations, and it often takes the shape of a list of operations. According to Ould (1995) there are three objectives that should be the focus of one's efforts while developing a business methodological framework. It is defined "modeling effort" as the amount of time, theoretical expertise, technical assistance, and partner involvement necessary to achieve the intended objective. We allocate a particular degree of simulation attempt to each goal that we want to accomplish. Below is a list of the three aims, in sequence to least amount of modeling work to most amount of modeling effort:

- Description, with the goal of helping all business stakeholders understand each other and come to an agreement about how a business should reach its goals.
- Evaluation, with goal of enhancing a company procedure to render the whole entity more efficient. Most procedure designs made because of this are capable of being measured in some manner (measuring the throughput of a production process or the average time required to complete an ordering process).
- Enactment, with goal of using IT to directly help a business operation. Process models made for this reason could be immediately run by a procedure generator, turned into a method which may be run by a device, or used as a basis for making software.

1 Objectives and Methodology

1.1 Objectives

The main objective of the thesis is to assess the importance of business processes and its different departments and how the director of a firms evaluates certain criteria towards each department. The author has focused on describing theoretical background of “Business processes” and its different theories that are applied within the scope of business processes.

1.2 Methodology

The main methodological tool is The Analytic Hierarchy Process (AHP) is a method for organizing and analyzing complex decisions, using math and psychology. The author applied the following procedures for evaluation. As a case study was taken the company “Fresh Trast” TOO, which is in Kazakhstan. The company has got 5 different departments such as:

- Accounting and Banking
- Logistic and procurement
- Warehouse
- Marketing and HR

The criteria for each department will be discussed with the Director of the company, as the author of the thesis doesn't have any detailed information regarding the company.

The final evaluation of variants is determined according to the following relationship:

Formula: 1: AHP Formula

$$H^j = \sum_{i=1}^n v_i \cdot u_i^j, j = 1, 2, \dots, m$$

Source: (Kulakowski, K., 2022)

- H^j ... is the overall evaluation of the j th variant
- v_i ... the weight of the i -th criterion
- u^{ij} ... partial evaluation of the j -th variant with respect to the i -th criterion
- n ... number of evaluation criteria
- m ... number of options

Both advantages and disadvantages are associated with the analytical hierarchy method. The convenience with which decision-makers may use it is a potential advantage. The person in charge of making the choice may communicate his preferences via the use of a verbal scale. The fact that this method may be used to solve a variety of different dilemmas involving decision-making is yet another benefit it offers. It is also essential to take into consideration the drawback, which is that it necessitates the collection of a big quantity of information.

This method will be applied in the empirical part.

2 Theoretical Part

This chapter is devoted to the theoretical background of business management process and how different methods are applied in different businesses. Yet, it accumulates different descriptions of business processes its features and other external and internal aspects that could impact the business process activities. The theoretical part is reviewed from the work of (Monashev, 2020).

2.1 Business Processes and its definition

ISO (2008)¹ defines the “business process” as a set of integrated activities that potentially transform the input into output.

(Aguilarsaven, 2004) defined “business process” as a structured set of activities that are designed to product a certain amount of output for a particular marketplace. However, he also emphasis his attention on the how the work is done within an organization, in contrast to a product. Consequently, a process is an intentional arrangement of workplace processes over time and space, with a start and a finish, and inputs and outputs that are well-defined. It is a framework for action. Processes are the framework by which a company completes the tasks required to generate advantage for its clients.

Hammer and Champy (1993) defines as a series of actions that combine several types of input with a result that the client will appreciate.

Johansson (1993) a collection of interconnected processes which turn an input into an output. A transformation that takes place during a process is ideal because it should enhance the value of the input and provide an output that is more beneficial and efficient for the recipients, perhaps upwards or downstairs.

Becker et al. (2008) defined a “business process” as a set of processes needed for producing economically valuable products that are complete in terms of content, time, and logical sequence.

^[1] ISO - (**International Organization for Standardization**) is an independent, non-governmental international organization with a membership of 167 national standards bodies.

(Johansson, Mchugh, Pendlebury, and Whilliam, 1993) describes it as a set of linked business activities that eventually lead up to a certain output. A transformation that takes place during a process is ideal because it should enhance the value of the input and provide an output that is more beneficial and efficient for the recipient, either upstream or downstream.

Thus, the “business process” is described by most scientists that consider it as “set, series, flow, collection” of activities “operations of steps”. This series of tasks is intended to convert inputs into outputs (product). Analysts acknowledge that these attributes are crucial for corporate operations.

Becker et al. (2008) claimed that “business process” should be logical and follow the process of its content with the main object for handling commercially significant things.

Robson and Ullah (1995) a process by which labor is passed from one person to another (or from one department to another).

Summarization:

“If only individuals and additional financial opportunities, such as information technology and machinery, are merged properly would a firm achieve its business goals in an efficient and effective way. Using business process management is a crucial strategy for fostering this productive teamwork” – Robson and Ullah (1995, page 153).

Several experts, nevertheless, stress that a product must be valuable to the consumer and have some value-added feature. Since business processes shall be centered towards the needs of business customer, according to Hammer (2003), "idea of business process implies that firms evaluate themselves and their work through the eyes of the client, not their own" (Hammer, 2003, p. 62). It might be understood, however, that this condition could simply apply to the effective business process. There are several examples of business processes that are not customer-focused in the papers on business process improvement by Anderson, Davenport, Harrington, Hammer, and Champy. Such reality is undoubtedly a significant disadvantage of such corporate procedures. This is the rationale behind their enhancement or potentially

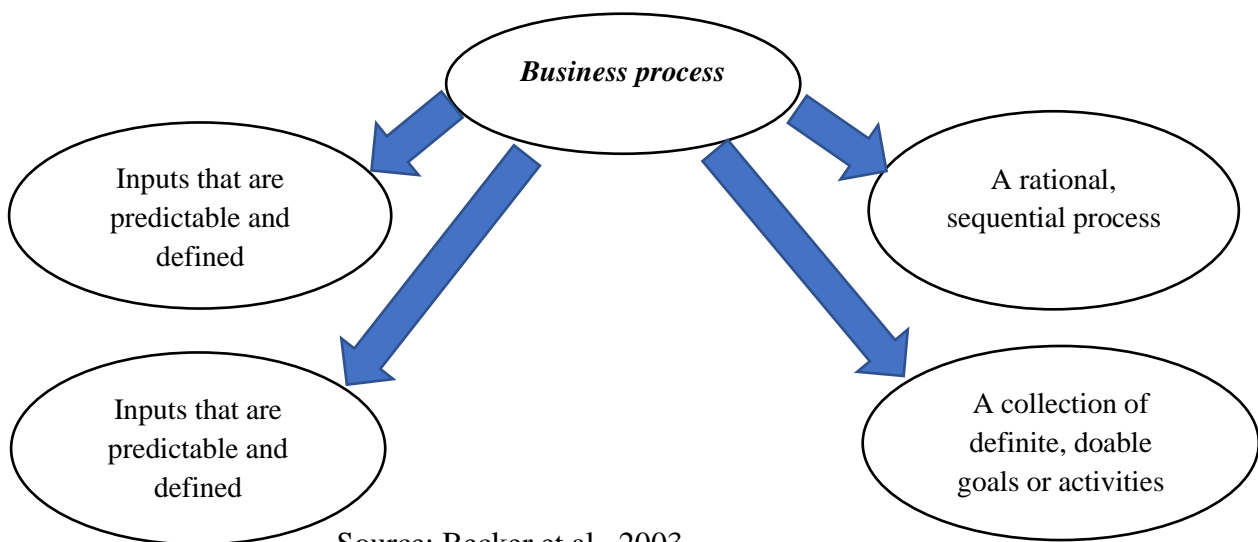
removal, but it does not imply that they are no longer considered business processes. Instead, they are the business processes that are carried out "incorrectly". Therefore, rather than agreeing that customer orientation is an essential component of the business process, we believe it to be a must.

Business processes should concentrate on two main points (ISO, 2008):

- efficiency of the process (capacity to produce intended results) and.
- method effectiveness (ratio of results achieved and resources used).

To assist the planning, organization, setting, implementation, and analysis of business activities, there are ideas, methodologies, and strategies used in business process management. The formal depiction of business processes, along with their associated activities and operational restrictions, is the cornerstone of business process management. After being defined, business processes may be examined, improved, and implemented (Weske, 2007).

Figure 1: Key features of business process



Source: Becker et al., 2003.

A study of the literature on concepts linked to business process management is the focus of this chapter (BPM). It provides an overview of BPM using its fundamental components (i.e., important effective drivers) and the BPM lifecycle's operations. Lean Six Sigma (LSS) and the Theory of Constraints are two more strategies which are used in BPM. BPM is seen as a

comprehensive operational strategy (TOC), however, that will be covered later in the following chapters.

BPM could be understood in different ways. Some managers and executives associate the BPM as a set of processes which are oriented on different techniques and tools, however, some still believe that it is fully a management concept. Authors themselves consider that middle definition of the BPM which integrates both, a set of management methodologies and the set of practices to shift business processes (Reijers, van Wijk, Mutschler, & Leurs, 2010).

2.1.1 Business process management

It an ordinary – systematic approach that businesses implement to produce goods and services, generally involving both, technological development, and human involvement.

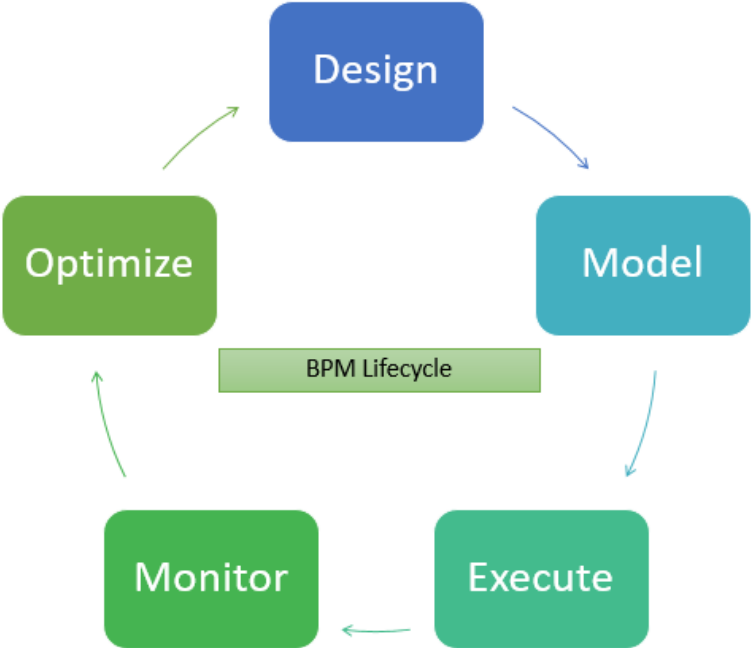
Design phase: within this phase, the business processes are defined, and the future business processes are already pre-determined. It is, however, usually uncommon when stakeholders are being involved in that phase, as business processes are set-up by internal – organization. Typically, activities, measurable outputs (such papers), responsibilities, computer systems, and necessary resources are needed to identify business processes.

Modeling phase: It results in the specific creation of a business process model through using data obtained throughout the development process. These models are often developed through sophisticated modelling software and a business process modelling standard, such as the Business Process Modeling Notation (BPMN), and then they are saved in a so-called modelling store.

Monitoring phase: whereby the effectiveness of the applied business procedures is assessed. What BPM technologies were used during the execution phase will determine the extent of the analysis. When a feature rich BPMS is utilized, operation efficiency may be measured at both the global and instance levels. Following that, this data may be combined and presented in thorough monitoring widgets, which provide managers with measurable real-world facts on the company's performance. When monitoring is conducted with this level of accuracy, economic performance monitoring known as the act of tracking a goal of its own.

Optimization phase: which takes into account the monitoring phase's results as it optimizes business operations. These improvements could prompt the redesign of current business procedures or the creation of new ones. As a result, the optimization phase may serve as the catalyst for a fresh design phase, bringing the BPM life cycle to a close, the full cycle is depicted in the **Figure – 2**.

Figure 2: BPM life cycle



Source: [theecmconsultant](http://theecmconsultant.com) (2023)

In the field of business process management, business process models are crucial. To model business processes, a variety of modelling approaches are available. Some of these approaches were created with this goal in mind while others were created before the BPM discipline and were modified for this use. Most approaches tend to be suited for one of the 3 options of process modelling, specification, analysis, and enactment—but rarely all three (Mil, H., 2010). The enormous variety of business process modelling languages has already prompted academics to try and map them all. A study conducted by et al. in particular provides a fantastic summary of these languages. We shall give a briefer introduction and simply discuss the languages that have been crucial in business process modelling. We'll cover the following languages: Flowchart,

Petri net, Integrated Definition for Function Modeling and Business Process Management Notation, Unified Modeling Language, Role Activity Diagram, event-driven process chain (Aguilarsaven, 2004).

2.2 Theories of BMP

2.2.1 Six Sigma Model

The Second World War and the subsequent Cold War became an important event for the development of industrial rationalization. After World War II, there is a large and significant collaboration in this field between American and Japanese scientists. Here it is necessary to mention the scientists Ishikawa (fishbone diagram), Taguchi (statistical methods) and especially Taiichi Ono, Shigeo Shingo and Eiji Toyoda, who were behind the creation and implementation of TPS (Toyota Production System), the direct predecessor of today's lean production, when it begins promoting the JIT (just-in-time) method. The origin of Six Sigma itself dates back to 1986, when Bill Smith introduced the concept at Motorola. Quality begins to be assessed based on measurements of standard deviations and process variability. These ideas were further passed on and processed, and in 1995 Jack Welch began to successfully implement them at General Electric.

Six Sigma is a methodology or today's possible strategy developed by Motorola. It was subsequently modified by Honeywell and General Electric. Six Sigma provides companies with opportunities to reduce error rates or other variability in their activities. The solution is based on a systematic approach that primarily uses data and facts. The outputs are largely based on the results of statistical methods. Currently, the methodology is used in all branches of industry, but also in services, and is beginning to penetrate almost the majority of commercial activities, which confirms its meaning, importance and, above all, real functionality. (Scheer and Hoffmann, 2015). Yet, they mention that the method is continuously changing and adapting to the requirements of today's industry and services. This is evidenced by the implementation of the Lean Six Sigma method in all types of industry, services and IT. Nowadays, it is becoming an inherent standard and approach of most companies.

Six Sigma, or Lean Six Sigma, went through nearly a century of development before reaching its current form. Of course, right from the start it was not Lean Six Sigma as we know it today. The beginnings of industrial rationalization are intrinsically linked to the industrial revolution and the development of workshops - manufactories. The culmination of these efforts is the launch of the first track production by Henry Ford in 1913. This operation brings revolutionary results for its time, when a car produced in this way is completed four times faster and at half the cost. Another important foundation of Lean Six Sigma was laid by Walter A. Shewhart when he introduced control charts in 1924 and then, in cooperation with Deming, introduced the so-called PDCA cycle.

Simply concluded, Six Sigma is a method of effective problem solving. By using it, the number of defective products produced, or services provided is reduced, thereby increasing not only income, but also customer satisfaction. Thus, Six Sigma identifies the causes and helps to design effective solutions.

Table 1: Lean Six Sigma - Two different disciplines

Criteria	Lean	Six Sigma
Focus	Improve system efficiency such as: <ul style="list-style-type: none"> • Improve Workflow • Stability process 	Improve process effectiveness. <ul style="list-style-type: none"> • Reduction of variation in outputs
Goal	Eliminate waste	Reduced defective outputs
Emphasis	Deliver value to customer	Quality to customer control
Some tools	Muda (Waste), Flow & Pull, Kaizen, Kanban, Value – Add Analysis, Value Stream Mapping.	Critical to Quality, Defect per Million Opportunities (DPMO), Failure Model Effects Analysis (FMEA), Pareto, Statistics.
Some shared Tools	Cause and Effect Diagrams, Process Mapping, Standardized Work, Visual Controls.	

Source: Own processing.

2.2.2 Theory of Constraints

The Theory of Constraints (TOC) was developed by Goldratt (1990) and is a managerial approach that can be applied to the development of company processes; despite the fact that Dalmaris (2007) doesn't quite count it among the Managerial Tradition methods, it seems meaningful to incorporate it into the reviewed literature. In comparison towards the "negative" goal of Business Intelligence Reengineering, part of the Managerial Culture, that seeks to restructure the whole system in order to achieve a breakout conclusion (Bhaskar, 2018), the "optimistic" goal of TOC is to make use of the program's capacity to accomplish the same degree of enhancement.

With an awareness of the fundamental relationship between the dependence and fluctuation of the system, Theory of Constraints aims to strive towards the global objective, or goal, of a system" (Youngman, 2009). The objective "to generate income today in the present as well as the future," as stated by TOC, is the primary strategic interest that is recognized by many commercial enterprises (Goldratt, 1990). This objective is affected by the following three primary metrics of TOC that were developed by Goldratt (1990):

- The rate at which the system makes money through sales is denoted by the symbol "T," which stands for "throughput."
- The total amount of money that is spent by the system to acquire items that it then plans to sell is referred to as the system's inventory (I).
- Operational Expense (OE) is the total amount of money spent by the system to convert Inventory (I) into Throughput (T) (T).

The following formulae are employed in calculating the TOC's metrics: Net Profit (NP), Return on Investment (ROI), and Productivity (P). These statistics are calculated according to the metrics that were discussed earlier: Net Profit (NP), Return on Investment (ROI), and Productivity (P).

$$NP = T - OE;$$

$$ROI = NP/I;$$

$$P = T/OE$$

Among the key tenets of the theory of constraint (TOC) has been the assumption that perhaps the performance of the overall system is equivalent to the throughput of its bottleneck (the constraint of a system), which could be either concrete (a physical constraint) or abstract (i.e., policy constraint). It indicates that the administrators of the systems need to boost the throughput in the bottleneck in order to boost the service's execution performance. **Table – 2**, outlines the methodology that executives might employ to accomplish this goal; this procedure is referred to as the Five Focusing Stages of TOC.

Table 2: The five focusing steps of the Theory of Constraints

No	Focusing Step	Description
1	Identify the system's constraint(s).	Finding the system's constraint (or constraints) can be done with the use of a variety of tools and methods, such as conducting interviews with personnel responsible for certain aspects of the system, performing a Pareto Analysis, and so on.
2	Exploit the system's constraint(s).	Neither the efficient usage of a constraint's capacity or the reduction of waste might be interpreted as an instance of exploitation of a constraint (see Lean Six Sigma).
3	Subordinate everything else to the above decision	It is essential to make certain that the subsystems operate in a manner that is subservient to the system.
4	Elevate the system's constraint(s).	To alleviate the capacity problems caused by the constraint, additional resources are being deployed along. This move, which is intended to boost throughput, also boosts inventories because it results in more investments or operational expenses.

5	Go back to step 1. Don't stop.	As soon as one limitation is removed, another one will immediately take its place. Consequently, it is necessary to run the method again.
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Source: Own processing, Excel.

Due to the fact that other models have less specifics, the one presented by Dumas et al. (2018) and shown in **Table – 3**, is regarded to be the foundation for the integrated BPM Lifecycle with the alterations that were discussed above. For the purpose of being more specific, Weske (2019) combines Analysis and Redesign into one stage called Evaluation, Saunders (2012) does not differentiate between Discovery and Redesign and combines them both into one stage called (Re)design, and combines Discovery Analysis, and Redesign into one stage called the Design stage. On the other hand, performing a more in-depth analysis of the BPM lifecycle phases in order to determine which methods are connected to each of those stages might be more effective.

Table 3:: Stages of the integrated BPM Lifecycle model

N	Stage	Description
1	Process Identification	1) Describing organizational strategy which is quite like the strategic development or “Understand Enterprise Strategy”. 2) Defining process architecture which is again the same as “Model Enterprise strategy”.
2	Process Enactment	The processes are carried out, and the pertinent data pertaining to the processes' carrying out are gathered and examined to evaluate how well the processes are doing in relation to the performance targets that are defined in KPIs.
3	Process Selection	The order of the processes is determined by prioritizing them according to the performance insights received throughout the enactment of the process. Prioritization is required to concentrate

		largely on certain processes, which will offer the best return on investment (ROI) from BPM.
4	Process Discovery	Discovering the processes that have the greatest priority, documenting those processes in process descriptions, and creating graphical as-is models using BPM-specific notations are all done utilizing a variety of different ways (e.g., BPMN).
5	Process Analysis	The processes that were previously chosen and found are analyzed in order to locate any problems that may have been missed.
6	Process Re(design)	Redesigning the process as it now stands is one way to address and resolve issues uncovered in process analysis. The revised process is represented by a model called the to-be process model, which was developed using the same methodology that was used to develop the as-is model.
7	Process Implementation	Either organizational change management or automation may be used to design and perform the necessary adjustments in order to alter the process.

Source: Own work, based on the different theories of (Rashid, O. and Ahmad, M., 2013)

Each step illustrated in **Table – 3**, is connected to the group of procedures (i.e., tools and techniques) that are outlined in more depth in the next parts of this article. The synopsis of these connections can be found in Table above, which does not cover Process Implementation due to the fact that discussing it would go beyond the purview of this thesis.

2.2.2 Identification Process

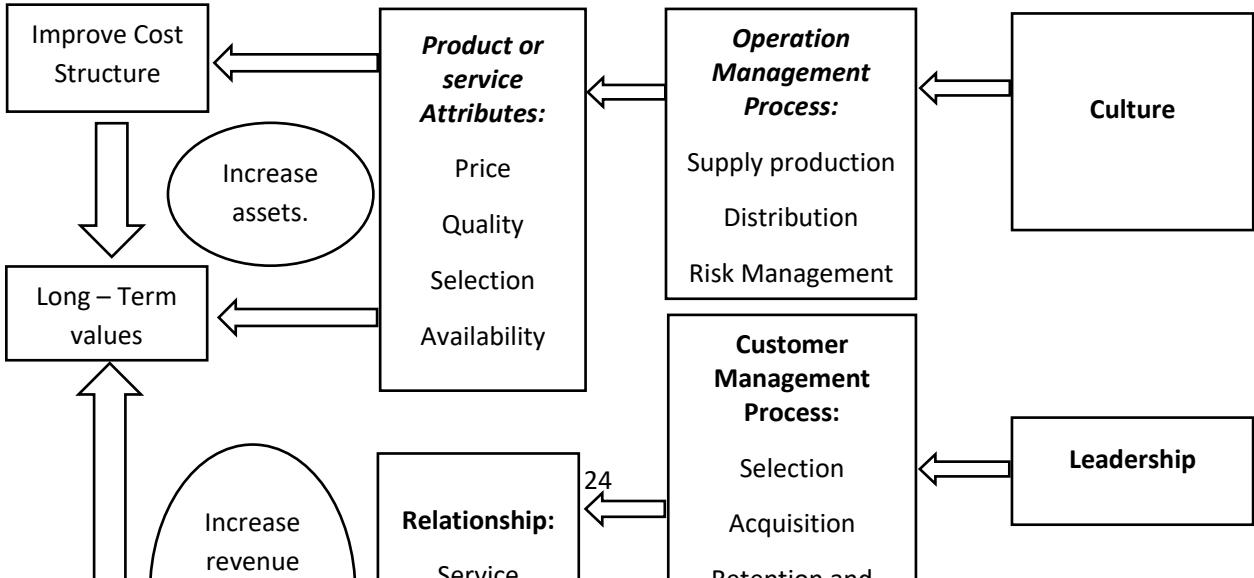
"Management methods that strive to objectively characterize the collection of business processes of a company" is how Dumas et al. (2018) described procedure identification. According to the information shown in Table 8, this stage is broken down into two subsidiary stages: (a) describing the organizational strategy, and (b) defining the process architecture.

Common methods that belong to the “*Process Identification*” are:

- Balanced Scorecard
- Porter’s Value Chain
- Reference Models

The **balanced scorecard** was originally presented to the public by Hoque (2004). It offers an explicit depiction of the approach that a business employs. The authors made the assumption that maximizing long-term shareholder value was the overarching objective of a firm. This objective was broken down into four distinct sub-objectives that were displayed visually as a "Strategy Map." As seen in Figure – 3, it incorporates four different viewpoints that are related to one another. The Learning and Growth Viewpoint takes into account the following four fundamental aspects of BPM that are covered in the paradigm developed by Rashid and Ahmad (2013) people (namely, teamwork and leadership), culture, strategic alignment, and information technology (IT). These components have an impact on the Internal Perspective, which is a representation of a combination of procedures carried out inside the company (i.e., process architecture). The processes that are part of the Internal Perspective have an effect on the Customer Perspective, including the non-financial performance measurements that correlate to particular company activities which in turn impact the monetary performance metrics that are part of the Economic Perspective.

Figure 3: Strategy Map



Source: Dumas et. al. (2018).

Porter's Value Chain:

According to Dumas et al. (2018), the **Value Chain** idea, which was established by Porter (1985), in its present condition is comprised of three categories of processes that are engaged in the generation of value for the organization. These categories are as follows:

1. Core processes include the most important aspects of value creation, which is the development of products and services that are then offered to customers.
2. The execution of the core activities is made possible by the support activities.
3. Management processes establish regulations and protocols for core and support operations.

Process Frameworks:

According to Lee & Ahn (2008) Process Frameworks, which are also known as Reference Process Models, are business intelligence models that are typically reproducible and universally applicable. These models are produced through summarizing best practices that are particular to a certain industry. Supply Chain Orientations Reference (SCOR) Model, Information

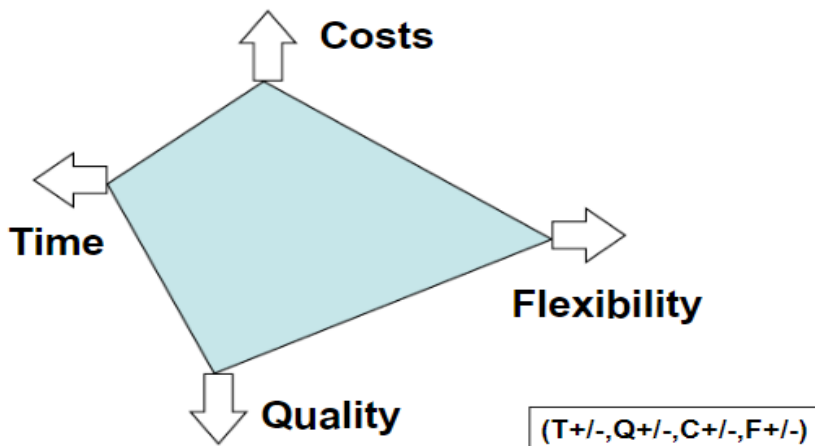
Technology Infrastructure Library (ITIL), and APQC Process Classification Framework are a few samples of referencing process models (PCF). The construction of a business process design with reference to benchmarking particular to a certain sector is the major use for these models.

2.2.4 Enactment Process

The enactment of a process is divided into two actions that occur simultaneously: process execution and process monitoring. The procedure is controlled (that is, regulated) via the use of process monitoring, and process execution is carried out in accordance with the execution process that was applied during the Process Implementation. As a result, the implementation of processes is not included in the scope of this thesis; nevertheless, a more comprehensive explanation of processes monitoring is given below. Data generated by the execution of a business process [that typically appears to take the template of a selection of occasion documents] to retrieve additional insight about the real execution of the procedure and to confirm its own consistence to standards, regulations, and rules" is the definition of what is known as "process monitoring" (Dumas et al., 2018). According to Weske (2019), monitoring is a sort of quality assurance that is associated with the measurement of performance measures. Offline process monitoring and online process monitoring are indeed the 2 techniques available for monitoring a process. Analyzing past processes executions with the use of statistics techniques and instruments is the focus of offline process monitoring. On the other hand, online process monitoring focuses on doing an analysis in real time of processes that are presently active by using process mining techniques that are connected with the IT Sector.

According to Dumas et al. (2018), there are four different productivity characteristics which come together to create the so-called "Devil's Quadrangle," which can be seen in Figure – n.

Figure 4: Devil's Quadrangle



Source: [docsity \(2023\)](#).

Time is usually related to the process of time development. According to Dumas et al. (2018), the key measures of time include cycle time, which is sometimes referred to as processing times. Another measurement of time is waiting time. "The time that it requires to process an item from start to finish is referred to as the cycle time.

Cost – usually considers two different factors such as variable costs and product costs (direct costs).

Quality measurement usually overlooks for a quality of products/services compared to the needs of potential customers.

Flexibility - measures of an organization's flexibility are utilized in order to ascertain how well it adapts to shifting circumstances.

2.2.5 Selection process

According to Dumas et al. (2018), the purpose of process selection is to pick particular business processes for the purpose of further improving them. The decision was reached since the majority of businesses do not have the resources to concurrently upgrade all of their processes. Because of this, people must restrict their attention to the aspects that are relevant. The researchers Dumas et al. (2018) proposed choosing high-priority procedures based on three factors that were assessed by experts on a numerical scale: feasibility, health, and strategic

relevance. It would make sense, however, to enhance the strategy that was suggested by the researchers and to combine the methods and instruments that are utilized in TOC and LSS in order to guarantee a greater prediction performance.

Yet, there is a possibility that this technique will result in a number of issues. To begin, estimations made by experts are very subjective and are prone to being prejudiced. For example, the deputy of finance may assign a high level of importance to the procedures that are associated with her department, but the deputy of operations may choose to focus primarily on the procedures that are associated with the manufacture of the product. Second, it would be challenging to convince executive managers to carry out such an estimation if they do not have a strong commitment to the business process management program. So, it appears appropriate to assign ranges of effort to process groups and then to execute a prioritizing within each of those groups to reduce the amount of subjectivity involved in estimating and the accompanying difficulties.

2.2.6 Process of Discovery

The act of obtaining information about either a current process or arranging it in terms of the as process is what process discovery is defined as by Dumas et al. (2018). To put it another way, the method of process discovery focuses on analyzing business operations and, as a result, developing the next process stage design. At the method investigation stage, there must be, as stated by Dumas et al. (2018), a total of four actions that need to be carried out:

- 1) Defining certain settings

To define the setting, you will need to put together the group that will be in charge of the process discovery assignment. This group will normally comprise of process analysts and domain experts. An individual that possesses a high level of BPM understanding is called a process analyst. Those who have a high level of understanding of a particular process or group of procedures are known as domain experts.

- 2) Gathering information

According to Dumas et al. (2018), there are three distinct categories of approaches to the process of acquiring information:

- (1) discovery based on evidence.
- (2) discovery based on interviews.
- (3) discovery based on workshops.

Most of these approaches originate from the human sciences (for example, conducting interviews and carrying out observations), whereas some are derived from data science (process mining).

3) Modelling the business processes

The information that was acquired in the phase before this one is utilized as an inputs inside the design of the business process. Weske (2019) describes a modeling approach as "a blueprint for a group of procedure cases with a comparable design." A process model consists of clusters (such as tasks, events, and gateways) and links that indicate the interactions between the components in the model. A business process is broken down into tasks, which are discrete chunks of work that are carried out, events, which record the occurrence of states that are important to a business process, and gateways presents points at which a judgment on the continuation of a process is made.

4) Assuring the quality of modeling

According to Dumas et al. (2018), describes three quality aspects and three actions for ensuring quality that relate to such quality parameters. Validation may be carried out inside the system that is used for process modeling (for example, Signavio²), but validation and certification need the involvement of subject matter experts.

^[2] Signavio is a provider of software for business process management (BPM), with locations in both Berlin and Silicon Valley. The Signavio Process Manager, which is a web-based business process

2.2.7 Process Analysis

Examining the process that was selected for the process discovery phase and modeled for the process selection phase is necessary to find the fundamental reasons (also known as process constraints) that impact the process performance. It is necessary to take advantage of the subsequent process analysis instruments and methods to accomplish the goals listed below:

- 1) Determine the variables that are responsible for the process and the activity.
- 2) Identify process constraints.
- 3) Confirm the connections between the underlying causes.

Value Stream Analysis, Waste Analysis, and Flow Analysis are the primary methodologies that are used to discover causative variables at the process level. On the other hand, the Ishikawa Diagram is regarded as the right instrument to find causative components at the level of activity.

Value Stream Analysis (VSA) is a technique which works in conjunction with LEAN and concentrates on studying and determining the many types of waste (i.e., actions that aren't essential) that may occur throughout the implementation of an operation. According to Zahrotun and Taufiq (2018), the operations involved in a process must be divided into three categories: value-adding (VA), business-value-adding (BVA), and non-value-adding (NVA). Operations that provide value for the client and hence cannot be discontinued cannot be classified as VA activities. Because of the laws that are already in place, which may be found in both external legislation and internal corporate policy, BVA operations are obligatory. There is a slim chance that these actions may be altered without first modifying the restrictions discussed before, which is an extremely unlikely scenario. The actions of the NVA cannot be categorized as those of the VA or the BVA. If it is practicable to do so, then solutions should be devised to eliminate these kinds of operations from the procedure.

modeling software, is the company's flagship product. SAP completed the acquisition of the company in March of 2021.

Another strategy that sees widespread use within the LSS program, *waste analysis* aims to improve the effectiveness of process execution by cutting down on the factors that contribute to inefficiency (i.e., wastes)., seven distinct forms of trash are a possibility when carrying out the procedure.

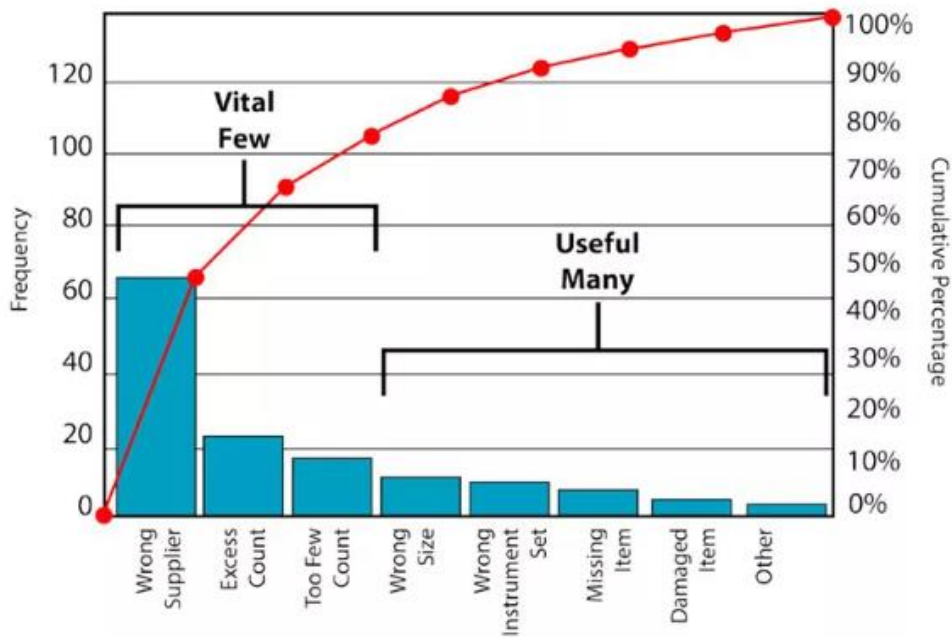
Flow analysis is "a series of approaches to estimate the overall performance of a process given some information about the performance of the performance of its jobs," as stated by Dumas et al. (2018). Several methods may be used to compute the total cycle time and cost associated with the process.

The information gleaned from the Flow Analysis may be used in conjunction with the Pareto Chart to assign priorities to the many activities that make up the process. A bottleneck activity is an action that has the greatest substantial effect and may thus be considered the most important (i.e., process constraint). To get the most out of the process redesign, a process analyst has to concentrate on finding solutions that would shorten the chosen process measure (for example, cycle time) associated with this activity. The Ishikawa Diagram, Value Stream Analysis, Waste Analysis, and Flow Analysis each identify potential causative variables, and these elements are often connected to one another. The process analyst may utilize the Present Reality Tree to determine the relationships that exist between these various parameters.

Pareto Chart

The Pareto Chart, which was shortly described above in **Table – 1** and **2**, entitled "**The five focusing steps of the Theory of Constraints**" may also be used to find the root cause of an issue and rank its contributing factors in order of importance. **Figure – 5**, displays a sample of a Pareto chart that includes a bar chart with individual causes and a curve that presents the cumulative impact of these factors on the issue that is being investigated.

Figure 5: Pareto chart



Source: [Investopedia \(2023\)](#).

2.2.8 Re(design) process

During the Process Redesign phase, the goal is to discover ways to reduce the impact of the real triggers discovered during the Process Analysis stage on the method outcome measures that have been selected (for instance, processing times), as well as to evaluate how effective the proposed solutions will be. Evaporating Cloud, also known as the Tool for Organizing and Classifying Thought (TOC thinking tool), the Theory of Inventive Problem Solving (TRIZ), Heuristic Process Redesign, and Benchmarking are examples of re - design methodologies that strive to produce the answer. It has been determined that the Future Reality Tree (also known as a TOC thinking tool) is an acceptable tool to use to evaluate the effectiveness of the suggested remedies. These techniques are broken down into even more specific steps farther down.

In their study, Dumas et al. (2018) differentiated between transformational (revolutionary) methods that aim to achieve fundamental process changes and transactional (evolutionary) methods that resolve problems identified during process analysis in an incremental manner. Transactional methods are classified as evolutionary, while transformational methods are classified as revolutionary. On the other hand, it appears more appropriate to differentiate

between changes in and of themselves. As will be seen in the following example, using redesign methodologies may assist in the development of solutions that have a variable level of effect on the process measurements. In their study, Dumas et al. (2018) differentiated between transformational (revolutionary) techniques which seek to produce basic modifications and transactional (evolutionary) techniques which resolve issues identified throughout process modeling in an incremental fashion. Transactional techniques are categorized as developmental, while impactful methodologies are classified as breakthrough. On the other hand, it appears more appropriate to differentiate between modifications in and of themselves. As will be seen in the following example, using redesign methodologies may assist in the development of solutions that have a variable level of effect on the process measurements.

To pick from both transactional and transformational adjustments to how a system operates, it appears necessary to formulate some kind of criterion first. This criterion might be seen as the stage that the industry is now at in its lifetime. According to Beer (1981), the use of innovative technology in the manufacturing chain enables businesses to make the transition from declining to rising markets (i.e., implementing fundamental process change). As a result, it is advisable to make modifications of a more gradual kind while a sector is experiencing growth. Whenever a business has achieved its pinnacle and is on the cusp of entering the decline phase, 43 on the other hand, substantial adjustments are the best course of action.

The Evaporating Cloud - is a chart of assists in finding a solution to a clash, whether that dispute is somewhere between circumstances that cannot coexist or between many options (Youngman, 2009). The concept that all disputes are caused by wrong assumptions serves as the foundation for the approach of dispute resolution. As a result, it seeks to identify the wrong expectations which contributed towards the dispute and then substitute those using correct assumptions that will help settle the issue (Goldratt, 1990).




Heuristic Process Redesign - According to Dumas et al. (2018), there will be 29 redesign heuristic that have been generated from successful program redesign projects. These heuristics enable for such an improvement in production efficiency within a few of the 4 dimensions which make up the Devil's Quadrangle (time, cost, quality, flexibility). This heuristic may be

understood in terms of the innovative concepts of TRIZ. Personalized for the commercial setting (Merging principle of TRIZ is reformulated as Activity composition heuristic).

3 Empirical part

This particular part will be devoted to the analysis of business processes and its assessment and importance based on the AHP modelling. However, first of all, the author will describe the organizational structure, its business field and employees.

Formula: 2: Information about the Company

Full name	LIMITED LIABILITY COMPANY "FRESHTRAST"
in Kazakh	"FRESHTRUST" LIMITED LIABILITY PARTNERSHIP
In English	LIMITED LIABILITY PARTNERSHIP "FRESHTRAST"
Alternative names	Limited Liability Partnership "FreshTrust", LLP "FRESHTRAST"
Status	
Address	Kostanay region, Kostanay city, Kostanay city, Kyiv street, 17/5
BIN	130140025064
Enterprise Size	Small business
Date of registration	01/31/2013 10 years 2 months
Industry	Wholesale and retail trade, car and motorcycle repair
Leaders	Voynova Julia Vladislavovna · Director Khabatkin Andrey Vladimirovich
Type of ownership	Private property
Founders	
The number of employees	51-100 people  22.02.2023
Date of last re-registration	08.05.2021
Branches	Not found

Source: [statnets \(2023\)](#)

The company mainly operates as a “Re-seller” of the different products such as (Soap, rubber, plastic, candies, chemicals, alcoholic and non-alcoholic beverages and etc). It’s operations are run in the whole Kazakhstan.

After a discussion with the executive of the company “Frest Trast”. The evaluation criteria was filled out, with the following criteria, see **Table – 4**.

Table 4: Evaluation of criteria

Highly important	Important	Medium	Unimportant	Highly unimportant
5	4	3	2	1

Source: Own processing.

Based on the evaluation criteria, the manager filled – in the following **Table – 5**, in the following way. The author only explained the meaning of the above table, the results are the following:

Table 5: Results of the evaluation

Criteria	Accounting and Banking	Logistic and Procurement	Warehouse	Marketing and HR
Cost Effectiveness	4	5	3	2
Productivity	3	5	4	4
Mobility and Availability	3	5	4	3
Customer Service	4	2	1	5
Risk Management	5	2	4	1

Source: Own processing.

Prioritization matrix:

Prioritization Matrix	Cost Effectiveness	Productivity	Mobility and Availability	Customer Service	Risk Management	Overall evaluation
Cost Effectiveness	1	7	5	3	1,00	0,35
Productivity	0,14	1,00	3,00	1	9,00	0,24
Mobility and Availability	0,20	0,33	1,00	3	0,14	0,08
Customer Service	0,33	1,00	0,33	1	0,20	0,07
Risk Management	1,00	0,11	7,00	5	1,00	0,26

Source: Own processing, Excel.

The “Cost Effectiveness” seem to be most important criteria of the “Frest Trast” company which actually make sense due to its business focus.

In the following Tables, the author, based on the filled-out criteria of the “Frest Trast” manager, managed to analyze which criteria is more relevant for a certain department.

Table 6: Cost effectiveness across departments

Cost Effectiveness	Accounting and Banking	Logistic and Procurement	Warehouse	Marketing and HR	Overall evaluation
Accounting and Banking	1	0,14	0,33	0,2	0,05
Logistic and Procurement	7	1	5	1	0,45
Warehouse	3	0,2	1	3	0,25
Marketing and HR	5	1	0,33	1	0,24

Source: Own processing, Excel.

Based on the evaluation, “**Cost effectiveness**” is important for the “**Logistic and Procurement**” department. Followed by “**Warehouse**” department and “**Marketing and HR**”.

Table 7: Productivity across departments

Productivity	Accounting and Banking	Logistic and Procurement	Warehouse	Marketing and HR	Overall evaluation
Accounting and Banking	1	0,2	0,33	1	0,10
Logistic and Procurement	5	1	1	5	0,46
Warehouse	3	1	1	1	0,29
Marketing and HR	1	0,2	1	1	0,15

Source: Own processing, Excel.

Again, based on the assessment of the “Frest Trast” manager expects from the “**Logistic and Procurement**” department the highest productivity across all departments, followed by “**Warehouse**”, which is directly linked with the “**Logistics.**”

Table 8: Mobility and Availability across departments

Mobility and Availability	Accounting and Banking	Logistic and Procurement	Warehouse	Marketing and HR	Overall evaluation
Accounting and Banking	1	0,33	0,14	0,11	0,06
Logistic and Procurement	3	1	1	5	0,36
Warehouse	7	1	1	5	0,41
Marketing and HR	9	0,2	0,2	1	0,18

Source: Own processing, Excel.

The evaluation of following criteria of “**Mobility and Availability**” stood for the potential resources which are available in a certain department. Thus, the results are that “Warehouse” is a favorite for a “**Mobility and Availability**”, followed by “**Logistics and Procurement**”.

Table 9: Customer service across departments

Customer Service	Accounting and Banking	Logistic and Procurement	Warehouse	Marketing and HR	Overall evaluation
Accounting and Banking	1	5	3	1	0,38
Logistic and Procurement	0,2	1	3	0,2	0,13
Warehouse	0,33	0,33	1	0,33	0,09
Marketing and HR	1	5	3	1	0,38

Source: Own processing, Excel.

Customer service is regarded as to, directly communicating with the customer or a potential employee. Thus, it is not a coincidence that there are two departments that are favourite in terms of “**Customer Service**” thus, the “**Accounting and Banking**” as well as “**Marketing and HR**” departments are directly involved in the customer communication.

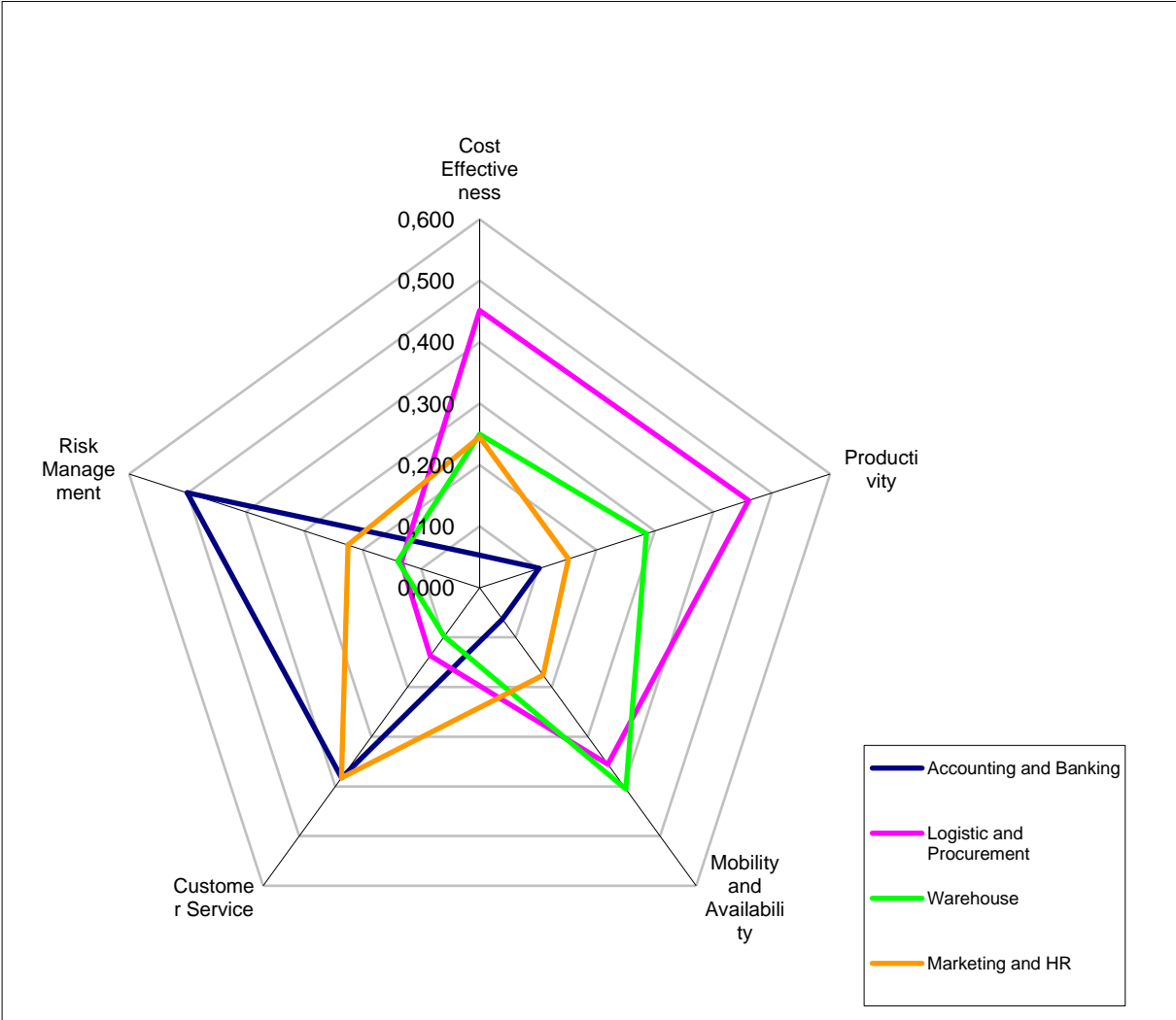
Table 10: Risk Management across departments

Risk Management	Accounting and Banking	Logistic and Procurement	Warehouse	Marketing and HR	Overall evaluation
Accounting and Banking	1	7	5	1	0,50
Logistic and Procurement	0,14	1	1	1	0,13
Warehouse	0,2	1	1	1	0,14
Marketing and HR	1	1	1	1	0,22

Source: Own processing, Excel.

The last criteria and its evaluation across departments was “**Risk Management**”. Accounting and Banking was the highest, as it is directly related to the valuable assets of the company.

Figure 6: Overall evaluation of criteria across departments.



Source: Own processing, Excel.

4 Discussion

Based on the criteria and prioritization of the managers with this criterion, the author managed to evaluate the importance of each department relating to each criterion. Due to the fact, that the business is mostly focused on retailing and distribution of goods. The “**Logistics and procurement**” seem to be winning over the following criteria:

- Productivity
- Cost efficiency

Manage the whole process of planning the buying of goods and the activities in the supply chain. This includes inventory control, logistics and distribution, and clearing customs. This is done to avoid costly delays and missed opportunities, thus, makes total sense to prioritize these two with the stated criteria above.

The following department “**Accounting and Banking**” deals with payments, transactions, and valuable assets, hence, based on the prioritization. The department wins over the following criteria:

- Risk Management
- Customer Service

Again, based on the evaluation of priorities, the manager seems to have a perfect analytical skill, when prioritizing the stated criteria across departments.

The next department of “**Warehouse**” wins over the criteria of:

- Mobility and Availability
- Productivity (2nd place)

Warehouses are places where goods are kept in order to sell them further. Warehouse’s mobility and availability is important. Mobility of the warehouse is vital for such a business scope.

The last department of “**Marketing and HR**” which mostly deals with either distributors or employees documentations, won two over two criteria, such as:

- Customer Service (2nd place)
- Risk Management

The “**Customer service**” is important for “**Marketing and HR**” as well as for “**Accounting and Banking**”.

Thus, the stated criteria, based on the manager’s decision are set properly and evaluation method of AHP has demonstrated the relations of criteria across departments.

4.1 Limitations of the study

There are, however, more employees that work within a firm and overlook different departments that have been considered within the practical part as their working duties vary on a daily basis.

The company doesn’t employ any IT specialists due to a lack of IT department. Physically, there is no need for such a small company to have one. Due to limitations of IT activities, the company only has got an “accounting” software C++, which is very easy to navigate in and usually, the system is supported via online service centre.

However, due to the lack of data, the author didn’t contain the statistical research resulting in a lack of future development and continuous growth.

4.2 Main findings

Based on the gathered prioritization matrix, see (Page – 37). The author managed to evaluate the proper importance of each criterion across all departments which function together for the past 20 years. The author’s main finding was that managers, even though do not apply any of the stated theory within the company, still do have an understanding of a proper control and priorities. Hence, the author can expect a high level of monitoring within the company for all departments.

5 Conclusion

The bachelor thesis was devoted to the topic of “Analysis of the business processes”. The whole thesis was divided into two parts. Theoretical part was mainly devoted to the “Theories of Constraints” “Six Sigma theory”. The author has highlighted the tools, which are applicable in the framework of the stated theories.

The empirical part was mainly focused on assessment of different departments. The research was rather of a theoretical nature, due to a lack of applicability above stated theories in the selected company and also due to a lack of practice above mentioned theories. The selected company which underwent the “AHP” method was a retailing company “Fresh Trast” located in Kazakhstan, Kostanaj Region.

Considering the fact that the business is mainly focused on the retailing and an IT industry is supported by external firm.

The main departments that should be constantly monitored and overlooked from the perspective of “Cost efficiency” and “Productivity” are:

- Logistics and procurement.
- Warehouse.

The “Warehouse” department should be monitored from the perspective of

- Mobility and Availability.

The “Accounting and Banking” since it directly holds main assets of the firm such as (Cash, banking accounts, checks and etc): should be overlooked from the perspective:

- Risk Management.

And both departments “Accounting and Banking” as well as “HR and Marketing” should be equally overlooked from the perspective of:

- Customer Service.

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Appendix – 1

LEVEL 1
OVERALL OBJECTIVE

LEVEL 2
GROUP CRITERIA

LEVEL 3
CRITERIA

ALTERNATIVES

