Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Management

Bachelor Thesis

Managerial Decision Making

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BACHELOR THESIS ASSIGNMENT

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Economics and Management

Thesis title

Managerial Decision Making

Objectives of thesis

The thesis aims to search for individual characteristics (formalized) decision-making methods and, put their application constraints (appropriate/inappropriate), apply some selected techniques to actual decision-making tasks.

Methodology

The theoretical part of the thesis will be processed in the form of a literature overview providing the current state of knowledge within the topic of the thesis. The literature review will represent the theoretical basis for the subsequent application part of the work, which will use adequate methods to support managerial decision making within the selected task of business practice while observing the maximum possible objectification of the output from the decision process.

The proposed extent of the thesis

40 – 60 pages

Keywords

deterministic decision making, consistency, contradiction, rational choice

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Recommended information sources

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Declaration

I declare that I have worked on my bachelor thesis titled "Managerial Decision Making" 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 take this occasion to thank the bachelor's thesis supervisor, doc. Ing. Tomáš Macák, Ph.D., for his assistance with the thesis' preparation. Additionally, I would also want to thank my family and friends for their assistance with my education.

Managerial Decision Making

Abstract

The bachelor's thesis on the topic "Methods of managerial decision-making" deals with the area of decision-making methods and their subsequent application to a specific decision-making problem from practice. In the first part, the theoretical starting points are presented, in which the topic of managerial decision-making is elaborated according to various authors. The chapters describe the levels of managers, managerial functions, management levels in the organization, managerial styles, as well as the definition of the decision-making process itself. The last chapter deals with multi-criteria decision-making, where selected decision-making methods are described.

In the practical part, the characteristics of the company are presented and the decision-making problem that the branch manager at “Jusan Bank” must solve. This is the selection of an “investment” plan for the bank to go with.

The task is solved using multi-criteria decision-making methods. The AHP method and the basic variant method are applied to the task. The results are then compared and one of the options is recommended. The company can apply a similar procedure for other selections.

Keywords: deterministic decision making, consistency, contradiction, rational choice.

Manažerské rozhodování

Abstrakt

Bakalářská práce na téma „Metody manažerského rozhodování“ se zabývá oblastí rozhodovacích metod a jejich následnou aplikací na konkrétní rozhodovací problém z praxe. V první části jsou uvedena teoretická východiska, ve kterých je zpracováno téma manažerského rozhodování podle různých autorů. V kapitolách jsou popsány úrovně manažerů, manažerské funkce, úrovně řízení v organizaci, styly řízení, ale i definice samotného rozhodovacího procesu. Poslední kapitola se zabývá vícekriteriálním rozhodováním, kde jsou popsány vybrané metody rozhodování.

V praktické části je uvedena charakteristika společnosti a problém rozhodování, který musí řešit manažer pobočky v Jusan Bank. Jedná se o výběr „investičního“ plánu pro banku.

Úloha je řešena pomocí vícekriteriálních metod rozhodování. Na úkol je aplikována metoda AHP a metoda základní varianty. Výsledky jsou poté porovnány a je doporučena jedna z možností. Obdobný postup může firma uplatnit i u dalších výběrů.

Klíčová slova: deterministické rozhodování, konzistence, rozpor, racionální volba.

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Introduction

Managers are regarded as crucial success elements in contemporary management. As part of their job, managers carry out managing duties. The effectiveness of the organization's management is also a factor in its success. A manager is a worker who actively performs management duties for which he is qualified based on election, appointment, authorization, establishment, or authorization. Controlling the job activities and resource utilization of the organization's other employees is under the purview of this set of workers.

At all levels of managerial functions, including planning, organizing, guiding, and controlling, every managerial choice is always a step in the decision-making process. The functioning of the entire business and its personnel are impacted by decisions, and the success of the business is largely influenced by the caliber of these judgements. A poor choice might cause the business to fail or possibly be liquidated. Managers can make the best choice with the aid of several decision-making techniques. Among these are multi-criteria decision-making techniques, which include the manager basing his choice on several previously established, significant to him factors. A compromise version of the solution is then discovered taking into account the provided criteria.

The bachelor's thesis' theoretical section covers fundamental ideas in decision-making. It addresses the decision-making process and its many stages, as well as explaining terms like decision-making methods and criteria that every manager considers before making a final call. It assesses the impact of information and quality on judgement. It goes over many ways to categorize decision-making issues and procedures. What part judgement and intuition play in forming decisions. The many managements decision-making processes are described, as well as how they work. The techniques include approaches to making decisions based on certainties and approaches to making decisions based on risks and uncertainties that might come along the work. The approaches merely act as a decision support tool, and the manager will always have the final say. The manager should think carefully before making a choice so that there are no unfavorable consequences, and the business is handled effectively rather than relying just on intuition to solve complicated decision-making challenges.

1. Objectives and Methodology

1.1 Objectives

The primary objectives of the bachelor's thesis are to introduce the topic of managerial decision-making and to apply various multi-criteria decision-making techniques to a particular decision-making problem, in this case, choosing the best applicant for the position of bank assistant at First Heartland Jusan. The outcomes of the chosen approaches are then compared, and an appropriate solution to the decision-making problem is suggested based on the discovery of a compromise alternative.

1.2 Methodology

There are two parts to the bachelor thesis: theoretical and practical. The theoretical portion, or literary study, is created mostly using published academic works or freely accessible online sources that address the topic of management decision-making. Management and the hierarchy of managers are defined in the first chapter of the literature study. The roles of managers and management levels in an organization are explained in the sections that follow. Other chapters discuss managers' management philosophies as well as the decision-making process itself and its many stages. The last chapter discusses multi-criteria decision-making and provides instructions on how to use particular decision-making techniques.

The practical part is based on Decision Matrix Analysis, where an enterprise will decide what types of investment is better-off for them in the future, with a certain budget available.

The author bases the research on different classification methods, such as single criteria decision making and the multi attribute decision making.

2. Theoretical Part

The chapter is devoted to the theoretical background of decision-making processes and its main essence. What is the cost of the wrong decision, and what are the further circumstances that could be, because of such decisions.

Basically, decision-making processes is seen as a core component of management theory and practice. Determining choice heuristics, decision bias, human features in the decision process, individual/collective decision making, establishing methodologies, etc. have all been important topics of research in the study of decision making in business management during the past few decades. However, it is still unclear which crucial decision-making success criteria will eventually result in superior decision-making results.

Making decisions is one of the most crucial tasks that managers conduct in the realm of management. Making decisions may be seen as both the foundation of management and a synonym for management. Some management theories categorize managing tasks into two categories. The so-called sequential management functions are included in the first group. Planning, organizing, leading others, and controlling are a few of them. All of this occurs in a certain order. Continuously performed tasks are included in the second group. Any managerial activity involves making decisions. Given that decision-making processes are at the heart of planning procedures, it is most effectively implemented during planning (Goodwin, 2014).

Fredrickson (1983) suggests in his research that there are two categories of decision-making: management and personal. What or whose interest is fulfilled, who implements the decision, and the degree of determination are only a few of the fundamental characteristics that set this division apart. The scope of the decision-making area is implied by the phrase degree of determination. There are a few things that affect its size. These are largely the decision-moral maker's standards. These are complemented by generally enforceable rules, such as legal requirements or organizational internal norms.

The science and the art of decision-making might be combined as managerial decision-making (Veber, 2000). In contrast to personal decision-making, it is essentially true that

management decision-making has repercussions that are not immediately obvious. However, huge businesses benefit most from management decision-making. They have more financial, technological, and human resources than small and medium-sized businesses to make managerial choices. Another factor is that skilled managers make choices in large businesses, whereas owners or their immediate reports frequently do so in small and medium-sized ones.

Since of the impact of all these factors, management decision-making outcomes are crucial for the business because they directly impact the effectiveness and long-term success of the organization.

2.1 Management and its hierarchy

The management is quite a wide topic to discuss and there are several explanations for this phrase, in which professionals attempt to convey its fundamental notion because the subject of management is so extensive (Goll, & Rasheed, 2005).

Management refers to a structured body of information that is generated in the form of numerous teachings and arranged in accordance with specific points of view, most of which are observed from practice. It also has connections to a few scientific fields, including sociology, psychology, and economics, which it applies to managerial situations. It is the process of planning, organizing, making decisions, communicating, inspiring, and regulating to accomplish a certain corporate goal.

The original English translation of the term “management” is administration or leadership. It might be interpreted as a team of business executives, a style of leadership, or even as a topic of investigation and study. Since the beginning of time, individuals have had to understand how to run an empire. For instance, they were assisted by advisors and officials who had to carry out their rulers' commands. We view management as a methodical, repeatable process inside the organization that aids in the accomplishment of a certain objective. It comprises of several interconnected duties that are completed by managers. Even though, the description of the “management” might differ, the meaning is still stays the same.

The management it-self consists of three different types of managers. However, the author is about to explain the term “Manager” at the first place.

2.2 Managers

The individuals who carry out management are managers. They are supervisors who are in charge of overseeing how their employees accomplish their jobs. The owner of a small firm is often the manager, but if the business grows and the owner is unable to undertake all management duties alone, the manager's role may be divided. Managers play a crucial role in today's businesses. They can be categorized into three levels according to (Pierce et el., 2022).

Picture 1: Hierarchy of management

Source: toppr.com (2023)

Top managers (top management) the highest representatives of the company (general directors, directors, board of directors, company executives). They represent the company externally, control various activities in the organization, participate in the development of the

company and create strategies to achieve the results of the company, for which they are responsible to the owners of the company.

Middle managers (middle management) oversee running factories and a variety of departments, such as human resources, accounting, and sales. They primarily engage in interpersonal contact, information gathering and dissemination, task creation and distribution to subordinates, and monitoring the execution of plans and tasks.

First-line managers (basic management) include team leaders, foremen, and foremen who operate in the healthcare industry. They are the group with the lowest management level, and they oversee and accountable for their teams (Muchena, M. and Pierce, A.R., 2022).

However, the very last phase is taken by the employees, which are not being managers yet, however, it should be noted as a part of the management process. This is the fact that employees also make their small (minor-decisions) daily, which eventually leads to a certain outcome (Morgan, 2017).

Each manager should sustain the rule of 4E's, which is responsible for the quality of his/her work, those are: (Robbins, S.P and Mary, K., 2004)

- Efficiency
- Effectiveness
- Economy
- Equity

2.2.1 The structure of decision processes

We might think of the framework of decision-making processes as a manual on how to solve decision-making issues, which might help to minimize any decision-making shortcomings that may arise in actual practice. Managers may ease the decision-making process, nevertheless, by applying the 14 solutions carefully, that is, rationally, methodically, and analytically, assessing each sub-process (phase), and accurately executing judgements.

Organizations that are more successful than others typically have better decision-making capabilities. As a result, the direction (structure) of the decision-making process will be covered in this section (Fredrickson, J. W., 1983)

2.2.1.1 Phases of the decision making

There are several methods to break the decision-making process down into steps (Levitin, 2015). To break it down, the decision-making process into a limited number of phases, it may be described in a greater depth if one can differentiate a bigger number of sub-components or more aggregates. Levitin's method is an illustration of a more aggregated breakdown. He separates the decision-making process into four phases:

1. Surrounding analysis - it includes understanding decision-making issues and their causes, as well as learning the circumstances that lead to the need to make decisions.
2. Suggested solution - centered on identifying, developing, and analyzing possible opportunities for activity, or a proper solution option.
3. Choice solution - pertaining to the examination of alternative activity courses that were offered in the preceding sub-process, which concludes with the selection of the alternative that will be put into practice.
4. Evaluation of the outcome - is oriented towards the evaluation of the realistically achieved results of the implemented variant of the solution and their assessment in relation to predetermined goals. The results found within this sub-sub-process can then initiate a new decision-making process.

2.2.1.2 More detailed breakdown of decision-making processes

(a) Identification of a problem

In this chapter, the author discusses about the stage's objectives and how to gather, examine, and assess data on the firm and its surroundings. As a consequence, the situations that need to be handled in order to start the decision-making process.

(b) Analysis and formulation of a problem

In this phase, it is necessary:

- describe the problem and formulate it.
- set goals.
- main page specifications and problem factors
- determine the causes of the problem.
- make a final formulation of the problem.

(c) Determination of variant evaluation criteria

The creation of the assessment criteria is a requirement for the evaluation of variations and the selection of the variant intended for implementation. These criteria represent the decision-points makers of view and are used to evaluate each variant's benefits in terms of accomplishing the predetermined goals (Morgan, J., 2017). The judging standards may be either:

Quantitative: quantitative standards, their values are presented in numbers (usually economic and financial criteria of indicator type, such as profit, profitability, liquidity, etc.)

Qualitative: The effects of variations with respect to qualitative criteria can only be conveyed orally because they cannot be expressed statistically or numerically. A decision problem's evaluation criteria must adhere to specific guidelines. They mostly include a **completeness** (the set of criteria should allow for the assessment and evaluation of all ramifications of the variations, both direct and indirect, positive, and negative); absence of redundancy (each aspect should be evaluated only once).

(d) Creation of solution variants (decision variants)

The development of alternative decision-making processes (variants of decision-making) is a step that places great demands on the problem-solvers' creative faculties. Therefore, the focus should be on processing the broadest range of conceptually distinct variations. Only one option can be chosen from a list of variants to be used as the implementation variant. The use of cooperation and group decision-making (using several employees with various professional

orientations with information technology, etc.) can enhance variability in decision-making situations, which results in the use of various viewpoints and problem-solving methodologies.

(e) Determining the consequences of variants

The examination of the effects of individual alternatives forms the basis for the later evaluation and selection of a potential variant, making the process of evaluating the effects of variants itself crucial. Each alternative is compared in relation to a defined objective. Combining different versions is permitted if the choice issue is sufficiently difficult.

(f) Evaluation of consequences and choice of variant

Choosing a solution variation that best achieves the solution's goals is the goal of this step. Typically, there are two phases to the variation evaluation process. In the first stage, unacceptable variants—those that do not satisfy some of the goals of addressing the decision-making issue or that go beyond some restriction conditions—are removed. The determination of the overall most advantageous (optimal) variant or the so-called preferential arrangement of the variants, i.e., their ranking according to the overall advantage from the best variant to the worst variant, is the outcome of the second phase's assessment of the overall advantage of the permissible variants.

(g) The realization of the chosen method

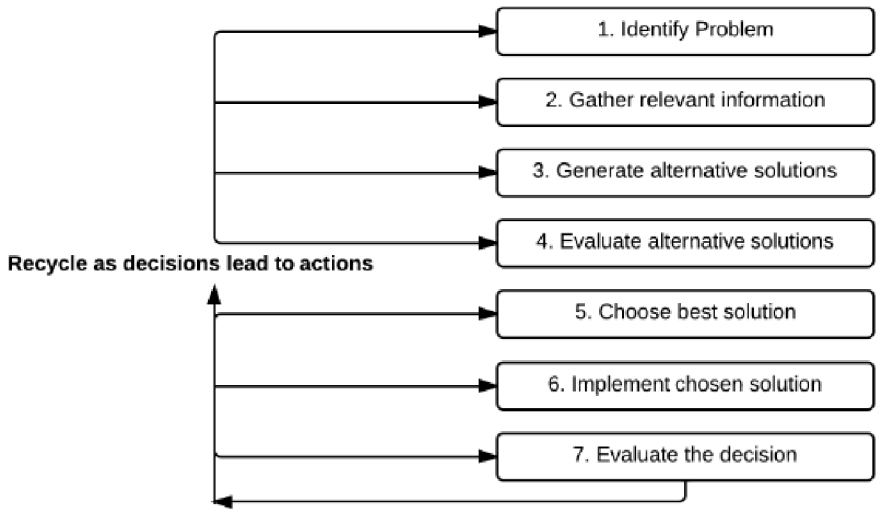
During this stage, the real evaluation of each variant's effects in relation to the previously decided criteria takes place. The findings for all variations are generated based on this evaluation, and based on these results, the final step of the decision-making process—the choice of an appropriate variant—takes place. Working within the parameters of the defined criteria is crucial at this point. Criteria serve as gauges for reaching a certain objective. There may be only one criterion present in some situations (for well-structured issues), but more than one set of criteria is almost always present.

(h) The checking of the results

Examining the outcomes entails identifying the variations between the implementation results that were actually obtained and the desired outcomes. It also entails assessing whether the issue still exists or if new issues have not emerged after the execution of the selected version. Corrective actions must be taken if there are major variances.

A decision as its known, is about choosing the right solution between alternatives that create a desired outcome (Bratton, 2007). Thus, Bratton illustrated the cycle where actions are led by decisions.

Figure 1: The model of rational decision



Source: Adopted from (Bratton, 2007, p. 347)

2.3 Factors effecting the decisions.

There are many factors that could potentially impact the direction of decisions. According to reports, the climate has a significant impact on managers and their SDMP and may even play a crucial role in specific situations (Zain & Kassim, 2012).

2.3.1 Internal

Khairullah & Khairullah (2013) assert that when it comes to workers who still make choices but on a semi level, the internal environment has a significant impact on management and their SDMP. Even if they have more expertise than a manager or somebody in a higher position, these people often have less authority and would "follow the leader" rather than express their viewpoint about a choice (Khairullah & Khairullah, 2013). According to Hough & White (2003), the decision-makers of the company influence and occasionally even create the internal environment. According to Zain & Kassim (2012), employees will produce more creative work and perform better when they work in a creative workplace.

2.3.2 External

According to Priem, Rasheed, and Kotulic (1995), the management and their SDMP are significantly impacted by the climate. Furthermore, according to Priem, Rasheed, and Kotulic (1995), managers is most affected when the internal and external contexts interact. Eisenhardt (1989) and Yang et al. (2012) concur in part with this, however they primarily make the case that efficiency and thoroughness are frequently found in a dynamic environment in organization.

According to Khairullah & Khairullah (2013), managers must create a hierarchical model that encourages employees to grow both creatively and quickly in their everyday job. According to Khairullah & Khairullah (2013) and Eisenhardt (1999), the necessity of ensuring the logic of each action may be lessened by a frequently changing and dynamic environment that consistently offers options. However, Hough & White (2003) maintain that a stable and non-dynamic environment should be chosen for making logical judgements. This makes it easy to identify important factors (Hough & White, 2003).

2.3.3 Speed of decision

The SDMP's speed might be viewed as a crucial component because it influences the decision's result. Allowing a foreign manager or allowing international firms to participate in the decision-making method has both favorable and harmful aspects. Based on the research of

Cheng and Lok (2010) the managers have tendencies to speed the process, especially at the times when the project is very interesting for the top management. Such decisions are usually taken on the top management level. They also claim that some managers are super flexible with the timeframe. However, there are times when managers should adopt to the project time and thus, it makes some decisions to slow down or speed up the process of decisions. Willis (2009) states that in China, management meetings take much longer period of time, thus, not speeding up the process of decision and take as much time as its needed. If considering the theory of hierarchy, such decisions might need a much longer time due to the fact that everybody from the bottom needs to be involved. Some managers prefer a system based on the guidelines and rules that could potentially speed the process up. This can provide a favorable impact in some circumstances, but when uncommon or nonstandard issues must be answered or determined, it may have a negative impact by encouraging less creative, passive behavior and uncertainty avoidance, which results in longer decision times (Cheng, Rhodes & Lok, 2010).

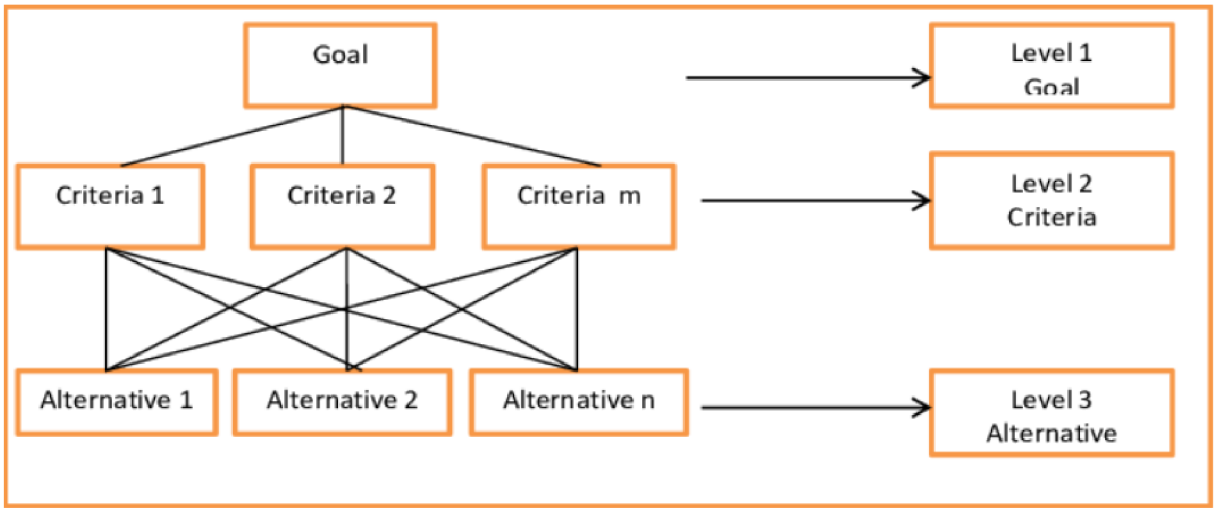
2.4 Multi – Criteria Decision Making Model

The decision models that have been employed in the past in numerous research publications on IT security, investments plans, HR hiring processes, transportation routes planning and etc. All are presented in this chapter's literature review. displays a thorough explanation of various decision models as well as the research gap in the area of application security. The list of MCDM selection methods for the assessment of decision models is also included in this chapter. The MCDM models that have so far been applied to financial decisions.

The mostly used method is called AHP[1] method. By using this technique, we may ascertain the magnitude of the supplied preference as well as the preference of pairs of criteria (i.e., the selection of the more desired criterion), see **Figure – 2**. Saaty selected a point scale to represent its size, which is detailed in the accompanying table (Fotr et al., 2010).

[1] AHP - developed by **Saaty** (1980), uses pairwise comparison questions to elicit a matrix of judgments of the relative preference between each pair of alternatives with respect to each attribute, and a matrix of judgments of the relative importance of each pair of attributes.

Figure 2: AHP method



Source: (T.L. Saaty., 2013)

Maizura (2017) stated, when applying the pairwise comparison method, it will arrange the individual criteria vertically and horizontally in the same order, so that there will be no values on the diagonal of the table. By successive comparison, it finds out whether the criterion given in the row is considered more important than the criterion given in the column. In the rows of the table, we write the criterion evaluated as more important, using one of the following equivalent methods.

However, Saaty's method is more consistent, and therefore more accurate, because it not only preferentially compares the criteria, but also determines the size of this preference, i.e. it finds out not only how which criterion is or is not more important than other criteria, but also by how much it is or is not more significant. In the comparison table, the individual criteria are arranged vertically and horizontally in the same order, and the value of their preference is placed after the symbol xij. In the rows of the table, however, the magnitude of the importance of the criterion evaluated as more important is written, which is expressed numerically in the scale of the Saaty scoring scale - See the **Table – 1**. In practice, the five-point Saaty scale <1;9> with scoring step 2 is used, if greater discrimination is needed, the ten-point Saaty scale <1;10> with scoring step 1 can be used. However, the author is about to apply the scoring methods of 9, with the 2 steps plan, in his practical part.

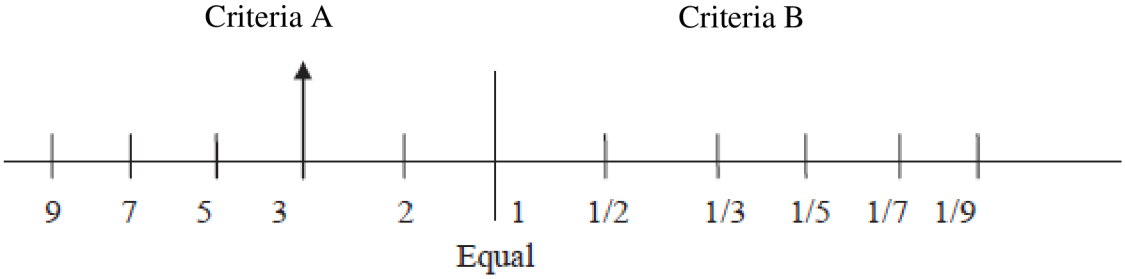
Table 1: AHP (Saaty's valuation criteria)

Number	Evaluation criteria
1	*Equal*
3	*The first criterion is slightly more significant than the second.*
5	*The first criterion is strongly more significant than the second.*
7	*The first criterion is very strongly more important than the second*
9	*The first criterion is more important than the second.*

Source: (T.L. Saaty., 2013)

Comparing criteria in pairs helps determine which of each is preferable. **Pair-wise** comparison is the method of doing this. We must do pairwise comparisons for these three options since our criteria are resources, threat intensity, and user preferences. So, using the preference scale as indicated below, we compare it.

Picture 1: Valuation of two different criteria.



Source: Own illustration, adopted from (Tzeng, G.H., 2009)

1) If the judgment value is on the left side of **A**, we put the **actual value.**
2) If the judgment value is on the right side of **B**, we put the **reciprocal value**.

The decision-maker must determine the relative weight of each criterion in relation to the available options. As the thesis's decision-maker, the author must choose which criteria are

most important. Threat level is assigned three times more importance in the aforementioned scale than resources. The upward arrow in the scale denotes the relative relevance of each criterion. With the similar way, the rest of the criteria should be valuated as depicted on the **Picture -1.**

3 Practical Part

In this chapter, the author is focused on describing the unit which was taken as for a practical part. It is highly important to determine the roots, managerial structure of the bank, its history, the way organization operates and what managerial decision making it applies internally.

3.1 The description of a bank “Jusan – Bank”.

The first thing to mention, is that Kazakhstan has got two – tier banking system. The first tier of the banking consists of the “National Bank of the Republic of Kazakhstan” which is a central bank of Kazakhstan and presents the highest tier of the system. The National Bank represents the interests of the Republic of Kazakhstan within the scope of its jurisdiction when interacting with other nations' central banks, banks, international banks, and other financial-credit institutions.

All banks functioning in the nation, except for the National Bank of Kazakhstan, are second-tier banks and constitute the second tier of the banking system. The legislation "On Banks and Banking in the Republic of Kazakhstan," enacted on August 31, 1995, No. 2443[2], serves as the legal foundation for the operation of second-tier banks. This legislation defines a second-tier bank in Kazakhstan as a corporate body that, regardless of the ownership structure, conducts business in order to achieve its primary objective of making profits. Second-tier banking are allowed to establish their subsidiary institutions, branches, and affiliated companies both inside and outside of Kazakhstan. As of April 13, 2022, there were 22 banks (10 of which have capital inflows, with a proportion of just 17.1%).

[2] A branch of a non-resident bank of the Republic of Kazakhstan is a separate subdivision of a non-resident bank of the Republic of Kazakhstan, which is not a legal entity, located on the territory of the Republic of Kazakhstan, which has passed registration with the Corporation and carries out banking activities on the basis of a license from an authorized body.

The Development Bank of Kazakhstan JSC[3], which functions as a national development institution in the Republic of Kazakhstan, is represented by the National Bank in accordance with its authority. Services offered by the business include leasing finance, bridging lending, financing of export activities, and financing of investment projects. It also provides a range of financial services, including mezzanine, syndicated bridges, leasing, project financing, lending for ongoing operations, guaranteeing transactions, and Republic of Kazakhstan equity and assets involvement in relationships with banking system, banks of other nations, financial institutions, and other financial and credit organizations.

3.2 Jusan Bank and its characteristics

As of February 12, 2019, the major shareholder with 99.5% ownership is First Heartland Securities. The chairman of the board of directors is Shigeo Katsu. The chairman of the board is Kayip Aybek Torebekuly.

Figure 3: Jusan - Bank's logo

Source: goldenwiki (2023).

Current and savings accounts, consumer loans with a bonus for on-time repayment, overdrafts, mortgages, as well as personal and travel insurance are all provided by the bank to its customers. A new supplemental pension savings plan has been developed as of 2020. When

[3] The Development Bank of Kazakhstan is a financial institution focused on the development of the non-primary sector of the economy. We invest in projects that contribute to the sustainable development of the national economy.

several debts are transferred and their consolidation is possible, it also enables you to transfer loans or mortgages.

Asset management firm of the Year Kazakhstan 2021 and best online broker honors were given to the company in 2021 by the British publication Global Banking & Finance Review and Bonds Awards CIS, respectively.

Since it is a financial institution, it is clear to expect that, based on the total profit of the bank and its cash-flow received from interests. There was an available cash for the further investment's plans. One of the profitable activities of the bank is to invest into the real estate, hedge funds etc. At this stage, the managerial decision was to choose the right one, among the available options. Financial department with the executive boarder and auditing consultants have decided to move forwards and invest available money into big project, which eventually might pay-off. However, before doing so, the management had to consider internal and external factors which might also influence the dividends payout in the future. Overall, there were 10 different projects to consider, however, at the end, after the assessment of each project, there were 4 favorites to decide on, the author named them as following:

- **Project A**
- **Project B**
- **Project C**
- **Project D**

In the calculations, they will be referred to as PR1, PR2, PR3 and PR4 due to the protection of private data. Furthermore, the manager has set the criteria according to which they will make decisions:

- Investments cost - the expenses linked to the project up to the day that the MOU was terminated, including but not limited to construction costs, operation costs, development costs, and other expenses.
- Realization time – the time frame when the project will be finally finished.

- Annual cost of services – annual costs that are needed for the potential project, such as: cost of rebuilding, maintenance costs, operational expenses and etc.
- Guarantee time – the person proclaims and accepts a degree of duty (responsibility) for any duties or for the traits and attributes of anything.
- Amortization time[4] - the time length of an asset which will serve as a generator of a profit, annual, the value of any asset decreases.

Hence, the following criteria look like this:

Table 2: Criteria of projects

Criteria	Project A	Project B	Project C	Project D
Investment costs	10 000 000	7 750 000	8 000 000	7 000 000
Realization time	5	4	3	2,5
Annual Cost of service	20 - 30 th. USD	up to 15 th. USD	up to 25 th. USD	up to 15 th. USD
Guarantee time	10 years	12 years	11 years	10 years
Amortization time	50 years	20 years	30 years	10 years

Source: Own processing.

[4] The amortization period is the length of time it takes a borrower to pay back the full amount of a loan principal plus the associated cost of borrowing (interest). An amortization period is typically set out in months or years.

3.3 Pointing method

The decision-maker decided to rate the importance of the factors on a simple ten-point scale. He chose the following weights based on subjective preferences and previous experience, whereas: 10 is the most important factor as annual spendings should not be excessively spent, 9 – for the investments costs, the same as with the annual costs, the investment cost should not be over evaluated for a certain project, so it is important to pay a fair amount of money for an investment, 8th ranks the realization time as it never guarantees you the exact time of the promised finishing, 7th was marked for the guarantee time, as the decision – maker ranked it due to previous experience, and the 6th was ranked as amortization it was only relevant for the financial statements of the Jusan – Bank.

Table 3: Ponting method

Criteria	Points	Standard weight	Ranking
Investment costs	9	23%	2
Realization time	8	20%	3
Annual Cost of service	10	25%	1
Guarantee time	7	18%	4
Amortization time	6	15%	5
Total	40	100%	

Source: Own calculation

Since this method is more often used for comparing the results of decision-making, as it converts the points into standardized weights, i.e. divides the points by 40 = 10 + 9 +8 + 7 + 6. In this way, it is very quick to obtain the basis for choosing the best of the variants. (Durriya H. Z. Khairullah, Zahid Y. Khairullah,, 2013).

3.4 The method of AHP – Saaty's method

In this chapter, the author based on the preferences of the decision – maker and his rating of the stated investment projects, has rated the projects him-self, easily by putting the number into the Excel, which was already formulated. Preferences apply the same, the only difference is in the calculation.

Table 4: Saaty's method - AHP

Prioritization Matrix	**Investment costs**	**Realization time**	**Annual Cost of service**	**Guarantee time**	**Amortization time**
Investment costs	1	3	1	3	7
Realization time	0,3333	1	0,2	0,3333	3
Annual Cost of service	1	5	1	7	5
Guarantee time	0,3333	3	0,1429	1	5
Amortization time	0,1429	0,3333	0,2	0,2	1
Total	2,8095	12,333	2,5429	11,533	21

Source: Own calculations, in Excel.

In decision – maker rates the project as it was described above, in the **Table – 1**. Hence, the results are the following, See, **Table – 6,** where each sell was divided by the total of a given criteria. For example, the weighting number for the investment costs of **0,317** was calculated on the base of **(1/2,8095) = 0,317**. The rest of the weighting variables were calculated in the same way.

Hence, the decision – making model has indicated that the Project – D deserves, more attention. However, the author wants to test all criteria based on the Saaty's method.

Table 5: Results of the evaluation method

Investment costs	Realization time	Annual Cost of service	Guarantee time	Amortization time	Final Score
0,3559	0,2432	0,3933	0,2601	0,3333	0,317
0,1186	0,0811	0,0787	0,0289	0,1429	0,090
0,3559	0,4054	0,3933	0,6069	0,2381	0,400
0,1186	0,2432	0,0562	0,0867	0,2381	0,149
0,0508	0,027	0,0787	0,0173	0,0476	0,044
1,000	1,000	1,000	1,000	1,000	1,000

Source: Own processing, Excel.

3.4.1 Investment costs

The author applies the same matrix for each variable to see whether, the decision of the manager.

Table 6: Investment costs – AHP

Investment costs	Project A	Project B	Project C	Project D	Final Score
Project A	1	0,2	0,333333333	0,142857143	0,058
Project B	5	1	3	0,333333333	0,282
Project C	3	0,333333333	1	0,333333333	0,145
Project D	7	3	3	1	0,515
Total	16	4,533333333	7,333333333	1,80952381	1,000

Source: Own processing, Excel.

Based on the results of the „Investment costs“ as a criterion, it has gained most of the points, with the **0,515**. Hence, the **Project D**, from the perspective of the “Investment Cost” is the favorite.

3.4.2 Realization Time

The same method was applied for the “Realization time” by the matrix calculation. Again, the author considered the preferences of the decision – maker, and results turned out to be the following.

Table 7: Realization time – AHP.

Realization time	Project A	Project B	Project C	Project D	Final Score
Project A	1	0,333333333	0,2	0,142857143	0,061
Project B	3	1	0,333333333	0,333333333	0,148
Project C	5	3	1	1	0,380
Project D	7	3	1	1	0,411
Total	16	7,333333333	2,533333333	2,476190476	1,000

Source: Own processing, Excel.

The favorite project in terms of the realization time turned out to be the **Project – D**. Indeed, the project – D, would take only 2,5 years to make it happen, which is a heavy reason of why this criterion is winning over the rest of the projects.

3.4.3 Annual Cost of Services

The following criteria was tested with the same application method. Again, the “Annual Cost of services” would include the costs for the maintenance, cleaning services, guarding and etc. Thus, the manager’s preferences were filled into the matrix table. The results are shown in the table below.

Table 8: Annual Cost of Services

Annual Cost of service	Project A	Project B	Project C	Project D	Final Score
Project A	1	0,2	1	0,333333333	0,102
Project B	5	1	5	1	0,448
Project C	1	0,2	1	0,333333333	0,102
Project D	3	1	3	1	0,348
Total	10	2,4	10	2,666666667	1,000

Source: Own processing, Excel.

The favorite project in terms of "Annual Cost of services" turned out to be the **Project – B**, which would project the "annual costs" for about 15-18 th. USD. However, the **Project – D** seem to have the same amount of costs per year, but not being on the first place.

3.4.4 The Guarantee time.

The next criteria "Guarantee time" was also calculated with the same methods and matrix steps.

Table 9: Guarantee Time

Guarantee time	Project A	Project B	Project C	Project D	Final Score
Project A	1	5	3	1	0,389
Project B	0,2	1	0,333333333	0,2	0,069
Project C	0,33	3	1	0,333333333	0,153
Project D	1	5	3	1	0,389
Total	2,53	14	7,333333333	2,533333333	1,000

Source: Own processing, Excel.

The favorites in terms of the "Guarantee Time" turned out to be Project – A and Project – D, there are equal in terms of "Guarantee time". However, initially, the decision – maker marked placed these criteria on a third place, See **Table – 6.**

3.4.5 Amortization time

The same technique was applied for the last criteria "Amortization time".

Table 10: Amortization time

Amortization time	Project A	Project B	Project C	Project D	Final Score
Project A	1	7	5	9	0,623
Project B	0,14	1	0,333333333	5	0,117
Project C	0,2	3	1	7	0,220
Project D	0,11	0,2	0,142857143	1	0,040
Total	1,45	11,2	6,476190476	22	1,000

Source: Own processing, Excel file.

Note: This particular aspect is very important from the perspective of accounting, and directly impacts the financial statements, however, across the projects, the winner is the length and hence the first project is supposed to be amortized, from the accounting perspective for over 50 years, which keeps an asset value on a higher level, based on annual reporting. The favorite from the perspective of amortization is "Project – A".

4 Discussions

Based on the evaluation of all projects and all aspects that are important for a project, the manager of Jusan Bank, provided with his assessment of factors importance across the Matrix. An overall evaluation considers 4 different projects where to each of the project there is a criterion assigned, such as:

- Investment Costs (overall expenses to fulfill the project)
- Realization time (how much time it will take to complete the project)
- Annual costs of services (maintenance costs per year)
- Guarantee time (in case of a system's failure, the provider will bear the costs for repair)
- Amortization time (important factor from an accounting perspective)

From the perspective of investment costs, the manager prioritized the "Project – D" as the most suitable one.

From the perspective of the "Realization time", the manager prioritized the "Project – D" as the most suitable one.

From the perspective of "Annual costs", the manager prioritized the "Project – B" as the most suitable one.

From the perspective of the "Guarantee time", the manager prioritized the "Project – D and Project – A" as suitable ones, both are equal, see **Table – 10.**

From the perspective of the "Amortization time", the manager prioritized the "Project – A" as the most suitable one.

An overall evaluation showed that the "Project – D" is a winner as it actually gathered more criteria, see the **Table – 12,** with an overall score of 0.399 %, or 39.9 %.

Summary	Investment costs		Realization time		Annual Cost of service		Guarantee time		Amortization time		Final Score
	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	
Project A	0,317	0,058	0,090	0,061	0,400	0,102	0,149	0,389	0,044	0,623	0,150
Project B	0,317	0,282	0,090	0,148	0,400	0,448	0,149	0,069	0,044	0,117	0,297
Project C	0,317	0,145	0,090	0,380	0,400	0,102	0,149	0,153	0,044	0,220	0,154
Project D	0,317	0,515	0,090	0,411	0,400	0,348	0,149	0,389	0,044	0,040	0,399

Source: Own calculation.

5 Conclusion

The aim of this work is to approach the issue of managerial decision-making, the application of procedures and methods of multi-criteria evaluation of variants in practice, and further to establish an overview of the properties (suitability and disadvantages) of methods of multi-criteria evaluation of variants after the application of those methods in a certain managerial task.

In the theoretical part of my bachelor's thesis, there is an introduction to the issue of decision-making, its essence, principles and managerial functions, then the decision-making processes and decision-making structures of individual phases and elements were presented, and the types of decision-making for certainties and their methods for determining the weights of criteria, direct determination methods were explained criteria weights and methods based on pairwise comparisons, other types of decision-making with which decision-making theory operates are decision-making based on uncertainty and risk in practice.

The practical part of my bachelor's thesis deals with the application of selected methods of determining the weights of criteria and methods of multi-criteria evaluation of variants in a given decision-making problem in which the decision-maker of a big enterprise in Kazakhstan wanted to invest available funds in four options (variants) in order to choose the most suitable according to four criteria (Investment costs, realization time, average annual costs, guarantee time and the length of amortization) and this was for my purpose to establish an overview of the properties of the used methods of multi-criteria evaluation of variants in practice.

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