Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economic Theories

Diploma Thesis

Agency problem: Firm's performance and its relation to incentive plan

Student: Bc. Irina Zarandia
Supervisor: Ing. Pavel Srbek, Ph.D.

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Bc. IRINA ZARANDIA

Economics and Management
Economics and Management

Thesis title

Agency problem: Firm's performance and its relation to incentive plan

---

Objectives of thesis

The main objective is to assess the relationship between a principal and an agent. To achieve this goal the agency problem will be defined in detail, and a review of approaches and solutions of the agency problem will be made. Special attention will be laid on explanation and description of incentive plans.

Methodology

One of the methods of research used in writing diploma thesis was a

quantitative method. Hence, the questionnaire technique and mathematical-statistical methods will be used . To make more deep investigation in writing thesis I used qualitative method. For this purpose secondary data will be collected and assessed by document analysis.

The proposed extent of the thesis

60-80

Keywords

Agent, principal, incentive plan, shareholders, agency problems, risk, finance

Recommended information sources

Abowd, J. M. (1990).'Does performance-based managerial compensation affect corporate performance?'. Industrial and Labor Relations Review, 43, Special Issue, 52–73.

Allen and Panian, 1982 M.P. Allen, S.K. Panian Power, performance, and succession in the large corporation Adm. Sci. Q., 27 (1982), pp. 538-547

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behavior, agency costs, and ownership structure. Journal of Financial Economics 3, 305-360.

Kaplan, S. N. Executive compensation and corporate governance in the US: perceptions, facts and challenges, NBER Working papers No. 18395, 2012

SRBEK, P., DITTRICH, L. O. Does the "CEO Chairman" Guarantee Better Performance for a Firm?. Danube: Law and Economics Review, 3, pp. 145-160, 2016.

Expected date of thesis defence

2020/21 SS – FEM

The Diploma Thesis Supervisor

Ing. Pavel Srbek, Ph.D.

Supervising department

Department of Economic Theories

Electronic approval: 29. 6. 2019

doc. PhDr. Ing. Lucie Severová, Ph.D.

Head of department

Electronic approval: 14. 10. 2019

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 15. 03. 2021

Declaration

I declare that I have worked on my diploma thesis titled "Agency problem: Firm's performance and its relation to incentive plan" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 31.03.2021   _____

Agency problem: Firm's performance and its relation to incentive plan

Abstract

One of the central problems of any publicly traded company is the agency problem. This phenomenon represents the conflict of interests between shareholders and senior managers who are entitled to act on behalf of them. Theoretical part of this Diploma Thesis put emphasize on the essence of agency problem, its aspects and historical background. It follows with the explanation of incentive plans as the most effective form of reducing agency costs. Approaches to it and forms of CEO compensation are described as a continuation to previous literature review. The main aim of the Thesis is to investigate the influence of firm performance on CEO compensation. Four indicators of company performance were chosen as variables for a Linear Regression Model with a purpose to estimate that interrelation. Among them Return on Assets (ROA), Earnings Per Share (EPS), Price to Earnings ratio (P/E ratio) and Return on Invested Capital (ROIC). The model was constructed on the data found and calculated for German software company SAP SE. The analysis supplemented also with a questionnaire that was carried out in order to assess the awareness of employees about the topic of Agency problem and the CEO pay practices. All the results and finding are explained in chapters Results and Conclusions.

Keywords: Agent, principal, incentive plan, shareholders, agency problem, CEO, Executive compensation, SAP SE, fixed compensation, variable pay, performance.

Problém zastoupení: Výkonnost firmy a její vztah k motivačnímu plánu

Abstrakt

Jeden z ústředních problémů jakékoli veřejně obchodované společnosti je problém agentury. Tento jev představuje střet zájmů mezi akcionáři a vyššími manažery, kteří jsou oprávněni jednat jejich jménem. Teoretická část této diplomové práce zdůrazňuje o podstatě problému agentury, její aspekty a historické pozadí. Následuje vysvětlení motivačních plánů jako nejúčinnější formy snižování agenturních nákladů. Přístupy k němu a formy odměňování generálních ředitelů jsou popsány jako pokračování předchozího přehledu literatury hlavním cílem diplomové práce je prozkoumat vliv výkonu firmy na kompenzaci generálního ředitele. Čtyři ukazatele výkonnosti společnosti byly vybrány jako proměnné pro lineární regresní model za účelem odhadu této vzájemné souvislosti. Mezi nimi patří: Rentabilita aktiv (ROA), Zisk na akcii (EPS), Poměrový ukazatel (P/E) a Návratnost investovaného kapitálu (ROIC). Model byl sestaven na základě nalezených dat a vypočítaných pro německou softwarovou společnost SAP SE. Byla doplněna také analýza dotazníkem, který byl proveden za účelem posouzení povědomí zaměstnanců o tématu Agenturní problém a mzdových praktikách generálního ředitele. Všechny výsledky a nálezy jsou vysvětleny v kapitolách Výsledky a závěry.

Klíčová slova: Agent, majitel, motivační plán, akcionáři, problém zastoupení, generální ředitel, odměna výkonného ředitele, SAP SE, fixní kompenzace, variabilní plat, výkon.

Table of content

List of pictures

List of tables

List of abbreviations

ASC - Accounting Standards Codification

CEO -Chief Executive Officer

EPS - Earnings Per Share

FSU – Financial performance Share Units

IPO - Initial Public Offering

KPI - Key performance indicators

LRM – Linear Regression Model

LTI - Long-Term incentives

MSU - Market value Share units

NOPAT – Net Operating Profit After Tax

OLSM - Ordinary Least Squares Method

OTC - Over-The-Counter market

PE - Price to Earnings ratio

ROA - Return on Assets

ROE - Return on Equity

ROIC - Return on Invested Capital

RSU - Retention Share Units

SAP - Systems, Applications and Products

SE - Societas Europaea

STI - Short-Term incentives

WACC - Weighted Average Cost of Capital

1 Introduction

Agency problem in general terms represents the conflict of interests between a principal and an agent that is entitled to act on behalf of principal, but might take decisions in his or her own interests. Agency problem most commonly arises in political science, supply chain management and economics, therefore an individual, a firm, an organization, or a government agency can be both a principal and an agent. This Diploma Thesis reveals that phenomenon in frameworks of economic field and takes shareholders as principals, and senior managers as agents.

Corporate governance is a system of methods for organizing a company management, developing operational management tasks and setting strategic goals, which is designed to eliminate the conflict of interests of principals and agents in the process of capital management. In other words, it designed to ensure the ability of principals to effectively control the activities of agents and increase their welfare.

The essence of corporate governance lies in such an organized transfer of management (from owners to managers), in which the principals retain sufficiently complete and effective control over the activities of agents.

Corporate governance is not a sole tool aimed to reduce agency costs. One of the most effective and widely accepted tools of aligning agent's and principal's interests is an incentive plan.

The system of motivation and remuneration should include indicators of the degree of achievement of operational and strategic goals and the observance of the interests of the owners of the company. The remuneration should objectively reflect both the performance of the company as a whole and the personal results (contribution) of specific managers in the short and long term, be sufficient to attract and retain highly qualified specialists.

Incentive plan applied for coordinating interests of CEO with shareholders' interests include monetary and non-monetary rewards, second of them include option and stock awards - short-term and long-term incentives based on the performance.

The reasonableness of its application investigated in many studies what follows in a diversity of results obtained on this topic. This Diploma Thesis is aimed to estimate interdependencies between CEO pay and firm performance indicators attempting to find the ways of reducing agency costs. Focus of the thesis will be on publicly traded company.

2 Objectives and Methodology

2.1 Objectives

The main objective of this Diploma Thesis is to assess influence of financial results of SAP SE company (hereafter "SAP") on executive compensation.

To achieve this goal the agency problem will be defined in detail, and a review of approaches and solutions of the agency problem will be presented. Special attention will be paid on explanation and description of incentive plans. Diploma Thesis will be focused on which financial indicators of the firm performance have the greatest impact on the executive compensation in the publicly traded company.

In order to achieve the main aim of the thesis, the following sub tasks will be set:

- To conduct the literature review and define the agency problem in details and reveal its theoretical aspects;
- To investigate the forms of incentive plans and define the system of compensation applied to SAP SE company based on the information from the Integrated Reports from 2003 to 2020;
- To identify a set of indicators affecting the CEO compensation;
- To conduct a questionnaire about the Agency Problem and compare its results with the survey conducted by Stanford University;
- To calculate amounts of indicators and total compensation of CEO based on Annual and Integrated Reports of SAP company from 2003 to 2020;
- To build Linear Regression Model and test the relationship between firm performance and CEO pay.

2.2 Methodology

Current Diploma Thesis consist of Theoretical and Practical parts. The first of them focused on publicly traded companies as an entity where agency problem appears. It highlights the characteristics of publicly traded companies and why they are the most affected by this problem.

The following section of Thesis represents the agency problem definition and literature review taking into account different researchers' viewpoints on that phenomenon.

Agency problem definition is followed by its aspects and ways of minimizing costs aimed to align interests of agent and principal. As found, the most commonly used and effective of them is creating incentive plans for Chief Executive Officers (CEOs), included stock and option awards. Forms of incentive plans are provided in the next part.

The deeper investigation of it is found in the following part called "Determination of CEO compensation", it considers different components to CEO compensation and their main features and aspects of application. As it found in the process of analysing literature in that filed, previous studies have had different conclusions about the impact of CEO remuneration on company performance.

With a purpose to assess company performance following measurements of accounting and market performance were chosen – Return on Assets (ROA), Earnings per Share (EPS), Price to Earnings ratio (PE) and Return on Current Investments (ROIC). That choice is explained by previous researchers on this topic and coefficients significance in company welfare assessment by investors while taking decisions on their investments.

The formulas used for indicators calculation are following:

$$ROA = \frac{Net\ Income}{Total\ Assets} \tag{1}$$

$$EPS = \frac{Net\ Income - Preferred\ Dividends}{Weighted - Average\ Number\ of\ Common\ Shares\ Outstanding} \tag{2}$$

$$PE\ Ratio = \frac{Market\ Value\ per\ Share}{Earnings\ per\ Share} \tag{3}$$

$$ROIC = \frac{NOPAT}{Booked\ Value\ of\ Invested\ Capital_{t-1}} \tag{4}$$

The impact assessment of the above-mentioned indicators on the compensation of CEO implemented in the Practical part of Diploma Thesis based on the data gathered from the Integrated annual reports of company SAP SE.

First of all, Practical part is introduced with SAP SE Characteristics, its historical background and relationship between shareholders and company's management. Thereafter types of compensation at SAP are considered. It consists of 2 systems of compensation - non-performance–based and performance-based compensation. Non-performance–based payment includes fixed compensation, fringe compensation and retirement pension, while performance-based compensation consists of short-term and long-term incentives (STI and LTI), that are also analyzed in details.

With a purpose to assess firm performance impact on CEO compensation OLS method was applied. All the data was found and calculated for a period from 2003 to 2020 years. CEO compensation served as dependent variable, while firm performance indicators as explanatory values. The constructed model presented as follows:

$$y = f\,(ROA;\ EPS;\ PE,\ ROIC\,) \qquad\qquad (5)$$

All the gathered and calculated values were collected in the Excel file and applied in SW Gretl. First of all, correlation matrix was constructed in order to find whether the multicollinearity between explanatory variables exist. No values more than 0.8 was found.

The column with coefficients provided the values for creation of formula where interdependence between parameters can be detected. These values were thereafter used in economic, statistical, econometric and mathematical verifications.

Economic verification was aimed to assess the direction and intensity of the effect caused by explanatory variables (performance indicators) on explained variable (CEO payment).

Statistical verification is focused on finding the degree of conformity between the estimated model and real data. With that purpose Adjusted R Squared, F-test and t-test were applied.

Econometric verification consisted of testing for autocorrelation (Durbin-Watson and Breusch-Godfrey tests), testing for heteroscedasticity (Breusch-Pagan test), testing of normality (Jarque-Bera).

Based on received results coefficients of elasticity were calculated for each of the company performance measurements. Using that coefficients different scenarios were simulated.

Questionnaire technique was used in the Diploma Thesis. Employees from two departments of SAP were interviewed about agency problems. The questionnaire was organized to compare the data with the survey completed by Stanford University in 2016.

3 Literature Review

3.1 Agency Problem in publicly traded companies

3.1.1 Explanation of publicly traded companies

The main goal of financial manager is to increase the wealth of firm's owners. Focus of the thesis will be on publicly traded company. When ownership and management are achieving this goal separately, managers can predominant. Agency problem appears between discretion of managerial power and interests of owners. Agents may use their managerial power in their own interests and to benefit themselves in different ways.

In order to conduct an in-depth study of the impact of CEO remuneration on the performance of companies, it is necessary to understand the concept of agency problem, identify the structure and cause of its occurrence.

Over time, an increasing number of authors cover this topic in their researches, thus there is an increase in a variety of works on this topic. The existing literature presents various conclusions about the effect of the CEO compensation on the results of the company.

Many researches have focused on how executive compensation schemes can help alleviate the agency problem in publicly traded companies. However, in order to adequately understand the situation with executive compensation, it must be recognized that the development of compensation mechanisms is also partly the result of the same agency problem.

For this reason, it is necessary to make a deep investigation in understanding of agency problem. First of all, it is necessary to disclose what are the publicly traded companies. Why they are the most affected by this problem? In this chapter of the thesis focus will be on publicly traded companies.

A public company is a company that has issued securities through an initial public offering (IPO) and trades its shares on at least one stock exchange or over-the-counter (OTC) market. Although a small percentage of the shares are initially listed for the general public, daily market trading determines the value of the entire company.

The company is considered "public" because the investors who become shareholders of the company can be anyone who purchases shares in the company.

Therefore, shareholders require a portion of company assets and its profits in return on their investments.

It has long been revealed that in big corporations the managers and the shareholders have different interests, so they are achieving the main goal of maximization of profit in different ways. The shareholders of these companies assign the managers to make decisions and act according to their interests.

As emphasized by Jesse Edgerton in the article "Agency Problems in Public Firms: Evidence from Corporate Jets in Leveraged Buyouts" the extent of agency problems in publicly traded firms and the need for executive compensation reform remain a subject of intense debate[1].

Lasher in his work "Practical Financial Management" states that this kind of relationship creates a conflict of interest known as agency problem. The agency problem arises when one person (principal) hires and authorizes another person (agent) to act on their behalf[2].

It worth to claim that the appearance of the publicly traded companies with huge number of employees leads to division of functions between ownership and management. The senior managers are agents who are supposed to manage the company capital in the best interest of the shareholders, that are interested in a long-term welfare growth. But conflict of interest may occur between the managers and the shareholders.

When the managers have more information about the work process of the company, they can use it to their own advantage, they can take decisions to their own benefits. This, in turn, does not correspond to the interests of the shareholder.

Conflict of interest between managers and shareholders leads to agency problem. There are different ways by which shareholders can control management actions. Some of the measures that can be used to resolve and prevent this problem are subject of analysis in this thesis.

---

[1] Edgerton, Jesse, Agency Problems in Public Firms: Evidence from Corporate Jets in Leveraged Buyouts 2011. AFA 2011 Denver Meetings Paper; FEDS Working Paper; *Journal of Finance, Forthcoming,* p. 73.
[2] Lasher, W. 2008. Practical Financial Management (5th ed.). USA. p. 16.

Tipuri and Podrug believe that "the theory of agency problem is a function of managers perceptions about the expected value of awards for achievement of financial targets of principal"[3].

Agent is a manager or employee, which main aspiration is to maximize personal goal. Moreover, he has to achieve economic objectives of the principal.

The theory of the agency problem says that the wealth of the stakeholder cannot be maximized, because he and his manager have different goals, have different channels for obtaining the information and have different level of risk.

The aforementioned authors state that there are two main sources of the agency problem. One of them is moral hazard and another one is adverse selection. Numerous studies have been done about this problem, as well as about the mechanisms used to solve it or take measures to prevent it.

Eun-Resnick referring to the question of agency problem says that for shareholders, the agency problem is very important because it leads to the ravishing of scarce resources, impedes the functioning of capital markets and slows economic growth[4].

Predik and Ivanovich-Dzhukich pointed out that the Code of Corporate Governance is a very useful measure that enables shareholders to act in accordance with their rights and increases the transparency of senior management[5].

Brigham and Houston offer several measures that can motivate managers to act in the interests of shareholders:

-managerial compensation

-direct intervention by shareholders,

-the threat of dismissal and takeover[6].

Another scientists Lasher highlight that the one most effective measure to diminish the agency problem is to control and monitor of the agent's work[7].

---

[3] Tipuri and Podrug. 2010. Theoretical conceptualization and empirical validation of Stewardship Theory. Proceedings of the Faculty of Economics in Zagreb, p. 201.

[4] Eun-Resnick. 2004. International Financial Management (3rd ed.). The McGraw-Hill Companies Inc. p. 56.

[5] Predic, B., and Ivanovic–Djukic, M. (2010). Methods of solving agency problem. Economic themes N1: 1–12, Faculty of Economics, Nis., p. 123.

[6] Brigham, E., and Houston, J. 2007. Fundamental of Financial Management (11th ed.). USA, p. 12.

[7] Lasher, W. 2008. Practical Financial Management (5th ed.). USA, p. 16.

Adam Smith Scottish economist foresaw this problem a long time ago and noted that conflicts between the owners of large publicly traded corporations and their hired executives are a typical "agency problem".

Wells emphasized that in the early 20th century, large listed companies with complex management structures emergedю They were competing with each other and often squeezing out controlled owners and family businesses. The increase of "American companies" led to increase in "professional managers" (non-owners) who were hired to manage the company's assets on behalf of passive and decentralized owners-shareholders[8].

The conflicts identified by Smith [9] arising between the owners large publicly traded corporations and their hired executives is the quintessential "agency problem" explored by Berle and Means and Jensen and Meckling. In the next chapter of the Thesis definition of the "agency problem" will be given.

3.1.2 Definition of Agency Problem

One of the central problems of any modern corporation is the agency problem. The owner (or owners) hires managers to achieve specific goals. However, profit depends not only on the efforts of managers, but also on external factors. The owner cannot determine to what extent the high (low) profit is obtained due to the high (low) efforts of managers, and to what extent - due to the action of external factors. This is a typical problem of the principal - the agent, or agency problem.

Meri Boshkoska in the article "The Agency Problem: Measures for Its Overcoming" states that "in modern corporations - are the most complex organizational type. And their capital is divided between a fairly large number of shareholders who can be employed in the company, but also legal entities and people can be the owners of the company" [10].

Furthermore, in these large companies, the interests of shareholders, managers and directors are intertwined. Simply because the number of owners is large, shareholders who

---

[8] Wells, Harwell, 2010, "No Man can be Worth $1,000,000 a Year": The Fight Over Executive Compensation in 1930s America, U. Richmond Law Review, p.44.

[9] Smith, Adam, 1776. The Wealth of Nations (Modern Library, Edited by Edwin Cannan, 1904. Reprint edition 1937. New York), p. 44.

[10] Meri Boshkoska. The Agency Problem: Measures for Its Overcoming. *International Journal of Business and Management*. 2015, Vol. 10, No. 1; ISSN 1833-3850 pp. 204-208.

cannot be hired at the same time will hire managers to represent them as agents, resulting in a distribution of ownership between control and management.

Managers are controllers and often place personal interests ahead of the interests of the company and its owners. This situation has repeatedly led to a conflict of interest between shareholders (owners) and company managers. This problem is called an "agency problem".

William Lasher emphasizes in one of his works that managers receive numerous and large benefits as a result of agency relationships[11]. In addition to the huge economic rewards that some executives receive, they also enjoy benefits called privileges, such as luxury cars, airplanes, yachts, and ships.

Thus, agency problem can be easily described as the problem of determining managerial responsibilities arising in connection with the transfer of authority to the manager.

The essence of the theory of the agency is the delegation of authority between the two parties. The parties which involved are called principals and agents as mentioned before. In other words, the principal represents the owner / shareholder of the company, and the agent is the manager[12].

As a result, company owners hire managers to increase company productivity and profits. However on practice owners may face some problems and then the case is compeletly different.

Corporate governance is an important topic for multinational enterprises and a hot topic for many studies. Corporate governance systems of companies in different countries differ from each other. American economists Shleifer and Vishny came to the same conclusion back in 1997 in their article "A Survey of Corporate Governance" [13].

They stated that the most important issue in managing a corporation is the agency problem and described the problem as the separation of management and finance. The main problem of corporate governance is how to convince financiers that they will get a return on their financial investments.

---

[11] Lasher, W. 2008. Practical Financial Management (5th ed.). USA.
[12] Guilding, C., Warnken, J., Ardill, A., & Fredline, L. 2005. An agency theory perspective on the owner/manager relationship in tourism-based condominiums. Tourism Management, 26, pp. 409-420.
[13] Shleifer, A., and Vishny, R. W. 1997. A Survey of Corporate Governance. *The Journal of Finance*, 52(2), 737-783.

The company's shareholders choose managers which are responsible for management of company's finances to increase the company's benefit. An example of such a manager is the Chief Executive Officer (CEO), who is responsible for many important tasks within the company.

Thus, finding and hiring the right manager is an important task for the company's board of directors. But even with the right CEO there may be some problems. The main question that arises is the remuneration of the CEO and whether it will affect the effectiveness of the company.

3.1.3 Theoretical aspects of agency problem

Stephen Ross and Barry Mitnick were among the first scientists to put forward the theory of agency relations, and actually began to create this relationship. Ross is responsible for the origins of economic theory of agency problem, while Mitnick is responsible for institutional agency theory, although the basic concepts behind these methods are similar[14].

In fact, using similar concepts under different assumptions can be regarded as complementary. In short, Ross put forward a study of agency relations on the challenge of awarding contracts. The agency is essentially seen as an incentive problem.

Mitnick put forward the traditional concept that institutions are built around agencies and developed to work with agencies to address the main flaws in agency relationships: behavior will never appear in the way that managers like it because he is not paid to improve it[15]. However, society has created institutions that pay attention to these defects, control or buffer them, adapt to them or be distorted by them for a long time.

Therefore, to fully understand the occurrence of agency problem, we need not only the source, but also the institutional structure and incentives.

In 1932, the work of A. Berle and J. Means "Modern corporation and private property" was published, in which the authors stated the fact of separation of the functions of managers from the functions of owners in companies with a dispersed structure of share capital[16]. In 1937, R. Coase in his revolutionary study "The Nature of the Firm" pointed

---

[14] Barry M. Mitnick. 2019. Origin of the Theory of Agency: An Account by One of the Theory's Originators. p. 3-10.
[15] Ibid, p.11
[16] Berle A., Means G. 1932. The Modern Corporation and Private Property. Macmillan: N. Y., p. 30.

out the existence of transaction costs, costs of drawing up and executing contracts, and also put forward the theory that any firm exists with the aim of minimizing transaction costs. and the size of the firm depends on the potential for savings on these costs[17]. These two classic works initiated further research on corporate governance and related agency costs.

In 2016 Emre Kazan in the ariticle „The impact of CEO compensation on firm performance in Scandinavia" stated that problems between the agent and the principal may lead to poor firm performance[18].

Likewise, Hill and Jones cited conflict of interests between managers and owners as the first reason for the growing problems.[19].

According to Guilding C. this conflict of interest has four typical reasons, namely[20]:

- the potential for rejection of efforts by the agent,

-the agent may use his work situation as an opportunity to channel resources for his own personal gain,

-the agent and the owner may have different opinions for a long -term relationship

-there may be a different attitude to risk on the part of the manager and the owner.

Donaldson and Davis argue that lack of consistency between the agent and the principal will result in the loss of the agent[21]. To prevent losses to the agency, owners must ensure that their interests are aligned with those of the agency.

Nyberg and Gerhart highlighted three things that can help minimize agency problems, namely[22]:

-improving directors' control over managers,

-punishing recalcitrant managers,

-the agent equity ownership. The third reason was supported by a study of Donaldson and Davis, which proposed the introduction of incentive mechanisms for

---

[17] CoaseR. H. The Nature of the Firm // Economica. 1937. Vol. 4. November. N 16. P. 386405. p. 13.

[18] Emre Kazan The impact of CEO compensation on firm performance in Scandinavia. 8 th IBA Bachelor Thesis Conference, November 10th, 2016, Enschede, The Netherlands. p. 15.

[19] Hill, C. W., and Jones, T. M. 1992. Stakeholder-Agency Theory. *Journal of Management Studies*, 29(2), 131-154.

[20] Guilding, C., Warnken, J., Ardill, A., and Fredline, L. 2005. An agency theory perspective on the owner/manager relationship in tourism-based condominiums. Tourism Management, 26, 409- 420.

[21] Donaldson, L., and Davis, J. H. 1991. Stewardship Theory or Agency Theory: CEO Governance and Shareholder Returns. *Australian Journal of Management*, 16(1), 49-65.

[22] Nyberg, A. J., and Gerhart, B. 2010. Agency Theory Revisited: CEO return and shareholder interest alignment. *Academy of Management Journal*, 53(5), pp. 1029-1049.

managers. In these plans, managers are financially rewarded for increaising the shareholder's value.

As a result of the separation of the functions of the owner and the manager, there has been information asymmetry: in this case, the managers of the company have a better understanding of the company's conditions than the investors (capital suppliers). In the late 1960s, scientists first began to talk about information asymmetry in the consumer market, and the first work in this direction was the study of Akerlof G.[23]. The American scientist suggested that in certain types of markets (researched on the used car market), only the seller knows the quality of a particular product. Akerlof calls such products "lemon": the quality cannot be understood without trying.

Nwidobie also mentioned in his article in 2013 that the agency problem may appear because of information asymmetry (agents / managers always have more information than shareholders), and that the debtor is able to transfer the fortune at the expense of the debt due to the fact that the manager accepts the project with high risk and high profitability. Such activities and management decisions can harm the company and shareholders[24].

Another source of agency problem is the well-known moral hazard that arises from information asymmetries. Moral hazard occurs when the behavior of a person or organization isolated from risk may differ from that of a fully exposed person. In our case, moral hazard arises from the different goals of managers and owners. For example, a company is considering new investments that are risky but can increase shareholder value. Investing benefits shareholders, not managers. If things don't go according to plan, they could lose their jobs. It is because of different goals that managers may decide not to make this type of investment, even if it harms the owner of the company.

Another possibility stated by Fabozi and Peterson is in which managers may even lose their positions in the company is when they make decisions based on their own interests. For example, managers may object to a decision to merge their company with another company, even if it is in the interests of shareholders. This behavior of senior

---

[23] Akerlof G. The Market for «Lemons»: Quality Uncertainty and the Market Mechanism //Quarterly Journal of Economics. 1970. Vol. 83. August. N 3. P. 488-500.

[24] Nwidobie, M. 2013. Agency conflict and corporate dividend policy decisions in Nigeria, Asian Economic and Financial Review, 3(8), pp. 1110–1121.

management can be the result of any possible and highly likely changes in leadership positions after the merge[25].

Therefore, the principal can limit the differences in alliances with managers by setting appropriate incentives for managers. These incentives can also include compensation for managers (including CEOs). The motivation of managers and CEOs will increase, which may have a positive impact on company performance. However, if the principal does not set up an appropriate incentive mechanism for the manager, it may lead to poor company performance. In the next chipter the forms of incentive plans will be defined.

3.2 Forms of incentive plans

Among financial economists, the main method of studying executive remuneration is to view the mechanism of managerial remuneration as a (partial) means of solving agency problems. This approach is called the "optimal contracting approach", which assumes that the board has developed a compensation plan to provide managers with effective incentives to maximize shareholder value.

In trying to understand the practice of executive remuneration, financial economists have done a great deal of work on this optimal contract model. Recent reviews of this work include Murphy[26] and Core, Guay and Larcker[27]. "Some of researchers state that working under the optimal contract model has its main disadvantage in political constraints on top management that leads the whole remuneration system to seem ineffective" – stated by Jensen and Murphy[28].

[25] Fabozi, F., and Peterson, P. 2003. Financial management & analysis. Wiley & Sons, Inc. New Jersey, p. 28.

[26] Murphy, Kevin J. 1999. "Executive Compensation," in Handbook of Labor Economics. Orley Ashenfelter and David Card, eds. Amsterdam: North Holland, pp. 2485–563.

[27] Core, John E. and David Larcker. 2002. "Performance Consequences of Mandatory Increases in Executive Stock Ownership." Working paper, Wharton School., p. 23.

[28] Jensen, Michael and Kevin Murphy. 1990. "Performance Pay and Top Management Incentives." Journal of Political Economy. 98:2, pp. 225– 263.

Internal audit is very important to ensure the continuity and development of the company. This helps to assess the company's performance, identify and stop potential ineffective operations, and protect assets and capital[29].

Another method of studying executive compensation focuses on the different relationships between agency problem and executive compensation. It's called „managerial power approach". Acoording to it the executive compensation is seen not only as a potential tool for solving agency problems, but also as part of the agency problem itself. As some researchers have recognized, some of the functions of a pay plan seem to reflect managers seeking rents rather than providing effective incentives.

One of the measures that can be taken to solve this problem is a way of financially rewarding managers. It is best to calculate their bonuses as a percentage of the company's realized profits.

This type of calculated rewarding will motivate managers to make decisions and take action to increase the company's profit, that is a goal for shareholders to defend their core interests. Another common practice is to invite managers to buy shares and take ownership. It is a way to reconcile the interests of managers and shareholders - long-term development, continuity and increase in shareholder value.

Eun and Resnick pointed out that centralized ownership is an effective way to prevent agency problems. According to them, the ownership share of managers has increased, and their interests are aligned with the interests of shareholders, so they will act in a way that increases shareholder value[30].

A good corporate governance system is essential for effective control over the company, improving its results and making more efficient use of external tools and methods. Corporate governance is a term that includes the relationships and roles of each party closely related to the company. Principles of corporate governance are responsibility, transparency and control in the decision-making process, as well as reports on the daily work of the company.

Larcker and Tayan defined corporate governance as a set of controls used by organizations to prevent potential hired managers from engaging in activities that are

---

[29] Jovanova, M. 2014. Internal audit as a service of management for improvement of economic efficiency of the enterprises in Republic of Macedonia. MA thesis, Faculty of Economics, Prilep, Macedonia, p.13.
[30] Eun-Resnick. 2004. International Financial Management (3rd ed.). The McGraw-Hill Companies Inc., p. 56.

detrimental to the well-being of shareholders. The level of alignment of the interests of the interested parties within the company shows a good level of corporate governance from the inside. In the most cases, there are many participating and interested groups such as boards of directors, shareholders, investors, employees, customers, suppliers, media, et cetera[31].

To have a better understanding of approches described below, in the tesis they will be described more deeply.

The optimal contracting view has in its base the assumption that managers are supposed to suffer from agency problems and consequently will not automatically seek to maximize shareholder value. Therefore, it is important to provide sufficient incentives for managers. In the optimal contracting approach, the board of directors pursues the interests of shareholders by trying to provide cost-effective incentives to managers through their compensation packages.

Optimal compensation contracts may be the result of effective commercial negotiations between the board and management, or it may be a market constraint that prompts these parties to enter into such contracts even in the absence of market negotiations. However, these forces cannot prevent serious deviations from market results.

Just as there is no reason to assume that managers will automatically seek to maximize shareholder value, there is no reason to expect the board to do so a priori. In fact, directors' behavior is also subject to agency problems, which in turn weakens their ability to effectively resolve agency problems between managers and shareholders.

Of course, in a world where shareholders elect individual directors, directors may have an incentive to build a reputation among serving shareholders.

However, board elections are elected by lists, and dissidents face major obstacles in nomination of their own list of directors, so such problems are extremely rare stated Bebchuk and Kahan in their paper in 1990[32]. Usually, the list of directors recommended by management is unique.

Among other things, the director negotiating with the CEO candidate knows that once the candidate becomes the CEO, he will have an impact on their re-nominated board,

[31] Larcker, D., Tayan, B. 2011. Corporate Governance Matters: A Closer Look at Organizational Choices and Their Consequences. Pearson Education Inc., New Jersey. p. 19.
[32] Bebchuk, Lucian Arye and Marcel Kahan. 1990. "A Framework for Analyzing Legal Policy Towards Proxy Contests." California Law Review. October, 78, pp. 1071–1135.

compensation and benefits. Directors also want to have a good personal and working relationship with those who expect to serve as the company's CEO and board member.

Although agreeing to a remuneration package that facilitates the recruitment of CEOs from outside is a small financial cost for directors, any interruption in hiring negotiations that may cause directors to get into trouble and force them to resume the CEO selection process is personally expensive for them. Finally, the limited time of directors forces them to rely on the information generated and provided by company's human resources staff and compensation consultants, all of whom have the motivation to please the new CEO.

Good reasons to doubt the ability of optimal contracting to explain pay practices also show that managers have a significant impact on their own pay. In addition, these reasons indicate that the more power managers have, the more opportunities they have to withdraw rent.

There are certain restrictions on what directors accept and what the market allows, but these restrictions do not prevent managers from getting better deals than they can get through fair exchange.

An important part of the managerial power approach is the cost and limits of " outrage". The complexity of the constraints faced by managers and directors depends in part on how much "anger" the proposed agreement will generate among the relevant outsiders.

Outrage can cause embarrassment or damage to the reputation of directors and managers, and can reduce the willingness of shareholders to actors in proxy tenders or takeover bids. Compensation arrangements are expected to generate more outrage the more reluctant directors approve of the contract, and the more doubts managers will have to begin with.

Thus, choosing a compensation package that is suitable for executives but not ideal for shareholders will depend on how outsiders view it. There is evidence that the structure of the compensation mechanism is indeed viewed by outsiders.

Johnson, Porter, and Shackler found that executives who received negative media coverage of their compensation agreement between 1992 and 1994 subsequently received

relatively small salary increases and made the compensation mechanism more sensitive to results[33].

Thomas and Martin found that in the 1990s, CEOs who criticized shareholders' goals for executive compensation fell by an average of $2.7 million over the next two years[34].

The perception by outsiders of the CEO's salary and the cost of violence is potentially important, which demonstrates the importance of another component of the management approach, „camouflage". To avoid or minimize the dissatisfaction caused by outsider admission of rent withdrawals, managers have great incentives to hide and attempt to legalize (or more generally disguise) the rent they are withdrawing.

Strong camouflage efforts can lead to the adoption of ineffective compensation structures, damaging managerial incentives and company performance. It turns out that this concept of disguise is very useful in explaining many other confusing characteristics of executive pay. Understanding the importance of compensation mechanisms means that transparency in disclosure is critical in the area of executive compensation. Financial economists often pay attention to the role of disclosure in the inclusion of information in market prices.

It is generally believed that as long as a limited number of market professionals know and fully understand the information, it can be reflected in stock prices. However, in the context of executive compensation, the ability of planners to select interventions that benefit managers depends on the wider perception of these mechanisms. As a result, open transparency and salience can have a significant impact on CEO remuneration.

3.3 Impact of CEO payment on company performance

3.3.1 Determination of CEO compensation

Basu, Hwang , Mitsydome and Weintrop in their article „Corporate governance, top executive compensation and firm performance in Japan" stated that the board of directors

---

[33] Johnson, Marilyn F., Susan Porter and Margaret B. Shackell. 1997. "Stakeholder Pressure and the Structure of Executive Compensation" Working paper, Michigan State University, University of Massachusetts at Amherst, Notre Dame.
[34] Thomas, Randall S. and Kenneth J. Martin. 1999. "The Effect of Shareholder Proposals on Executive Compensation." University of Cincinnati Law Review. 67:4, pp. 1021–1081.

is responsible for determining the salary of the CEO, which must be approved by the shareholders. This usually occurs at the annual general shareholders' meeting[35].

There are several components to CEO compensation. The main form of the CEO compensation is a fixed basic salary. In addition, the CEO can be paid in the following forms:

- cash dividends

- share-based payments

- stock options, et cetera.

Cash dividends are payments made by companies based on the performance of the CEO. Companies can also develop incentive plans to coordinate the interests of the CEO and shareholders.

The CEO is then allowed to buy or receive shares or stock options in the company, and this process affecys the CEO compensation based on the stock options. As mentioned earlier, previous studies have reached different conclusions on the impact of CEO compensation on the company's performance.

This thesis examines the impact of CEO compensation on company performance. This means that the CEO's salary is the dependent variable.

The explanatory variable is the performance of the company because it tests whether the explanatory variable is related to the dependent variable and how it works. As the dependent variable will be used CEO compensation, baseline and variable compensation. Variable compensation includes cash dividends, share-based payments and share options paid to the CEO. Total salary is based on base salary plus CEO variable salary.

In the next chapter the indicators of firm's performance will be disclosed.

3.3.2 Description of firm performance indicators

Return on Assets is the indicator most commonly used by researches who aim to access interdependence between CEO compensation and firm performance. It is explained by its ability to provide them with information about company's management efficacy and

---

[35] Basu, S., Hwang, L. S., Mitsudome, T., and Weintrop, J. 2007. Corporate governance, top executive compensation and firm performance in Japan. Pacific-Basin Finance Journal, 15, pp. 56- 79.

value added to the firm by its higher manager. ROA is one of the ratios that have different ways of calculations among investigators. In the research of Jeffrey J. Jewell and Jeffrey A. Mankin „What is your ROA? An investigation of the many formulas for calculating return on assets" authors analyzed 70 textbooks where ROA were used and found 11 different versions of ROA formula (1)[36]. As they demonstrated in their table "ROA Formulas and Frequencies" the most commonly used is also the simplest version of ROA, that calculated by dividing Annual Net Income on Total assets for the same period and shows how well analysed company apply its assets in terms of profitability. The formula (1) for ROA finding is provided below:

$$ROA = \frac{Net\ Income}{Total\ Assets} \qquad (1)$$

That calculations shows how many cents are earned on each dollar of company assets and consequently the higher amount of ROA signifies about stronger business profitability and its management. In contrast to Return on Equity (ROE) – one more indicator widely used altogether with ROA attempting to estimate CEO compensation - ROA takes into account a company's debt.

The second indicator of firm performance chosen for following analysis is Earnings Per Share. EPS is a ratio that represents how much money a company creates for each share, and is a commonly used metric to assess corporate value.

This indicator was also analyzed by Jewell and Mankin from the viewpoint of its calculation and its formulas application in literature. In their study "What is your EPS? Issues in computing and interpreting earnings per share" they stated that a variance of EPS formulas is explained first of all by the fact that only in 2009 this indicator became the ratio that is required disclosure and a mandated formula, defined by Accounting Standards Codification (see ASC 260-10-45-10)[37].

The prescribed formula for basic EPS is calculated by dividing firm's income available to common stockholders by the number of weighted-average common

---

[36] Jewell, Jeffrey Jay and Mankin, Jeffrey A., What is Your ROA? An Investigation of the Many Formulas for Calculating Return on Assets 2011. Academy of Educational Leadership Journal, 15 (Special Issue), pp. 79-91.

[37] Jewell, J. J. and Mankin, J. A. 2016. What is Your EPS? Issues in Computing and Interpreting Earnings Per Share. Academy of Accounting and Financial Studies Journal, 20(3), 48-61.

outstanding shares during the analyzed period. That computation is based on data that can be found in company balance sheet and income statement.

The formula of EPS is depicted as follows:

$$EPS = \frac{Net\ Income - Preferred\ Dividends}{Weighted - Average\ Number\ of\ Common\ Shares\ Outstanding} \quad (2)$$

According to Accounting Standards Codification the use of Weighted-average number of common shares otstanding is more reasonable and give reliable results because the number of shares can change over time.

Higher EPS ratio amounts say that company possess assets to either reinvest it for business needs or allocate them to stockholders in the form of dividend payments. It can be a green light for investors who find attractive a company with higher EPS when comparing a bunch of companies within the same industry. But at the same time this indicator should be taken into account with another firm performance indicator since EPS value is able to be manipulated by higher management.

As it seen from the formula, mandated by ASC, the denominator includes total amount of Outstanding Shares for analyzed period. Therefore, the company's management can simply buy back its own shares and EPS value in that case will grow up without any increase in firm income.

Jewell and Mankin also confirmed that four "competing" versions of the EPS formula in wide use (even though the only one was mandated and defined as correct by ASC 260) is not the sole issue of EPS application. "Second, there is the widespread belief that EPS can be used for cross-sectional comparisons of firms' earnings. "Jewell and Mankin clarified that it is incorrect due to the ability of senior management to influence on amount of outstanding shares[38].

One more indicator widely taken into account by investors and consequently by higher management is Price to Earnings ratio (PE), that is linked to EPS. In contrast to EPS, the formula used for PE computation does not vary among investigators.

---

[38] Ibid, p. 55.

Earnings per Share are included in denominator of PE formula, while numerator represented by company current stock price. To determine the P/E value, one should use following depicted below (formula 3):

$$PE\ Ratio = \frac{Market\ Value\ per\ Share}{Earnings\ per\ Share} \qquad (3)$$

The calculation result tells to investor which amount of money they should expect to invest in firm in order to get one dollar of that company's earnings in the future. For example, if a corporation was currently trading at a P/E equaled 26.70, the interpretation is that an investor is willing to pay $26.70 for $1 of current earnings.

Therefore, due to ability of PE to show what the market *is willing* to pay for a stock at present time based on its past or future earnings, this value demonstrates if company's stock is undervalued or overvalued. This value might also indicate that for some reason company investors have expectations related to increase in growth rates in the future.

Price to Earnings ratio is also widely applicable for comparison selected company with its own historical results or against companies operating within the same industry.

The fourth firm performance parameter chosen for current analysis is Return on Invested Capital (ROIC), that gives the necessary context for other metrics such as the P/E ratio, that was reviewed previously. Considered in isolation, Price to Earnings Ratio may indicate that the company is overestimated, when decline can be explained by the situation when the firm does not generate value for shareholders at the same rate as before.
On the other side, companies that consistently demonstrate high ROIC, even if the P/E ratio seems too high, should probably trade at a premium to other stocks.

For ROIC calculation 4 key components are needed: operating income, tax rates, book value of invested capital, and time.

$$ROIC = \frac{NOPAT}{Booked\ Value\ of\ Invested\ Capital_{t-1}} \qquad (4)$$

Numerator of formula represented by NOPAT – Net Operating Profit After Tax, that is found in following way:

$$NOPAT = (Operating\ Profit) * (1 - effective\ tax\ rate) \quad (5)$$

Denominator of ROIC includes invested capital, that equals to a sum of company debt and equity, also known as the capital structure of the business.

Thus, the Return on Invested Capital is the percentage amount that a company is making for every percentage point over its invested capital. ROIC is always calculated as a percentage and is usually expressed as an annualized or trailing 12-month value. Comparing that parameter with company WACC - weighted average cost of capital – gives a sense of efficacy of company capital application by its senior management.

When ROIC exceeds tha value of WACC it can describe a company as healthy and growing – it generating a value and consequently a corporation will trade at a premium. Reverse situation – when WACC is higher than ROIC - commonly identify about unsustainable business model existed.

The impact assessment of the above mentioned indicators on the compensation of CEO will be implemented in the Practical part of Diploma Thesis based on the data gathered from the Integrated annual reports of company SAP SE.

4 Practical Part

4.1 SAP Company's Characteristics

The abbreviation of SAP means Systems, Applications, and Products in Data Processing. It was founded in 1972 in Walldorf, Germany and now has offices around the world.

SAP SE Company is a German multinational software development company that produces enterprise software to manage business operations and customer relations. The company is famous for its ERP software.

SAP's headquarter is in Walldorf, Baden-Württemberg, Germany. There are more than 102400 employees from more than 140 countries.

SAP is assessed as the market leader in software production industry. It helps helps companies around the world and in all industries to run their businesses.

SAP system generates 77% of the world's transaction revenue[39]. The company's machine learning, Internet of Things (IoT) and advanced analytic technologies are helping to transform customers' businesses into smart enterprises. SAP's comprehensive suite of applications and services enables its customers to operate profitably and continually adapt and change. There are more than 400,000 customers worldwide in more than 180 countries.

Three main segments where SAP are operating are Applications, Technology and Services. It sells software licenses, subscriptions for cloud applications and other services, mainly support services, conculting, aoftware and cloud subscription . SAP generated about 11.51 billion eouros from the segmenr software and support.

The following Figure 1 shows SAP's global revenue from 2009 to 2020. Among the most profitable segments of the company can be highlighted Software support sector which brings approximately 10% of the whole revenue annually. Also, there should be noted the annual revenue growth of such sectors as Services, Cloud Sector and other Services.

---

[39] About SAP. URL: https://www.sap.com/corporate/en.html

Figure 1. SAP's global revenue from 2009 to 2020, by segment (in million euros)
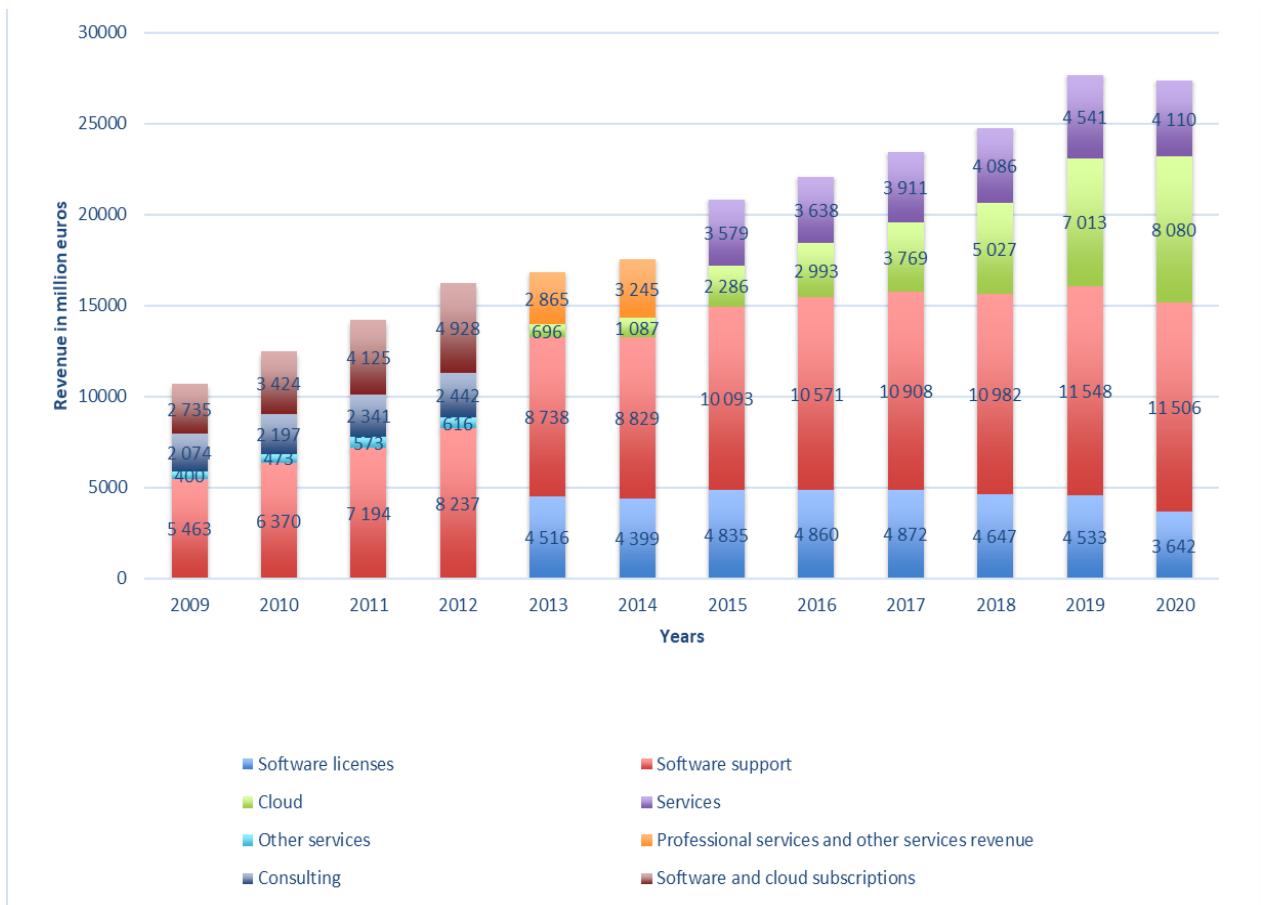
Source: SAP 2020 Annual Report on Form 20-F, p.11.

Chief Executive Officer (CEO) of SAP is Christian Klein. He joined SAP in 1999 and appointed to Executive board in 2018.

SAP Executive board consists of 8 people as of 31.01.2021. Among them[40]:

- CEO - Christian Klein;

- Chief People Officer, Labor Relations Director - Sabine Bendiek;

- Customer Success (until January 31, 2021) - Adaire Fox-Martin;

- Chief Financial Office- Luka Mucic;

- Customer Success (since February 1, 2021) - Scott Russell;

- Chief Technology Officer Juergen Mueller;

- SAP Product Engineering - Thomas Saueressig;

---

[40] SAP Integrated Report 2020, URL: www.sapintegratedreport.com, p. 10-11.

- Marketing, Communications, and Solutions - Julia White.

The focus on this thesis mainly will be on the compensation of Chief Executive Officer and it's relation to the performance of the firm.

Factors such as the COVID-19 pandemic, Brexit, political instability and the presidential elections in the United States had a direct impact on the company's financial situation and its position on the global market, as investment pressure remained high amid persistently low interest rates.

As the annual lows of the stock market continue to rise, SAP's share price fell 10.9% year over year.

In the next chapter of the Thesis relationship between shareholders and company's management will be disclosed.

4.2 Types of compensation at SAP

There are two systems of compensation and both of them are approved by the Annual General Meeting. The data related to compensation system is taken from the annual „SAP Integrated Report", which represents full-year financial performance[41].

CEO rewards are based on requirements that match a global company in a fast-paced industry. The compensation level of CEO must be competitive to support SAP in the global marketplace for highly qualified executives, especially in the context of the international software industry.

The compensation consists of two systems (Table 1):

- non-performance – based compensation;

- performance-based compensation.

Table 1. Systems of compensation at SAP

Non-performance-based compensation			Performance-based compensation	
Fixed compensation	Fringe Benefits	Retirement Pension	STI – Short-term incentive	LTI- Long-term incentive

Source: own elaboration, data taken from SAP Integrated Report 2020, p. 23.

---

[41] Ibid, p. 23.

Performance-based compensation depends mainly on SAP's performance against predefined goals (key performance indicators, KPIs) and SAP stock prices, and may be restricted. These KPIs and their target values and weights are set by the Board of Supervisors every year, and are consistent with SAP's budget for the year or the SAP financial goals reported externally.

The target salary is evaluated based on SAP's global strategy, market position, business performance and future economic prospects, as well as salaries paid in comparable domestic and international companies.

Based on salary data from DAX 30 and US IT and other technology companies, a benchmark test was conducted in February 2020. Each performance-based element corresponds to the 100% goal of all KPIs. The Supervisory Board reviews, evaluates and sets these remuneration targets at the first meeting of each fiscal year (February 19, 2020). The Supervisory Board believes that this method can ensure the adequacy of compensation[42].

SAP is one of the leading providers of customer service applications in the world. Figure 2 demonstrates the leading vendor share of the customer service application market worldwide in 2018 and 2019.

As it can be noticed, Salesforce was the market leader possessing a market share of 45 percent. Oracle and SAP lag significantly behind the current leader, the size of their market share fluctuates approximately at the same level.

SAP's market share was 7.9% in 2019 which is lower than it was in 2018 (8.3%).

---

[42] Ibid, p. 23.

Figure 2. Customer service application leading vendor share worldwide in 2018 and 2019 (in percentage)
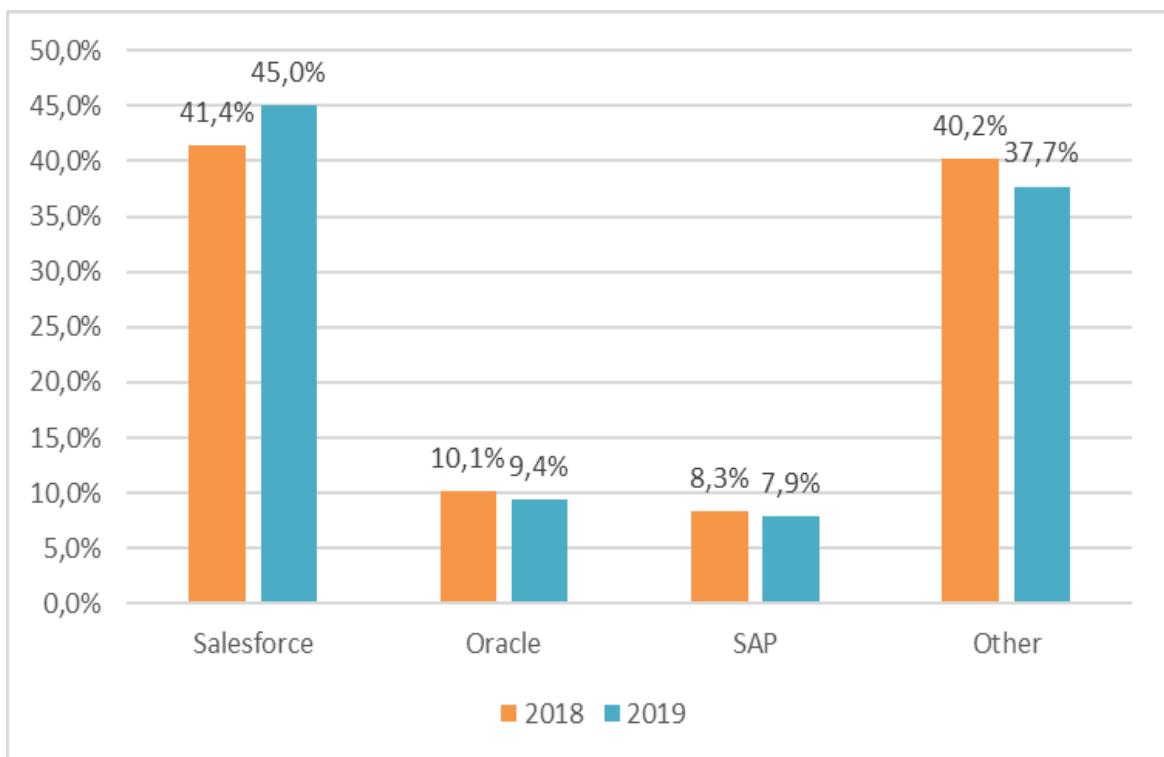
Source: Salesforce.com, 2021.

Based on the Figure 3 SAP is in the top 10 of most valuable technology brands worldwide in 2020.

This Figure 3 demonstrates Top-20 technology companies for 2020 year ranked by their brand values. The first spot in the rating belongs to Apple whose brand value exceeds 352 billion U.S. dollars. The company successess is accomplished with its growth in annual revenue, that equaled 260 billion U.S. in 2019 and was announced as firms highest annual revenue.

Figure 3. Values of the top 20 technology brands worldwide in 2020 (in billion U.S. dollars)
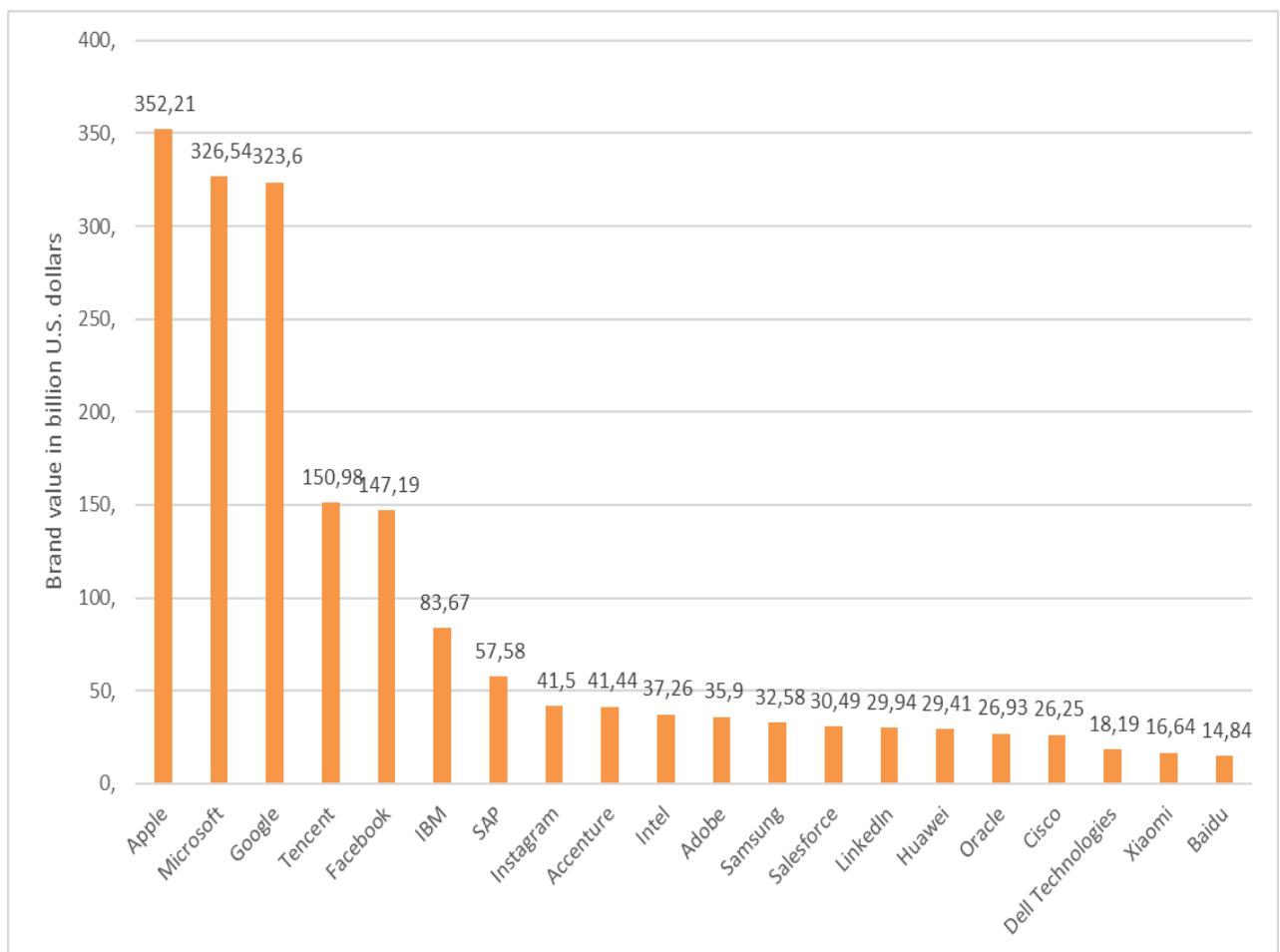
Source: own elaboration based on data from Bloomberg

https://www.brandz.com/admin/uploads/files/2020_BrandZ_Global_Top_100_Report.pdf

According to the chart, Apple is followed by such technology companies as Microsoft with brand value equal to 326 billion U.S. dollars and Google with brand value of 323 billion U.S. dollars. SAP takes the seventh place at this chart and its brand value is equates to 58 billion U.S. dollars. According to the opinion of many specialists, SAP has made solid progress on its internal dimensions of brand leadership in 2020.

Thus, total Executive Board compensation includes fixed and variable compensation. In the next chapter non-performance-based compensation of CEO at SAP will be described.

4.2.1 Non-Performance-Based Compensation of CEO at SAP

Fixed compensation is part of non-performance-based compensation. It's paid in 12 instalments on a monthly basis in local currency of CEO.

Fringe Benefits

Additional benefits in the SAP, which are specified in the contract, consist of insurance contributions, payments in kind, costs of maintaining two households, aircraft use and tax gross levies in accordance with local conditions.

The upper limit of regular fringe benefits is 20% of the CEO's fixed remuneration.

The recurring fringe benefits are limited in terms of value to 20% of fixed compensation for the CEO.

As stated in the Integrated Report 2020 if the members of the board of directors are permanently residing abroad, then in this case, he is entitled to compensation for tax advice in the amount of 30% of the fixed compensation of the CEO.

If it's needed to move to Germany from abroad, then the CEO will receive a package for the move, which includes up to 30% of his fiscal compensation.

In addition, if a compensation benefit received prior to the transition to the SAP Executive Board is lost due to that transition, a one-time payment (entry bonus) of up to 200% of the flat fee may be granted.

Retirement Pension

The pension plan used by SAP is based on assessed contributions. For Board members who have their permanent residence abroad, SAP is able to rearrange the retirement plan that applies to employees of a company belonging to the SAP group in the respective country, taking into account a limit of up to 30% of their fixed compensation.

4.2.2 Performance-Based Compensation of CEO at SAP

Performance -based compensation of SAP Executive board consists of Short-term (one-year performannce based) pay and the long-term (multi-year basded) pay.

The short-term compensation is also called Short-Term Incentive (STI) depends on a set of financial goals (KPIs).

STI 2020 financial KPIs are 80% and include:

-current cloud reserves in constant currency, not related to IFRS;

- annual growth of revenue from cloud computing and software in constant currency excluding IFRS;

- increase in operating margin in constant currency excluding IFRS in 2020 compared to the same period last year.

20 % are the sustainability KPIs and they include:

- Customer Net Promoter Score, which measures SAP customer loyalty;

- Employee Engagement Index, which measures the commitment, pride and loyalty of SAP employees;

- Carbon Impact, which measures SAP's greenhouse gas emissions.

The detailed overview of STI is illustrated on the Figure 4 below:

Figure 4. Short-term incentives of SAP company
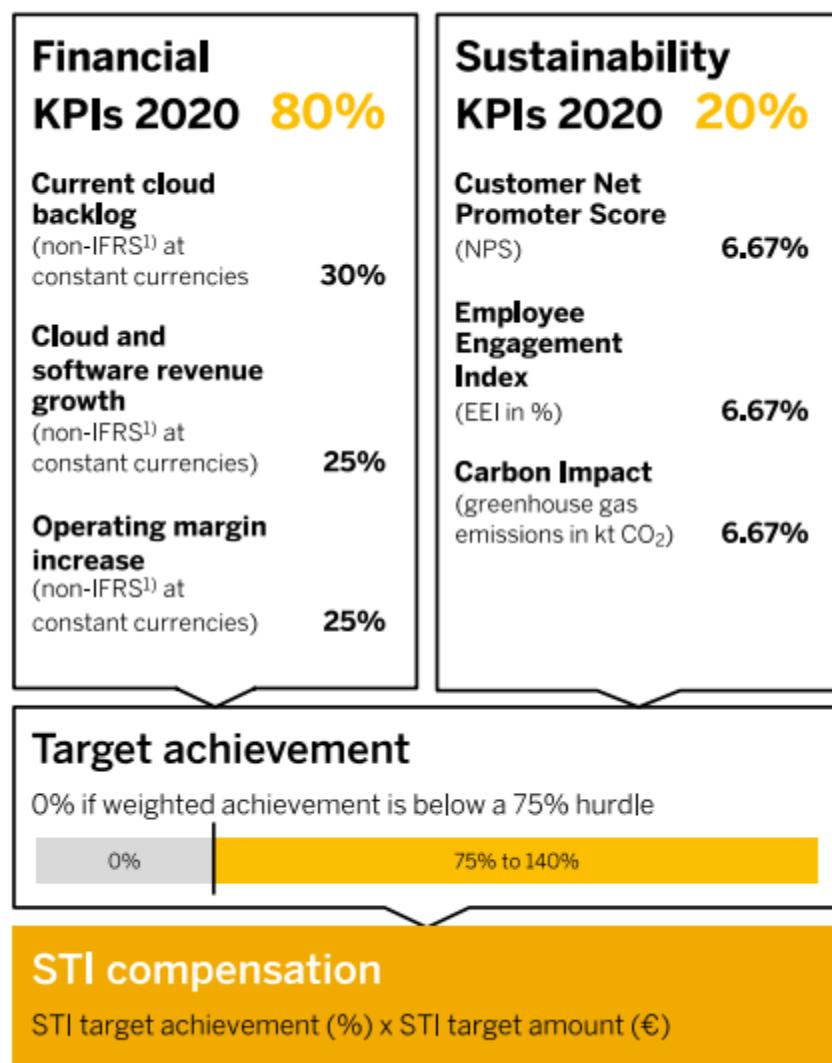
Source: SAP Intagrated Report 2020, p. 24.

If the weighted target achievement for the financial KPIs is below 75%, there is no STI payout for the financial KPIs. In this case, the target achievement for these KPIs is set to zero.

The 2020 targets have not been adjusted despite the global situation with Covid 19 and its impact on the company's performance.

The STI compensation is paid out after the Annual General Meeting of Shareholders. It is paid in the national currency of the members od Executive Board. All of them must acquire at least of 5% SAP shares of the actual payout amount according to appropriate trading period regulations. These shares are held for three years.

Long-Term Incentives

The goal of the long-term incentive – LTI (in other words multi-year performance-based compensation) is s to reward annual operating profits with a constant non-IFRS currency to ensure the long-term retention of executive board members and to reward them for a long-term SAP share price performance ("Performance") as compared to its main peer group (Peer Group).

In 2020, the Supervisory Board presented a new long-term performance-based multi-year compensation plan called "the SAP Long-Term Incentive Program 2020 (LTI 2020)".

LTI 2020 is issued once a year to reflect SAP's long-term strategy, so as to establish a unified incentive mechanism for the executive board members to achieve the key goals in the long-term strategic plan. LTI 2020 is also used to reward the members of the executive committee for the long-term performance of SAP stock price relative to the market, thereby ensuring respect for the interests of shareholders. In addition, LTI 2020 includes components designed to ensure the long-term retention of executive board members.

LTI 2020 is a virtual equity plan that provides annual payments for approximately four years each year. When a single payment is awarded, in each case, the amount of appropriation specified in the service contract of the executive board member is converted into virtual shares.

The amount of the subsidy cannot exceed 700% of the fixed compensation (based on the corresponding euro amount when the specific compensation is determined). Finally, the grant amount is divided by the SAP stock price, that relates to the arithmetic average

(grant price) of the 20 trading days after the planned release of the preliminary results for the fourth quarter and the full year.

In 2020, preliminary results will be released on January 28, 2020. The shares allocated in this way consist of

-1/3 of the financial performance share units (FSU),

-1/3 of the market value share units (MSU),

-1/3 of the retention share units (RSU).

The vesting period for all three types of units is approximately four years.

The overview of the LTI Grant process is illustratde on the Figure 5.

Figure 5. LTI Grant process
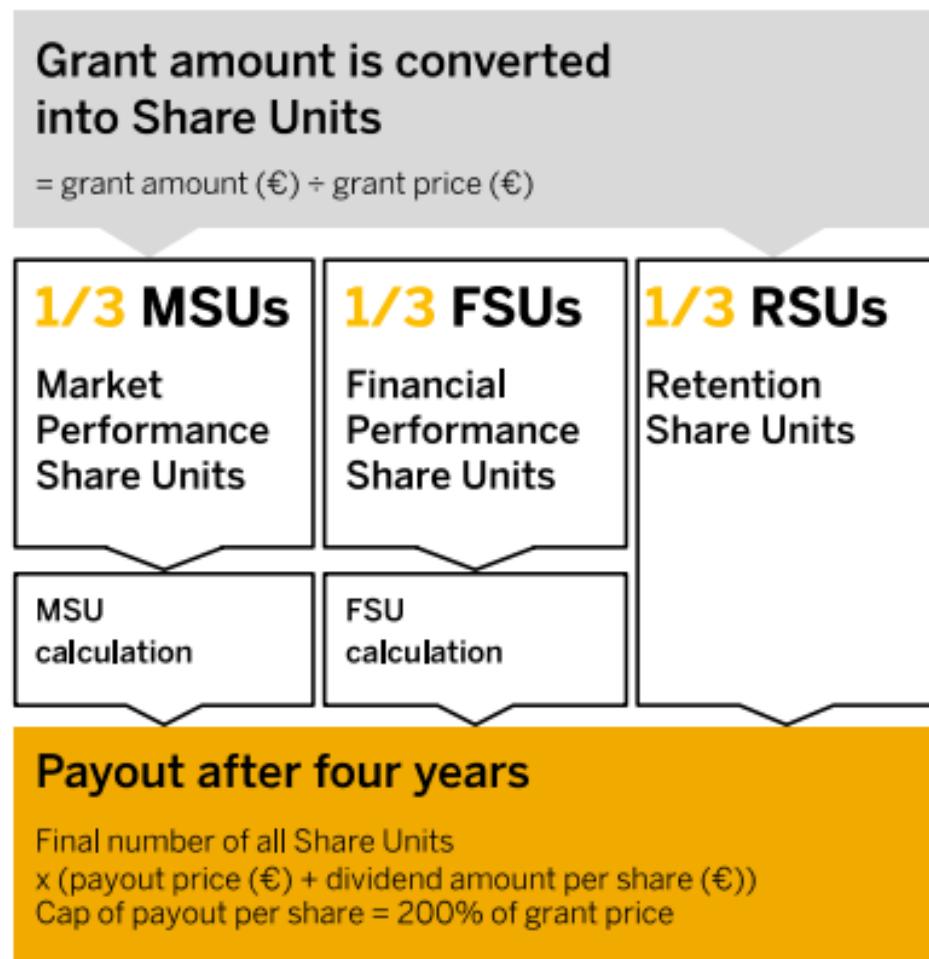
Source: SAP Intagrated Report 2020, p. 25.

Compared to RSU, FSU and MSU will undergo quantitative changes. In addition, FSU, MSU and RSU may be confiscated in whole or in part.

The value of the existing FSU, MSU and RSU will be paid in Euros after the SAP annual general meeting, which uses the financial statements for the third fiscal year after the fiscal year in which the shares were granted.

The validity of the unit is related to the dynamics of the SAP stock price (including dividend payments). Therefore, the amount paid for each unit (considering the specific circumstances, the price is equal to the current SAP stock price plus the dividend units paid for SAP shares from the beginning of the year in which these units are granted to the end of the third year of the following year. Within 20 trading days after the planned fourth quarter and full-year preliminary results are released, the arithmetic average of the SAP stock price will be used as the payment price.

The unit payment amount (including the unit dividend amount payable) is limited to 200% of the award price. As the number of FSU and MSU may change, any year.

Therefore, the LTI 2020 installment payment is arithmetically equal to 267% of the grant amount. Any potential exchange rate risk shall be borne by the members of the board of directors.

However, under certain conditions, all types of shares may expire during the entire payment period.

Thus, the total compensation of the CEO can reach millions of euros, which is hundreds of times higher than the salary of average workers. The next chapter will examine the dependence of SEO compensation on the company's financial performance, as well as provide the results of a survey conducted with company employees about their views on the existing CEO compensation system.

4.3 Questionnaire about the Agency Problem

Another part of the Diploma Thesis is a conduction of questionnaire. SAP employees from Global finance shared services department and Corporate finance reporting department were asked about Agency problem topic if they are aware about its existence.

In 2015 there was a simmilar survey conducted by Stanford University (Corporate Governance Research Initiative; The Rock Center for Corporate Governance).

The main question of the survey to respondents was: "Do you believe the government should do something to change current CEO pay practices?"

The opinion of Americans about the CEO pay practice in the U.S. in 2015 is illustrated on the Figure 6.

Figure 6. Public opinion on current CEO pay practices in the U.S. 2015
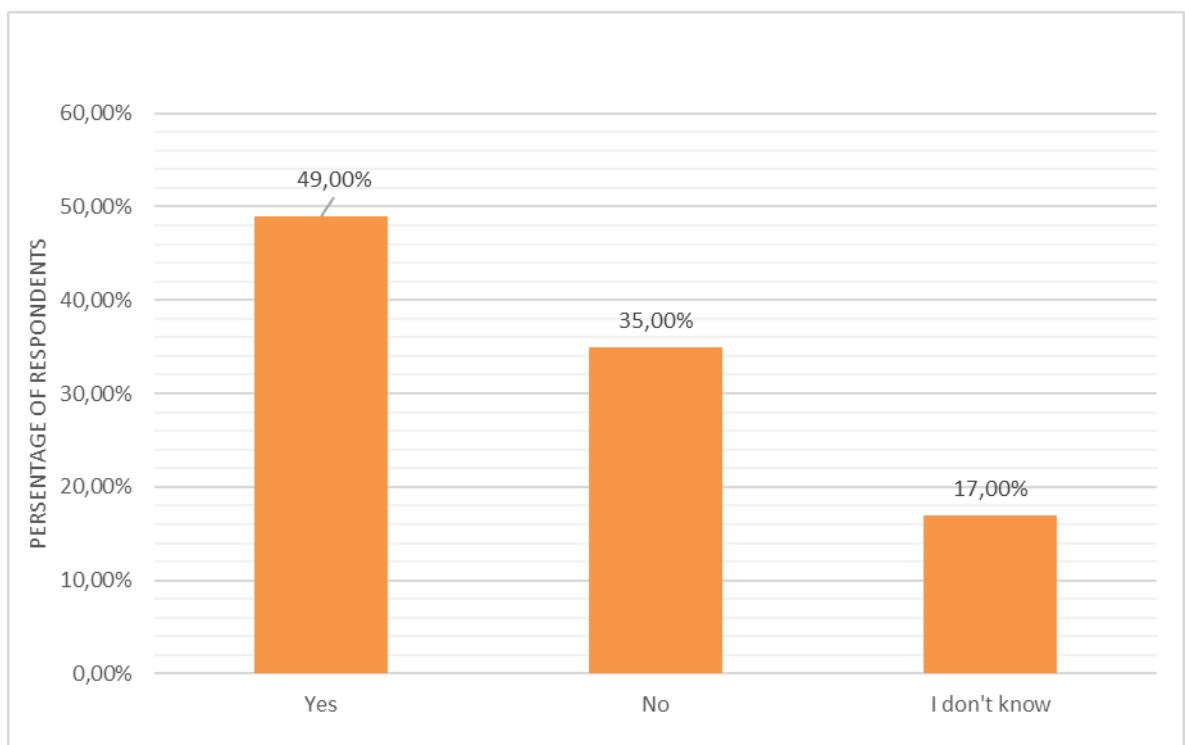
Source: Americans and CEO Pay 2016, page 9. URL: Centers & Research Initiatives | Stanford Graduate School of Business

Based on the Figure 6 approximately half of the respondents (49 percent) believed that the government should do something to change current CEO pay practices.17% of the respondents do not have an opinion about this topic. The majority of Americans believe that CEOs are overpayd relative to the averager worker. The public opinion varies about the degree to which executives should share in the value created at a company.

According to the research done by Fernando Duarate most CEOs in few days earn more than the average worker annually[43]. On the Figure 7 the ratio between CEO and average worker pay in 2018 is demonstrated.

---

[43] Fernando Duarte, 2019. „It takes a CEO just days to earn your annual wage". URL: https://www.bbc.com/worklife/article/20190108-how-long-it-takes-a-ceo-to-earn-more-than-you-do-in-a-year

Figure 7. Ratio between CEO and average worker pay in 2018 (by country)
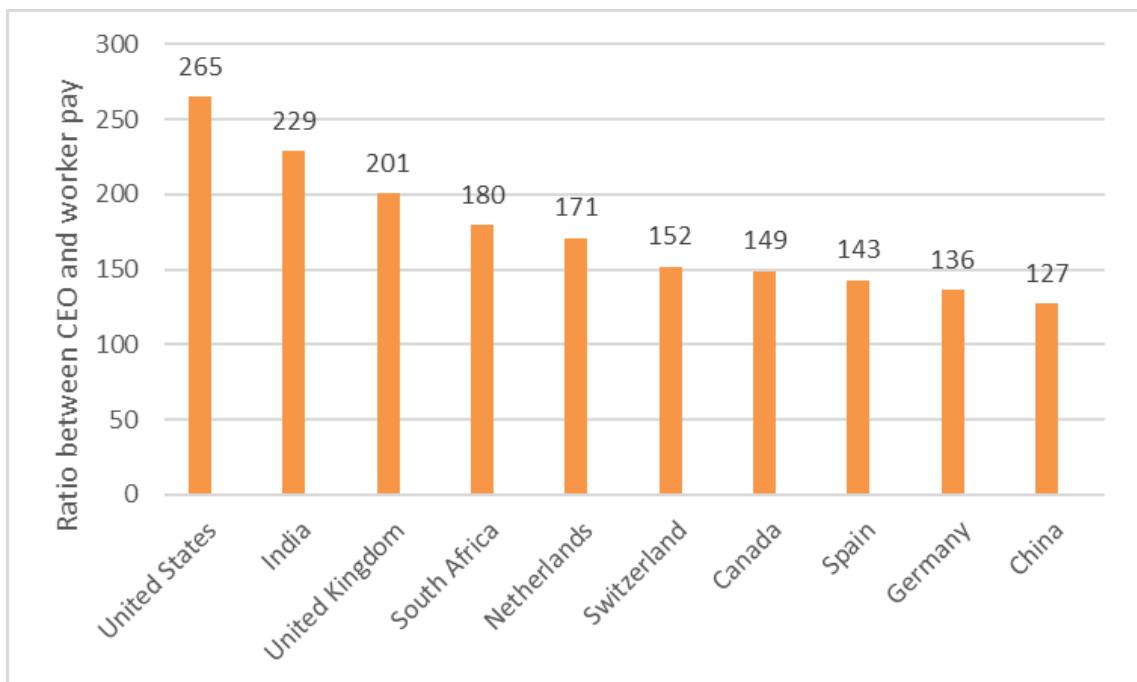
Source: Bloomberg, 2021. bbc.com

Based on the study of Lawrence Mishel and Julia Wolfe (2019) included 350 America's largest public firms, the Ratio between CEO and average worker pay, using the options-exercised measure, amounted 20-to-1 in 1965, 30-to-1 in 1978, 58-to-1 in 1989 and 121-to-1 in 1995[44]. As it visible from the Figure 7 in 2018 it doubled from 121-to-1 in 1995 to 265-to-1 in 2018.

A survey regarding gap between CEO compensation and worker salaries shows that United States of America again appear to take top place among all comparable countries. On average, Chief Executive Officers in the U.S. in 2018 were paid 265 times more than the workers in the same company.

US are followed by India, where the ratio equals 229 and explained by poor remuneration of Indian average worker in comparison with other more developed countries. The ratio for United Kingdom is also exceeding 200. Spain, Canada, Germany and China rounded out the top 10 for countries with the highest CEO to worker pay.

---

[44] Lawrence Mishel and Julia Wolfe. 2019. „CEO compensation has grown 940% since 1978". URL: https://www.epi.org/publication/ceo-compensation-2018/#:~:text=CEO%20compensation%20in%202018%20(stock%2Doptions%2Dgranted%20measure),the%20recovery%20began%20in%202009

Thus, the above mentioned surveys served as the idea for a similar survey for SAP company. The main aim of the questionnaire was to determine awareness of SAP workers on the topic of Agency Problem and identify their opinion regarding the CEO pay practices and interference of goverment in it.

Number of respondents: 30 employees of SAP GFSS and CFR departments.

Among respondents by years of working experience were:

10 employees with experience from 1 to 3 years, 9 employess with experience from 3 to 5 years, 6 employees with experience more than 5 years and 5 employees with less than a year of experience.

They are currently located in Prague, Czech Republic, but originally they come from differen countries. There are 19 people with experience in a company from 1 to 5 years.

There are 13 associates, 12 specialists, 3 managers and 2 interns among respondents.

The results of the questionnaire are demonstrated on the Figures 8, 9 and 10 below.

Figure 8. Awareness of employees about Agency problem (in persentage)
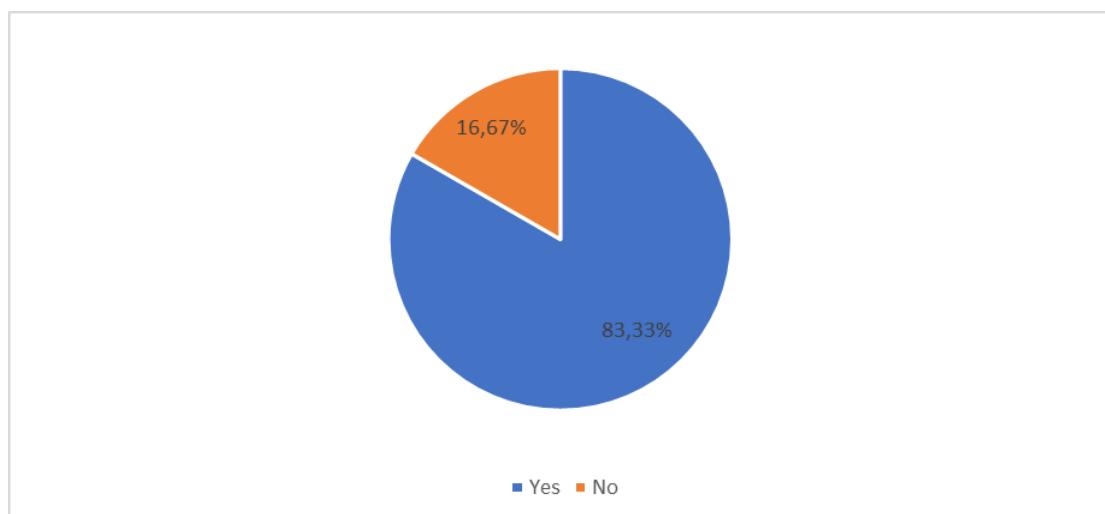
Source: own elaboration, 2021.

83,33% of employees are familiar with the topic of Agency problem. 16,67% of respondents have not heard about existence of this problem between owners or shareholders and CEOs.

Figure 9. Opinion of employees regarding high gap between the CEO pay and average worker's pay (in persentage)
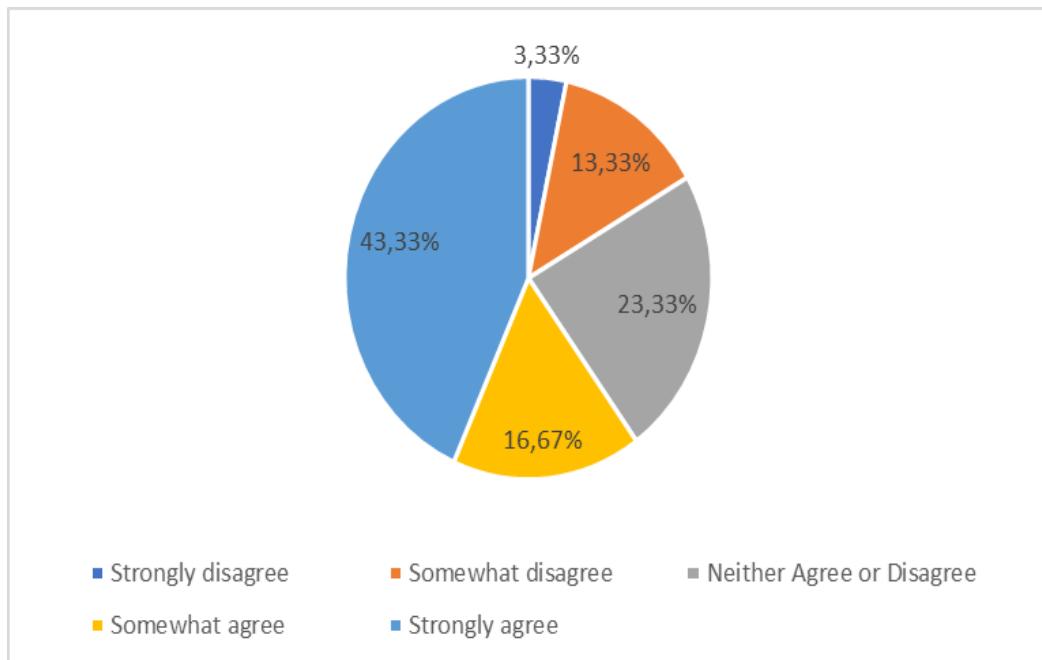
Source: own elaboration, 2021.

Majority of respondents (43,33 %) believe that CEOs are not overpaid and they are compensated in an appropriate amount. 16,67% of employees somewhat agree to the statement that huge gap between CEO pay and average worker pay is sufficient. They might be not completely sure as they don't have enough information about the reason of such a high remuneration if it's really fair and relates to the performance of the company. Thus, it could be concluded that more than the half of employees agree with such division of compensation.

About 23,33% of respondents do not have a clearly expressed position on this issue. About 13,33% of respondents somewhat disagree of such a huge gap. Only 3% of employees stongly disagree with the statement.

The last question to respondents was the same as in the survey conducted by Stanford University: „Do you believe the government should do something to change current CEO pay practices?"

Figure 10. Respodents opinion about the government interference (in persentage)
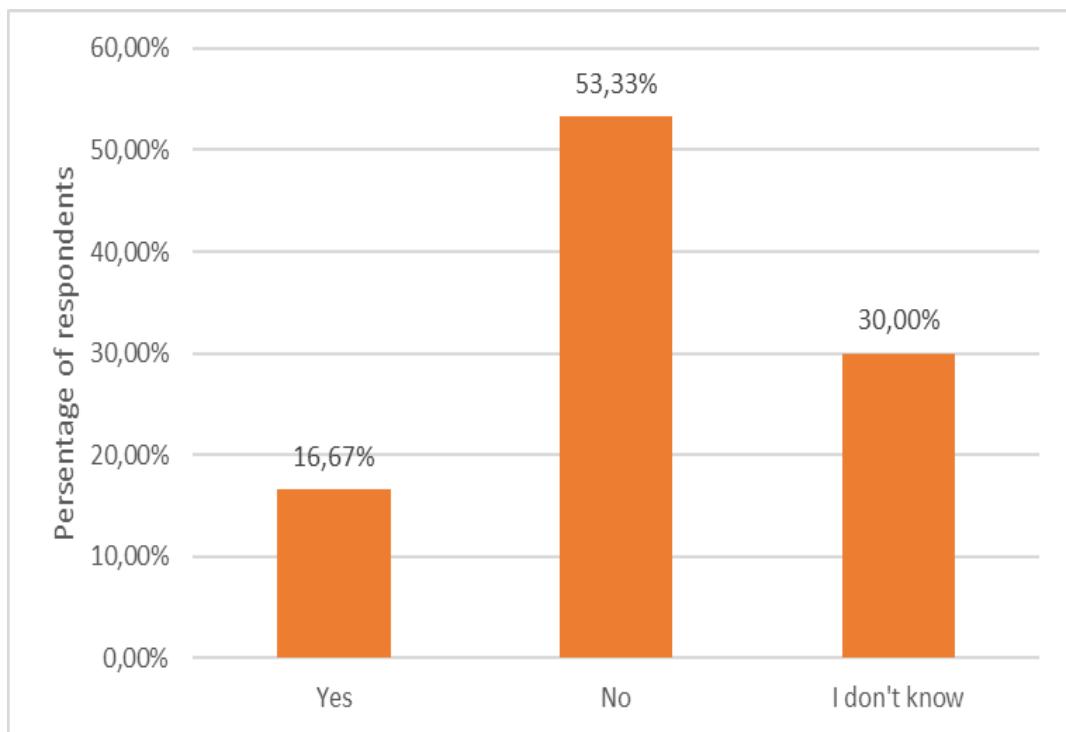
Source: own elaboration, 2021.

On the Figure 10 it's visible that 53,33% of employees are not in a favor of government support regarding changes in CEO pay practices. The reason stated by one of the respondents was that it's a publicly traded company and state should not be giving such directory for compensation of anyone in a company. 16,67% of respondents believe that government should intervene, while the remainder 30 % have no opinion.

And it's worth to mention that the results differ from the results obtained in the survey of Stanford University. According to the survey of Stanford University most of the Americans (49%) are in favor of government interference in CEO pay practices. 35 % of respondents have an opinion that there is no need to regulate CEO pay practices by government. And 17% of respondents do not have an idea.

Thus, according to the results obtained in questionnaire, there is a variety of positions on the significant difference in high compensation of CEOs compared to the average employee. One of the reasons was the lack of knowledge in the need for such high remuneration of CEOs and whether it is connected with performance of the company. This interconnection between CEO pay and firm's performance will be deeply explored in the next chapter using OLSM.

4.4 Assessment of firm performance impact on CEO compensation using OLSM

There are several ways for assessing the impact of firm performance on CEO compensation. One of the methods is an econometric analysis. For analysis of the relationship between firm performance and CEO pay the Linear Regression analysis will be used for time series data from 2003 to 2020.

This means that the CEO compensation is the dependent variable. The explanatory variable is the performance of the company, because it tests whether the explanatory variable is related to the dependent variable.

In order to provide the estimation of the parameters, the Ordinary Least Squares Method (OLSM) will be used via SW Gretl.

For the endogenous variable CEO compensation, data on the total compensation of CEO will be collected. Total compensation of SAP is measured by sum of performance related and non-performance related compensation. It's made up by following components:

- Fixed compensation;
- Fringe benefits;
- Share-based payments;
- equity-based compensation composed of stock-options, restricted stocks and/or performance shares.

All measures of CEO compensation are in absolute values.

In order to investigate the correlation of CEO compensation with the performance of the firm, for the independent variable will be taken following firm performance indicators:

1) ROA – return on assets. It measures the rate of return on the total assets (shareholder equity plus liabilities). It measures the efficiency of a company in generating profit from shareholders' equity and its liabilities.

2) EPS – earnings per share. Shaw used this indicator in his study regarding compensation and performance. He stated that „share performance helps us to evaluate how absolute performance translates into value for the shareholder"[45]. It is an indicator that attracts the greatest interest among owners and

---

[45] Gerhart, B., and G. T. Milkovich. 1990. "Organisational Differences in Managerial Compensation and Firm Performance." Academy of Management Journal 33 (4): pp. 663–691.

shareholders as it is usually used for setting up the goals by the board of the company.

3) PE ratio – price-to-earnings ratio. It measures the current share-price of a company in relation to its earnings per share. It allows investors to better understand the value of the company.

4) ROIC – return on invested capital. It characterizes the return on the financial resources invested in the business. In this case, only those investments are taken into account that were directed to the main activities of the company.

All of the avove mentioned indicators may affect the CEO compensation. They were included in our model in order to measure which is the most influential with regard to CEO pay.

According to the different researches these indicators demonstrated the most significant relationship with the CEO compensation. For example, Gerhart and Milkovich used ROA as the measure of company performance in their investigation of relationship between compensation and performance of the firm[46]. Therefore these indicators were chosen for construction of the model with the purpose to estimate their influence on the CEO pay in the selected company – SAP SE company.

Economic model for OSLM:

$$y = f\,(ROA;\ EPS;\ PE,\ ROIC\,) \qquad (5)$$

where,

ROA – Return on Assets, %

EPS – Earnings per share, USD

PE – PE ratio

ROIC - Return on Capital (ROIC), %

<u>A*ssumptions of economic theory*</u>:

1) Does the increase of ROA of the company lead to increase in CEO compensation?

[46] Shaw P. 2011. "CEO Pay-performance Sensitivity in South African Financial Services Companies." Unpublished master's dissertation. Department of Business Administration, University of Pretoria, Pretoria, p. 15.

2) Could the CEO's pay be influenced by the change of EPS level in a given year?

3) May the increase in PE ratio affect the increase in compensation of CEO?

4) Does the interdependence exist between CEO pay and return on capital?

4.4.1 Econometric model

$$y_t = \gamma_0 x_0 + \gamma_1 x_{1t} + \gamma_2 x_{2t} + \gamma_3 x_{3t} + \gamma_4 x_{4t} + u_t \qquad (6)$$

where,

y_t - Endogenous (dependent, explained) variable (regressand)

$x_{1t}, x_{2t}, x_{3t}, x_{4t}$ – Exogenous (explanatory) variables in time (regressors)

u_t - Stochastic variable (residual term)

$\gamma_0, \gamma_1, \gamma_2, \gamma_3, \gamma_4$ - Parameters

Declaration of variables + units:

y_1 – **Total compensation of CEO, million USD /year**

x_0 – unit vector (constant)

ROA – Return on Assets, %

EPS – Earnings per share, USD

PE – PE ratio

ROIC - Return on Capital (ROIC), %

N - number observations. There are 18 observations in the model.

In the next part of the Thesis data set will be provided and correlation matrix will be presented.

4.4.2 Data set (data table + source; correlation matrix)

Calculations of total CEO compensation, Return on Assets (ROA), Earnings per Share (EPS), Price to Earnings ratio (PE) and Return on Current Investments (ROIC) indicators were done based on SAP Integrated and Annual Report for period from 2003 to 2020 using Excel tool.

On the Table 2 all calculated data for period 2003-2020 is represented.

Table 2. Data set of SAP's performance and CEO pay for priod 2003-2020

N	Year	Total CEO Compensation, million USD	ROA, %	EPS, usd	PE ratio	Return on Capital (ROIC),%
		Y1	ROA	EPS	PE	ROIC
1	2003	5.5	18.00	1.13	38.6	48.1
2	2004	6.5	18.80	1.72	31.39	45.5
3	2005	7.6	18.00	1.50	32.23	54.7
4	2006	11.3	18.93	1.91	27.3	78
5	2007	8.1	19.06	2.18	23.23	84.6
6	2008	12.3	13.49	2.33	17.54	81.6
7	2009	12.6	15.40	2.12	22.89	79.2
8	2010	11.0	12.89	2.08	25.63	53.3
9	2011	16.8	13.55	3.76	14.61	83.8
10	2012	17.0	10.52	3.12	26.7	66.6
11	2013	19.6	12.27	3.83	23.41	74.6
12	2014	13.0	8.54	3.64	21.56	47.5
13	2015	10.4	7.40	2.84	29.2	31.7
14	2016	16.5	8.21	3.21	27.7	39.7
15	2017	18.2	9.54	4.03	28.7	42.3
16	2018	11.2	7.94	4.04	26.06	34.9
17	2019	12.3	5.60	3.11	44.11	17.2
18	2020	11.1	9.03	4.97	25.53	21.3

Source:own calculations based on SAP Integrated and Annual reports 2003-2020.

Figure 11. Correlation matrix

```
Correlation Coefficients, using the observations 2003 - 2020
5% critical value (two-tailed) = 0.4683 for n = 18

       ROA           EPS            PE          ROIC
    1.0000       -0.7407       -0.0801        0.6310   ROA
                  1.0000       -0.3051       -0.3360   EPS
                                1.0000       -0.6363   PE
                                              1.0000   ROIC
```

Source: Own calculations using SW Gretl.

Based on Figure 11 correlation matrix has no values greater than 0.8 among explanatory variables. It means that regressors used in the model are not correlated. The

correlaton parameters do not exceed 80%. Therefore. there is no multicollinearity in the model. which is desirable. The highest correlation coefficient is between EPS and ROA, which is equal to -0.7407. This value ($0.8 \geq |-0.7407| = |P_{ESP\ ROA}|$) indicates that both the high multicollinearity ($r > 0.8$) and perfect multicollinearity ($r = 1$). are not present.

4.4.3 Parameters' estimation in SW Gretl

The Ordinary Least Square Method (OLSM) was used in SW Gretl to estimate parameters of the model (Figure 12).

Figure 12. Ordinary Least Square Method. using observations 2003-2020

```
File  Edit  Tests  Save  Graphs  Analysis  LaTeX

Model 1: OLS, using observations 2003-2020 (T = 18)
Dependent variable: Y1

               coefficient   std. error    t-ratio    p-value
   -------------------------------------------------------------
   const        -5.04508      8.23122      -0.6129     0.5505
   ROA          -0.632221     0.214236     -2.951      0.0112    **
   EPS           2.43894      0.916271      2.662      0.0196    **
   PE            0.262009     0.139870      1.873      0.0837    *
   ROIC          0.205571     0.0489327     4.201      0.0010    ***

Mean dependent var    12.28127    S.D. dependent var    4.038776
Sum squared resid     59.51770    S.E. of regression    2.139693
R-squared             0.785366    Adjusted R-squared    0.719325
F(4, 13)              11.89209    P-value(F)             0.000277
Log-likelihood       -36.30401    Akaike criterion      82.60802
Schwarz criterion     87.05988    Hannan-Quinn          83.22187
rho                   0.162084    Durbin-Watson         1.643064
```

Source: Own calculations using SW Gretl.

The following estimates of parameters were received (Table 3):

Table 3. Estimates of parameters

γi	result
$\gamma 0$	−5.045
$\gamma 1$	−0.632
$\gamma 2$	2.439
$\gamma 3$	0.262
$\gamma 4$	0.206

Source: Own calculations using SW Gretl.

Thus, estimated econometric model is:

$$\hat{y}t = -5.045 - 0.632ROA_{1t} + 2.439\ EPS_{2t} + 0.262PE_{3t} + 0.206ROIC_{4t} + \hat{u}_t \qquad (7)$$

where,

y_1 – Total compensation of CEO, million USD /year

$x0$ – unit vector (constant)

ROA – Return on Assets, %

EPS – Earnings per share, USD

PE – PE ratio

ROIC - Return on Capital (ROIC), %

4.5 Verification of a linear regression model (LRM)

4.5.1 Economic verification

The economic verification is carried out in order to assess the direction and intensity of the effect caused by explanatory variable on the explained variable, in other words, the accuracy of the signs and the size of the numerical values of the estimated parameters.

Based on the coefficients obtained by OLS method which are presented in the Table 3, following interrelations between CEO compensation and financial indicators are formulated:

1) If the ROA indicator increases by 1%, then the compensation of CEO will decrease by 0.632 million USD, ceteris paribus.

2) If the EPS grows up by 1 USD, then the CEO pay will increase by 2.439 million USD, ceteris paribus

3) If PE decreases by 1 unit, then the compensation of CEO will go down by 0.262 million USD, ceteris paribus.

4) If the ROIC indicator increases by 1 unit, then the CEO pay will increase by 0.206 million USD, ceteris paribus.

All the above-mentioned estimates have the positive relationship with the CEO compensation and financial indicators and correspond with the assumptions made earlier, except of Return on Assets.

As it was assumed before if a firm uses its assets more effectively, the higher CEO pay should be. But there is a negative relationship between CEO pay and ROA, which causes controversy across studies. While some studies show positive relationship between ROA and CEO pay, the others have the negative relationship. Bradly[47] and Coetzee and Hall[48] also have found the strongest negative correlation between CEO pay and ROA in their studies.

4.5.2 Statistical verification

The degree of conformity between the estimated model and real data

The coefficient of determination – „Goodness of fit".

Our coefficient of determination R2 is equal to 0.785366. We can say that 78.5 % change in the total compensation of CEO at SAP company (y) is explained by changes in the independent variables (ROA, EPS, PE, ROIC). But this value is generally considered a strong effect size. It indicates that the model explains the variability of the responses data around its mean.

R^2 is a measure of "goodness of fit" of the linear relationship. The higher the R^2, the better the model fits real data.

Statistical verification of an entire model

Null hypothesis (H0): $\gamma 1 = \gamma 2 = \gamma 3 = 0$. All regressors x_i taken jointly are not significant (the entire model is false).

Alternative hypothesis (H1): γi . H0 is not true.

F-test checks the statistical significance of R^2 and evaluates the statistical significance of a whole model:

df = n - p, where

df – degree of freedom

n – number of observations

p – number of parameters

df = 18 – 5 = 13.

[47] Bradley S. 2013. The relationship between CEO compensation and company performance in a South African context. *Jornal of Economic and Financial Sciences*. Vol. 6 p. 539-564.
[48] Coetzee, Willem Jacobus, and John Henry Hall. 2020. "The Relationship Between CEO Compensation and Company Performance Measurements of Listed South African Firms". Southern African Business Review 24 (May), p. 23.

$\alpha = 0{,}05$

The value of F-test statistic of our model is equal to 11.89209 (we can find it in SW Gretl).

According to the table F*0.05(4, 13) = 3.1791

$\hat{F}$ =11.89209 >F* =3.1791 –> thus, the conformity between model and data is statistically significant.

Statistical verification of estimated parameters

Test of statistical significance of the estimated parameters (γ_1, γ_2, γ_3) is needed to see if there exists statistical evidence against or in favour of inclusion of each regressor (x_i).

Null hypothesis (H_0): $\gamma_i=0$ - parameter is false, it is not statistically significant

Alternative hypothesis (H_1): $\gamma_i \neq 0 - H_0$ is not true, parameter is statistically significant.

To test stated hypothesis, need to calculate test statistic => t-value (Table 4).
df = n - p, where

df – degree of freedom

n – number of observations

p – number of parameters

df = 18 – 5 = 13

$\alpha = 0{,}05$

Table 4. T-value calculation to test statistical significance

	X_0 (const)	ROA	EPS	PE	ROIC
Parameters	−5.04508	−0.632221	2.43894	0.262009	0.205571
t-value	|−0.6129|	|−2.951|	2.662	1.873	4.201
$t\alpha$ (0.05;13)	2.1604	2.1604	2.1604	2.1604	2.1604
Significant or not significant	Not significant	significant	significant	Not significant	significant

Source: Own calculation, data is taken from SW Gretl.

1. If $t_{value} > t_\alpha$ -> we can reject H_0 about the statistical insignificance of the parameter -> explanatory variable in terms of its influence on the response variable (at the

level of significance α = 0,05 and at n-p (18-5) degrees of freedom) is statistically significant.

2. if $t_{value} < t_\alpha$ -> this explanatory variable is NOT statistically significant with probability 100 (1-α)%.

Alternative approach

In order to determine the degree of conformity between the actual value of the parameter with and its estimate.

The confidence interval is determined:

$$\gamma_{iinterval} = \gamma_{ii} \pm t_\alpha S_{\gamma i}$$

If the confidence interval contains ZERO, the parameter is NOT statistically significant.

The results of calculation of the confidence interval using SW Gretl are given on the Figure 13.

Figure 13. Coefficient confidence intervals

```
t(13, 0.025) = 2.160

       VARIABLE          COEFFICIENT        95% CONFIDENCE INTERVAL

          const            -5.04508          -22.8275        12.7374
            ROA           -0.632221          -1.09505       -0.169393
            EPS             2.43894           0.459453        4.41842
             PE            0.262009          -0.0401632       0.564180
           ROIC            0.205571           0.0998582       0.311284
```

Source: Own calculations using SW Gretl.

According to the Figure 13 it's visible that const and PE confidence intervals include 0. As we know if the confidence interval contains ZERO, the parameter is NOT statistically significant. Then we can conclude: ROA, EPS and ROIC are statistically significant and γ0, PE are not statistically significant.

P-value:

The outcomes of test may be interpreted with the use of P-value that measures the strength of evidence in support of H0.

If the p-value $< \alpha$, then we reject the H0

The P-values are taken from SW Gretl presented on Table 5.

Table 5. The results of P-values

	X$_0$ (const)	ROA	EPS	PE	ROIC
p-value	0.5505	0.0112	0.0196	0.0837	0.0010
$\alpha = 0{,}05$	0.05	0.05	0.05	0.05	0.05
Significant or not significant	Not significant	significant	significant	Not significant	significant

Source: Own calculations using SW Gretl.

Statistically significant parameters mean that the results are real with a high level of confidence and this is no coincidence.

The parameter PE is not statistically significant, but it cannot be argued that the hypothesis is true, or that it is incorrect and should be rejected, since there is no evidence that there is no connection between PE and CEO compensation.

It is worth noting that insignificance at the 1% and 5% levels does not render the model useless, as most researchers argue. Practical significance should take precedence over statistical significance in special cases, since the context or location of the study differs, as well as structures and systems. In this case, it is necessary to report the results obtained, taking into account the adequacy of the model and its stability. Thus, the conclusion would be that there is a practical connection between PE and CEO compensation.

Perhaps this result was obtained due to a small sample of data, and therefore in the future studies it makes sense to revise the results and take a large sample of data in order to convince that the data is statistically significant.

4.5.3 Econometric verification

Testing for autocorrelation

Durbin-Watson test is used to detect the presence of autocorrelation in the residuals. There are results in the Figure 14 calculated in SW Gretl.

Figure 14. Durbin-Watson test

```
Durbin-Watson statistic = 1.64306
p-value = 0.101233
```

Source: Own calculations using SW Gretl.

Durbin-Watson statistic = 1.64306

p-value = 0.101233

n = 18– number of observations

p = 5 – number of parameters

$\alpha = 0{,}05$

In statistical table there are two limits for value of DW statistics dl = 0.82044, du = 1.87189. 0.82044<1.64306< 1.87189

dl <DW < du

It means that test is inconclusive. So, another test of autocorrelation needs to be used (Figure 15). DW statistic is not applicable when there is no intercept in the model and when lagged dependent variables are included in the explanatory variables.

Figure 15. Alternative test: Breusch-Godfrey test

```
Breusch-Godfrey test for first-order autocorrelation
OLS, using observations 2003-2020 (T = 18)
Dependent variable: uhat

              coefficient    std. error    t-ratio    p-value
  ---------------------------------------------------------------
  const         1.18370       8.66510       0.1366     0.8936
  ROA          -0.0377912     0.228426     -0.1654     0.8714
  EPS          -0.198892      0.995659     -0.1998     0.8450
  PE           -0.00520717    0.143681     -0.03624    0.9717
  ROIC         -0.000194695   0.0501761    -0.003880   0.9970
  uhat_1        0.187331      0.310409      0.6035     0.5574

  Unadjusted R-squared = 0.029457

Test statistic: LMF = 0.364211,
with p-value = P(F(1,12) > 0.364211) = 0.557

Alternative statistic: TR^2 = 0.530223,
with p-value = P(Chi-square(1) > 0.530223) = 0.467

Ljung-Box Q' = 0.523607,
with p-value = P(Chi-square(1) > 0.523607) = 0.469
```

Source: Own calculations using SW Gretl.

If p-value > α (0.05), It means that Ho: hypothesis holds – no autocorrelation. In our case, all three p-values are more than 0.05. Therefore, there is no autocorrelation of residuals in data.

Test for heteroscedasticity

To examine if the variance of the error term is a function of the regressors.

Null hypothesis (H_0): the error variances are all equal (homoscedasticity).

Alternative hypothesis (H_1): the error variances are multiplicative function of one or more variables (there is a heteroscedasticity).

Figure 16. Breusch-Pagan test for heteroscedasticity

```
Breusch-Pagan test for heteroskedasticity
OLS, using observations 2003-2020 (T = 18)
Dependent variable: scaled uhat^2


               coefficient    std. error    t-ratio    p-value
       -----------------------------------------------------------
       const    -1.53488       5.51843       -0.2781    0.7853
       ROA       0.0372288     0.143630       0.2592    0.7995
       EPS       0.429309      0.614294       0.6989    0.4969
       PE        0.0300550     0.0937730      0.3205    0.7537
       ROIC      0.000440772   0.0328058      0.01344   0.9895

       Explained sum of squares = 1.6352

Test statistic: LM = 0.817602,
with p-value = P(Chi-square(4) > 0.817602) = 0.936073
```

Source: Own calculations using SW Gretl.

Since p-value (0.936073) > α (0.05), then there is a homoscedasticity in the model.

For White test the number of observations is crucially important.

For correct indication of heteroskedasticity, the number of observations should be greater than 30 (n > 30).

Test for normality

Null hypothesis: the error terms are normally distributed.

Alternative hypothesis: the error terms are not normally distributed.

Figure 17. Results of Jarque-Bera test

```
Frequency distribution for uhat1, obs 1-18
number of bins = 7, mean = 1.13489e-015, sd = 2.13969

        interval          midpt     frequency     rel.      cum.

           < -3.0035     -3.5934         1        5.56%     5.56% *
   -3.0035 - -1.8237     -2.4136         1        5.56%    11.11% *
   -1.8237 - -0.64390    -1.2338         6       33.33%    44.44% *************
   -0.64390 -  0.53590   -0.054001       4       22.22%    66.67% *******
    0.53590 -  1.7157     1.1258         4       22.22%    88.89% *******
     1.7157 -  2.8955     2.3056         0        0.00%    88.89%
         >=   2.8955      3.4854         2       11.11%   100.00% ***

Test for null hypothesis of normal distribution:
Chi-square(2) = 0.348 with p-value 0.84049
```

Source: Own calculations using SW Gretl.

As p-value (0.84049) > α (0.05), it means that there is a normal distribution of u_t in the model.

Figure 18. Test statistic for normality
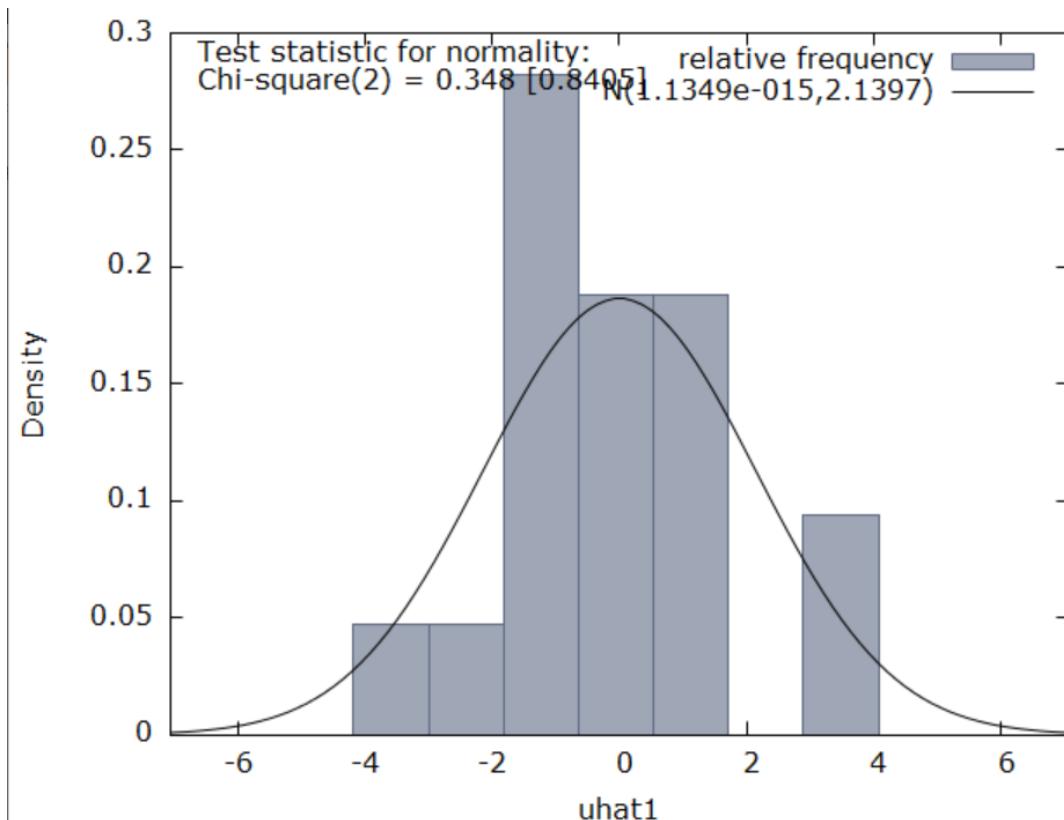
Source: Own calculations using SW Gretl.

On Figure 18 there is a normal distribution of the data.

4.5.4 Mathematical verification

To assess the accuracy of the calculation:

$$\bar{y}_t = \bar{\hat{y}}_t$$

Table 6. The average values of y observed and y theoretical

Year	y1	ŷt
2003	5.5	6.3
2004	6.5	4.8
2005	7.6	6.9
2006	11.3	10.8
2007	8.1	11.7
2008	12.3	13.5
2009	12.6	12.7
2010	11.0	9.6
2011	16.8	16.6
2012	17.0	16.6
2013	19.6	18.0
2014	13.0	13.8
2015	10.4	11.4
2016	16.5	13.0
2017	18.2	15.0
2018	11.2	13.8
2019	12.3	14.1
2020	11.1	12.4
Average	**12.3**	**12.3**

Source: Own calculations using MS Excel.

Based on the Table 6 the average value of y observed is equal to average value of y theoretical.

12.3= 12.3

4.6 Model application (coefficients of elasticity; scenarios' simulation)

Coefficients of elasticity

$$E = \frac{\partial y}{\partial x_i} * \frac{x_i}{\hat{y}},\qquad\text{(8)}$$

Estimated econometric model is:

$$\hat{y}_t = -5.04508 - 0.632ROA_{1t} + 2.439\ EPS_{2t} + 0.262PE_{3t} + 0.206ROIC_{4t} + \hat{u}_t,\qquad\text{(7)}$$

63

Calculation of the coefficients for last year (2020):

$$\hat{Y}_{2020} = 12.4$$

(ROA) $eii = \dfrac{\partial y}{\partial x1} * \dfrac{x1}{\hat{y}} = -0.632* (9.03 / 12.4) = -0.46\,\%$

(ESP) $eii = \dfrac{\partial y}{\partial x2} * \dfrac{x2}{\hat{y}} = 2.439 * (4.97 / 12.4) = 0.98\,\%$

(PE) $eii = \dfrac{\partial y}{\partial dx3} * \dfrac{dx3}{\hat{y}} = 0.262*(25.53 / 12.4) = 0.54\%$

(ROIC) $eii = \dfrac{\partial y}{\partial dx3} * \dfrac{dx3}{\hat{y}} = 0.206*(21.3 / 12.4) = 0.18\,\%$

Interpretation of results:

1)   If the ROA increases by 1 % in 2020, then the compensation of CEO falls by 0.46%, ceteris paribus.

2)   If EPS increases by 1% in 2020, then the CEO pay will increase by 0.98 %, ceteris paribus.

3)   If PE increases by 1% in 2020, then the CEO pay will increase by 0.54%, ceteris paribus.

4)   ROIC increment of 1% leads to an increase in the CEO compensation by 0.18 %, ceteris paribus.

Scenarios' simulation

1) If it supposed that in next year (2021) the ROA of SAP company increases by 6%, ceteris paribus, then the compensation of CEO will decrease by 0.46 *6% = 2.76 %.

The amount of compensation in 2020 was 12.4 million USD per year.

12.4 million USD – 100%

Change in compensation level is (- 2.76) %

Change in compensation level = (12.4 *(- 2.76))/100= - 0,343 million USD per year.

It means that the amount of compensation of CEO will decrease by 0.343 million USD.

The amount of compensation caused by a raise in ROA by 6% will be:

12.4+ (- 0.343) = 12,057 million USD.

2) If the EPS in 2021 increases by 7 %, ceteris paribus, then the CEO compensation will increase by:

(0.98 *7*12.4) / 100 = 0.849 million USD.

The amount of CEO compensation will be equal to 12.4+ 0.849 = 13.249 million USD.

3) If the PE in 2021 decreases by 8%, ceteris paribus, then the CEO compensation will decrease by:

$$(0.54 *8*12.4) / 100 = 0.535 \text{ million USD.}$$

The amount of CEO compensation will be equal to 12.4- 0.535 = 11,865 million USD.

4) If the ROIC in 2021 decreases be 10%, ceteris paribus, then the CEO compensation will decrease by:

$$(0.18 *10*12.4) / 100 = 0.225 \text{ million USD.}$$

The amount of CEO compensation will be equal to 12.4 - 0.225 = 12.175 million USD.

All the results of calculations made in the Practical Part will be presented in the next chapter of the Diploma Thesis.

5 Results and Discussion

In this chapter will be provided overall results obtained in the Practical Part of the Diploma Thesis. The results of the questionnaire will be disclosed as well as findings received by constructing the Linear Regression Model. For that purpose, the Ordinary Least Square Method (OLSM) was used in SW Gretl to estimate the parameters of the model and identify the relationship between CEO compensation and company's performance.

5.1 Results of questionnaire

According to the Ratio between CEO and average worker pay in 2018 by country there is a huge gap between CEOs and average worker pay in most of the countries. The highest gap was represented in the United States of America, Chief Executive Officers in the U.S. in 2018 were paid 265 times more than the workers in the same company. Top 10 countries with the big difference between CEO pay and average worker consist of: United States, India, United Kingdom, South Africa, Netherlands, Switzerland, Canada, Spain, Germany and China.

Germany is the country where SAP SE company is headquartered. The gap in CEO pay salary and average worker is 136.

30 employees of SAP company were asked about their opinion regarding high gap existence between CEO and average worker pay. Majority of respondents (43.33%) believe that CEOs are not overpaid and they are compensated in an appropriate amount. Only 3% of employees strongly disagree with such a big gap between CEO pay and average worker's pay.

16.67% of employees somewhat agree to the statement that huge gap between CEO pay and average worker pay is sufficient. About 23.33% of respondents do not have a clearly expressed position on this issue. 13.33% of respondents somewhat disagree of such a huge gap. Only 3% of employees strongly disagree with presented difference between CEO pay and average worker's pay.

In the question „Do you believe the government should do something to change current CEO pay practices?" the majority of employees (53.33%) stated that they do not believe that interference of government into CEO pay practices is needed. Approximately

16.7% of employees thinks that it's necessary to somehow regulate the CEO pay practices by government. And 30% of respondents do not know what is the right approach.

5.2 Results of OLSM

The Ordinary Least Square Method (OLSM) was used in SW Gretl to estimate the parameters of the model, which included the following indicators of the firm performance:

$$y = f\,(ROA;\ EPS;\ PE,\ ROIC\,) \qquad (5)$$

Obtained estimated econometric model is:

$$\hat{y}t = -5.045 - 0.632ROA_{1t} + 2.439\ EPS_{2t} + 0.262PE_{3t} + 0.206ROIC_{4t} + \hat{u}_t, \qquad (7)$$

The data was calculated for 18 observations from 2003 to 2020.

Tests carried out during the work proved that there is no autocorrelation and heteroscedasticity of residuals in data. And normal distribution of variables is detected.

According to the model the following interrelations between CEO compensation and financial indicators were formulated:

1) If the ROA indicator increases by 1%, then the compensation of CEO will decrease by 0.632 million USD, ceteris paribus.

2) If the EPS grows up by 1 USD, then the CEO pay will increase by 2.439 million USD, ceteris paribus

3) If PE decreases by 1 unit, then the compensation of CEO will go down by 0.262 million USD, ceteris paribus.

4) If the ROIC indicator increases by 1 unit, then the CEO pay will increase by 0.206 million USD, ceteris paribus.

Due to the fact that some of the indicators are measured in different ways: ROA and ROIC in percentage, EPS is in USD and PE is a ratio, the coefficients of elasticity were calculated in order to have more comparable data.

The coefficient of elasticity indicates the change in percentage in the dependent variable (y) that is happening when independent variable changes by 1 percent.

Thus, the results of calculations are interpreted in the following way:

1) If the ROA increases by 1 % in 2020, then the compensation of CEO falls by 0.46%, ceteris paribus.

2) If EPS increases by 1% in 2020, then the CEO pay will increase by 0.98 %, ceteris paribus.

3) If PE increases by 1% in 2020, then the CEO pay will increase by 0.54%, ceteris paribus.

4) ROIC increment of 1% leads to an increase in the CEO compensation by 0.18 %, ceteris paribus.

The results of study suggest that Earnings per Share (EPS) and Price to Earnings ratio (PE) are strongly related to the annual CEO pay in SAP SE. Conversely, there was weak positive relationship observed between compensation amount and Return on Invested Capital (ROIC), while for Return on Assets this interdependence presented was even negative.

Thus, according to the coefficients of elasticity there is a positive relationship between Earnings per Share (EPS), Price to Earnings ratio (PE), Return on Current Investments (ROIC) and CEO pay in the SAP company.

But the Return on Assets has a negative impact on CEO remuneration. The question of the negative impact of ROA on CEO compensation remains controversial and needs further discussion and investigation. It was expected that higher ROA leads to the higher CEO pay, since a firm uses its assets more effectively. But the results given in the model show that increase in ROA indicator by 1%, may decrease the compensation of CEO by 0.632 million USD (or by 0.46%), which is in contrast to the findings that were done by Shakerin Bin Ismail, Natalie Vivienne Yabai and Low Joe Hahn, who obtained a positive significant relationship between CEO pay and the indicator Return on Assets[49].

It's very controversary accross the studies. While some studies show positive relationship between ROA and CEO pay, the others have the negative relationship. Bradly[50] and Coetzee with Hall[51] also have found the strongest negative correlation between CEO pay and ROA in their studies. Perhaps the negative correlation can be

---

[49] Shakerin Bin Ismail, Natalie Vivienne Yabai and Low Joe Hahn. 2014. Relationship between CEO Pay and Firm Performance: Evidences from Malaysia Listed Firms. *Journal of Economics and Finance.* e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 3, Issue 6. (May-Jun. 2014), p 26.
[50] Bradley S. 2013. The relationship between CEO compensation and company performance in a South African context. *Jornal of Economic and Financial Sciences.* Vol. 6 p. 539-564.
[51] Coetzee, Willem Jacobus, and John Henry Hall. 2020. "The Relationship Between CEO Compensation and Company Performance Measurements of Listed South African Firms". *Southern African Business Review* 24 (May), p. 23.

explained by the fact that when companies aim to increase ROA, they may be interested in reducing costs, which may include reducing the CEO's salary.

It's an interesting point for future investigation of this topic.

For scenario simulation done for the year 2021 the following results were received:

1) If in next year (2021) the return on assets of SAP company increases by 6%, ceteris paribus, then the compensation of CEO will decrease by 2.76 %. Then the amount of compensation of CEO will decrease by 0.343 million USD and reach 12,057 million USD.

2) If the EPS in 2021 increases by 7 %, ceteris paribus, then the CEO compensation will increase by 0.849 million USD. The amount of CEO compensation will be equal to 13.249 million USD.

3) If the PE in 2021 decreases by 8%, ceteris paribus, then the CEO compensation will decrease by 0.535 million USD. The amount of CEO compensation will be equal to 11,865 million USD.

4) If the ROIC in 2021 decreases be 10%, ceteris paribus, then the CEO compensation will decrease by 0.225 million USD. The amount of CEO compensation will be equal to 12.175 million USD.

The results obtained in Practical Part were disclosed in this chapter. CEO at SAP company is paid for performance, especially when there is an increase the indicators such EPS, PE and ROIC. In the next chapter conclusions on the topic of agency problem and relationship between CEO compensation and firm's performance will be presented.

6 Conclusion

An attempt to conduct research in the field of agency problems was carried out in this Diploma Thesis. It examines an impact of firm's financial results on CEO compensation. The existing literature defines agency problem as a conflict of interests between owners of the company and the managers. Whenever separation of ownership and management takes place, agency problem arises. The analysis of the Diploma Thesis was made on the basis of the Integrated and Annual Reports of publicly traded company SAP SE.

There are the following most effective corporate governance mechanisms that are commonly adopted to solve the agency problem:

1) empowering the authorized Supervisory board with control functions over senior managers decisions;

2) ensuring the transparency and usefulness of the disclosure of financial and non-financial information in corporate reporting;

3) application of a comprehensive system of motivation and remuneration of managers, including various short-term and long-term incentives (including bonuses and privileges for top managers).

However, it should be emphasized that each of the above mechanisms has its own difficulties and disadvantages. The main problem lies in choosing the optimal balance of mechanisms and incentives so that their application would be economically viable.

The payment of bonuses does not prevent the selfish or opportunistic behavior of managers, therefore, corporate governance mechanisms should provide the incentives taking into account the long-term dynamics of the company's performance, and if the strategic goals set by the owners are met.

It is a controversary question in the different studies if the CEO compensation is reasonable. Fernando Durate[52], Coetzee Willem Jacobus and Hall John Henry[53],

---

[52] Fernando Duarte, 2019. „It takes a CEO just days to earn your annual wage". URL: https://www.bbc.com/worklife/article/20190108-how-long-it-takes-a-ceo-to-earn-more-than-you-do-in-a-year

[53] Coetzee, Willem Jacobus, and John Henry Hall. 2020. "The Relationship Between CEO Compensation and Company Performance Measurements of Listed South African Firms". Southern African Business Review 24 (May), p. 23.

Lawerence and Wolfe Julia[54] raised this issue in their researches. Stanford University has conducted a survey in order to define the awareness of Americans about agency problem and involvement of the government into CEO compensation practices.

Continuing to that investigation, questionnaire about the Agency Problem was conducted among 30 SAP employees. SAP SE is headquartered in Germany. Based on the ratio between CEO and average worker pay in 2018 Germany was in the top 10 countries with the high gap in CEO pay salary and average worker that is equal to 136.

30 employees of SAP company were asked about their opinion regarding high gap existence between CEO and average worker pay. Majority of respondents (43.33%) believe that CEOs are not overpaid and they are compensated in an appropriate amount. Some of them explained their opinion by stating that the CEO's responsibilities include a wide range of tasks, such as taking important corporate decisions, managing the company's overall activities and resources, and most importantly, he is the face of the company and acts as the main person in negotiations between the board of directors and many other representatives of corporation. Only 3% of employees strongly disagree with such a big gap between CEO pay and average worker's pay.

In the next question about government interference 53.33% of employees replied that they are not in a favor of government support regarding changes in CEO pay practices. 16% of respondents believe that government should intervene, while the remainder 30 % have no opinion.

Thus, the main reasearch question of the Thesis is: „What is the impact of the firm's performance on the compensation of the company?"

The total compensation of CEO SAP is comprised of fixed compensation, fringe benefits and performance-based compensation which contains long-term incentives and short-term incentives.

Performance-related short-term incentive compensation depends on the KPI of the company. There are two types of KPI: financial (80%) and sustainability (20%). It's granted in case the weighted achievement is above 75%.

---

[54] Lawrence Mishel and Julia Wolfe. 2019. „CEO compensation has grown 940% since 1978". URL: https://www.epi.org/publication/ceo-compensation-2018/#:~:text=CEO%20compensation%20in%202018%20(stock%2Doptions%2Dgranted%20measure),the%20recovery%20began%20in%202009

In order to assess the performance of the company the following measurements of financial performance were chosen – Return on Assets (ROA), Earnings per Share (EPS), Price to Earnings ratio (PE) and Return on Current Investments (ROIC).

The linear regression model was built for assessment of the impact of financial indicators on CEO remuneration. Different studies (Kazan Emre[55], Shakerin Bin Ismail, Natalie Vivienne Yabai and Low Joe Hahn[56]) found that there is a positive relationship between CEO pay and firm's performance. But some of them indicated that the relationship can be negative. Among them Bradly[57] and Coetzee with Hall[58] who have found the strongest negative correlation between CEO pay and ROA in their studies.

Positive relationships were identified for Earnings per Share (EPS), Price to Earnings ratio (PE) and Return on Current Investments (ROIC) for SAP company according to the model constructed in the Diploma Thesis. The results indicated that the CEO compensation increased from 2003 to 2020 in collaboration with EPS, PE and ROIC.

The biggest effect on CEO compensation has been provided by Earnings per Share (EPS) indicator which has the highest elasticity among other financial indicators and it is equal to 0.98%. So, EPS was the most dominant predictor of the CEO compensation. Among of the performance measures used in the study EPS appeared to be the main determinant of total CEO compensation for SAP SE for the period from 2003 to 2020 years.

Thus, the result obtained satisfies the assumptions revealed in the construction of the model and it proves the agency theory, which is based on the idea that shareholders should have an interest in increasing of compensation of CEOs while they receive reward for their investment. Therefore, on the one hand, this result gives the satisfaction to both shareholders and CEOs and then can alleviate the agency problem.

---

[55] Emre Kazan The impact of CEO compensation on firm performance in Scandinavia. 8 th IBA Bachelor Thesis Conference, November 10th, 2016, Enschede, The Netherlands. p. 15.
[56] Shakerin Bin Ismail, Natalie Vivienne Yabai and Low Joe Hahn. 2014. Relationship between CEO Pay and Firm Performance: Evidences from Malaysia Listed Firms. *Journal of Economics and Finance.* e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 3, Issue 6. (May-Jun. 2014), p 26.
[57] Bradley S. 2013. The relationship between CEO compensation and company performance in a South African context. *Jornal of Economic and Financial Sciences.* Vol. 6 p. 539-564.
[58] Coetzee, Willem Jacobus, and John Henry Hall. 2020. "The Relationship Between CEO Compensation and Company Performance Measurements of Listed South African Firms". *Southern African Business Review* 24 (May), p. 23.

On the other hand, since the EPS has the most significant influence on CEO compensation in SAP SE, this indicator could be treated as an instrument of firm performance increase. The linkage between CEO pay and EPS will make managers to take decisions aimed to increase EPS and firm performance as a result. But from here following suggestion appear. Due to the fact that EPS is a parameter that include Net income in numerator and Shares Outstanding in denominator, the value of annual EPS can be manipulated. Both values should be observed by Supervisory board in order to be convinced that senior managers increase EPS by annual growth in Net Income rather than by buying back company stocks.

One more firm performance indicator that relate to Net Income is ROA, that according to results of constructed model has a negative relation with CEO pay. The coefficient of elasticity is equal to -0.46%. This interrelation is explained by decreasing trend in ROA from 2003 to 2020. But it could become a tool which enable the company to increase its welfare. If SAP SE's board of directors reconsider their compensation policy and link the compensation of CEO directly to ROA value it could result in Net Income increase.

Price to Earnings ratio (PE) has the positive impact on CEO compensation and the coefficient of elasticity is equal to 0.54%. The link is relatively weaker than with the Earnings per Share (EPS). But these two indicators are the most strongly related to the annual CEO pay in SAP SE. It was expected as Price to Earnings ratio is closely related to Earnings per Share. As this idicator estimates the market value of a share of stock in relation to its per-share earnings. CEOs at SAP are compensated on performance-based system which is connected to equity of the firm.

The main goal of CEOs will be to increase the performance indicators of SAP by improving the Price to Earnings Ratio. Consiquently, they will receive higher compensation in the form of equity. Thus, increase in PE leads to increas in CEO remuneration, and it can alleviate the agency problem in the company.

A weak positive relationship was found between Return on Current Investments (ROIC) and CEO compensation. The coefficient of elasticity of ROIC is equal to 0.18%. It is a key measure to assess the effectiveness of management and it can be considered as an important factor in generating high quality shareholder returns. ROIC shows how well a company and its management operate and manage the capital to make a profit.

David Trainer in his study stated that "The CEO is often not interested in the wise allocation and organization of capital, as shareholders sometimes do not understand that ROIC is the main factor in creating value" [59]. But positive relationship of ROIC with CEO pay gives an understanding that COE is compensated for effective use of capital.

Companies whose investment community and leaders pay the most attention to this indicator are becoming successful. Therefore, a positive relationship between ROIC and CEO pay at SAP company speaks about the existence of this trend and the interest of both investors and managers in improving this indicator. But, perhaps, it is worth to continue improvement going forward and give a recommendation to the company's management to pay more attention to this indicator and strengthen the link between this indicator and CEO compensation, in order to create opportunities for investors to benefit from improved corporate governance.

That means that in SAP company there is the relationship between compensation system of the CEO and financial performance of the company. The results of the Thesis confirm the statement that the CEOs are compensated if and when the financial performance indicators increase. It can be concluded that with the optimal systems of compensation CEOs are rewarded to maximize interests of shareholders and are interested to raise long-term performance of the company.

---

[59] David Trainer. 2018. CEOs Who Focus On ROIC (Return On Invested Capital) Outperform. Forbes. URL: https://www.forbes.com/sites/greatspeculations/2018/09/12/ceos-that-focus-on-roic-outperform/?sh=23367603567b

7 References

Scientific Books and Journals

1. ABWOD J. M., 1990. *"Does performance-based managerial compensation affect corporate performance?"*. Industrial and Labour Relations Review. 43. Special Issue. pp. 52–73.

2. AKERLOF G., 1970. *The Market for «Lemons»: Quality Uncertainty and the Market Mechanism.* Quarterly Journal of Economics. Vol. 83. August. N 3. pp. 488-500.

3. ALLENA M.P., PANIAN S.K., 1982. *Power. performance. and succession in the large corporation Adm. Sci. Q.27.* pp. 538-547.

4. BASU S, HWANG L. S., MITSUDOME, WEINTROP J., 2007. *Corporate governance, top executive compensation and firm performance in Japan.* Pacific-Basin Finance Journal, 15, pp. 56- 79.

5. BEBCHUK Lucian Arye, KAHAN Marcel, 1990. "*A Framework for Analyzing Legal Policy Towards Proxy Contests."* California Law Review. October, 78, pp. 1071–1135.

6. BERLE A., MEANS G., 1932. *The Modern Corporation and Private Property.* Macmillan: N. Y., 30 p.

7. BOSHKOSKA Meri, 2015 *The Agency Problem: Measures for Its Overcoming.* International Journal of Business and Management, Vol. 10, No. 1; pp. 204-208. ISSN 1833-3850

8. BRADLEY S., 2013. *The relationship between CEO compensation and company performance in a South African context.* Jornal of Economic and Financial Sciences. Vol. 6 pp. 539-564.
   BRIGHAM E., HOUSTON J., 2007. *Fundamental of Financial Management (11th ed.).* USA, 12 p.

9. COASER H., 1937. *The Nature of the Firm.* Economica. Vol. 4. November. N 16. P. 386405, 13p.

10. COETZEE Willem Jacobus, HALL John Henry, 2020. *"The Relationship Between CEO Compensation and Company Performance Measurements of Listed South African Firms".* Southern African Business Review 24 (May) 23 p.

11. CORE John E, LARCKER David, 2002. "*Performance Consequences of Mandatory Increases in Executive Stock Ownership."* Working paper, Wharton School. 23 p.

12. DONALDSON L., DAVIS J. H., 1991. *Stewardship Theory or Agency Theory: CEO Governance and Shareholder Returns.* Australian Journal of Management, 16(1), pp. 49-65.

13. EDGERTON Jesse, 2011. *Agency Problems in Public Firms: Evidence from Corporate Jets in Leveraged Buyouts.* Journal of Finance, Forthcoming. AFA 2011 Denver Meetings Paper; FEDS Working Paper ,73 p.

14. EUN-RESNICK, 2004. *International Financial Management (3rd ed.).* The McGraw-Hill Companies Inc., 56 p.

15. FABOZI F., PETERSON P., 2003. *Financial management & analysis.* Wiley & Sons, Inc. New Jersey, 38 p.

16. GERHART B., MILKOVICH G. T., 1990. *"Organisational Differences in Managerial Compensation and Firm Performance."* Academy of Management Journal 33 (4): pp. 663–691.

17. GUILDING C., WARNKEN J., ARDILL A., FREDLINE L, 2005. *An agency theory perspective on the owner/manager relationship in tourism-based condominiums.* Tourism Management 26, pp. 409- 420.

18. HILL C. W., JONES T. M., 1992. *Stakeholder-Agency Theory.* Journal of Management Studies, 29(2), pp. 131-154.

19. JENSEN Michael and MURPHY Kevin, 1990. "*Performance Pay and Top Management Incentives."* Journal of Political Economy. 98:2, pp. 225– 263.

20. JEWELL Jeffrey Jay, MANKIN Jeffrey A., 2011. *What is Your ROA? An Investigation of the Many Formulas for Calculating Return on Assets.* Academy of Educational Leadership Journal, 15 (Special Issue), pp. 79-91.

21. JEWELL   Jeffrey Jay, MANKIN   Jeffrey A., 2016. *What is Your EPS? Issues in Computing and Interpreting Earnings Per Share*. Academy of Accounting and Financial Studies Journal, 20(3), pp. 48-61.

22. JOHNOSON Marilyn F., PORTER Susan,shackell Margaret B.,. 1997. *"Stakeholder Pressure and the Structure of Executive Compensation"* Working paper, Michigan State University, University of Massachusetts at Amherst, Notre Dame.

23. JOVANOVA M., 2014. *Internal audit as a service of management for improvement of economic efficiency of the enterprises in Republic of Macedonia*. MA thesis, Faculty of Economics, Prilep, Macedonia. 13 p.

24. KAPLAN S. N., 2012. *Executive compensation and corporate governance in the US: perceptions. facts and challenges.* NBER Working papers No. 18395. 45 p.

25. KAZAN Emre, 2016. *The impact of CEO compensation on firm performance in Scandinavia.* 8 th IBA Bachelor Thesis Conference, Enschede, The Netherlands, 15 p.

26. LARCKER D., TAYAN B., 2011. *Corporate Governance Matters: A Closer Look at Organizational Choices and Their Consequences.* Pearson Education Inc., New Jersey, 19 p.

27. LASHER W., 2008. *Practical Financial Management (5th ed.).* USA. 16 p.

28. MITNICK Barry M., 2019. *Origin of the Theory of Agency: An Account by One of the Theory's Originators*, pp. 3-10.

29. MURPHY KEVIN J., 1999. *"Executive Compensation," in Handbook of Labor Economics.* Orley Ashenfelter and David Card, eds. Amsterdam: North Holland, pp. 2485–563.

30. NWIDOBIE M., 2013. *Agency conflict and corporate dividend policy decisions in Nigeria.* Asian Economic and Financial Review, 3(8), pp. 1110–1121.

31. NYBERGA. J., GERHART B., 2010. *Agency Theory Revisited: CEO return and shareholder interest alignment.* Academy of Management Journal, 53(5), pp. 1029-1049.

32. PREDIC B., IVABOVIC-DJUKIC M., 2010. *Methods of solving agency problem.* Economic themes N1: 1–12, Faculty of Economics, Nis., 123 p.

33. RANDALL Thomas S.,KENNETHh J. Martin, 1999. *"The Effect of Shareholder Proposals on Executive Compensation."* University of Cincinnati Law Review. 67:4, pp. 1021–1081.

34. SHAKERIN Bin Ismail, YABAI Natalie Vivienne, LOW Hahn, 2014. *Relationship between CEO Pay and Firm Performance: Evidences from Malaysia Listed Firms.* Journal of Economics and Finance. e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 3, Issue 6. (May-Jun. 2014), pp. 14-31.

35. SHAW P., 2011. *"CEO Pay-performance Sensitivity in South African Financial Services Companies."* Unpublished master's dissertation. Department of Business Administration, University of Pretoria, Pretoria. 15 p.

36. SHLEIFER A.,VISHNY R. W., 1997. *A Survey of Corporate Governance*. The Journal of Finance, 52(2), pp. 737-783.

37. SMITH Adam, 1776. *The Wealth of Nations.* Modern Library, Edited by Edwin Cannan, 1904. Reprint edition 1937. New York, 44 p.

38. SRBEK. P, DITTRICH. L. O., 2016. *Does the "CEO Chairman" Guarantee Better Performance for a Firm?* Danube: Law and Economics Review. 3. pp. 145-160.

39. TIPURI, PODRUG, 2010. *Theoretical conceptualization and empirical validation of Stewardship Theory.* Proceedings of the Faculty of Economics in Zagreb, 201 p.

40. WELLS Harwell, 2010, *"No Man can be Worth $1,000,000 a Year": The Fight Over Executive Compensation in 1930s America,* U. Richmond Law Review, 44 p.

Internet Sources

41. ABOUT   SAP,   2021.   [online].   [Accessed: 2021-   01-20].   Available   at: https://www.sap.com/corporate/en.html

42. Americans and CEO Pay 2016, 9 p. [online]. [Accessed: 2021- 03-01]. Available at :Centers   &   Research   Initiatives | Stanford   Graduate   School   of   Business

43. Bloomberg,   2021.   [online].   [Accessed: 2021-   02-20].   Available   at: https://www.brandz.com/admin/uploads/files/2020_BrandZ_Global_Top_100_Report.pdf

44. Bloomberg, 2021. [online]. [Accessed: 2021- 02-20]. Available at: bbc.com

45. DURATE Fernando, 2019. *„It takes a CEO just days to earn your annual wage".* [online]. [Accessed: 2021- 03-10]. Available at: https://www.bbc.com/worklife/article/20190108-how-long-it-takes-a-ceo-to-earn-more-than-you-do-in-a-year

46. LAWERENCE Mishel,WOLFE Julia, 2019. *„CEO compensation has grown 940% since 1978".* [online]. [Accessed: 2021- 01-29]. Available at: https://www.epi.org/publication/ceo-compensation-2018/#:~:text=CEO%20compensation%20in%202018%20(stock%2Doptions%2Dgranted%20measure),the%20recovery%20began%20in%202009

47. Salesforce,   2021.   [online].   [Accessed: 2021-   02-20].   Available   at: https://www.salesforce.com

48. SAP 2020 Annual Report on Form 20-F, 11 p. [online]. [Accessed: 2021- 02-12]. Available at: https://www.sap.com/investors/en.html

49. SAP   Integrated   Reports   2018.   [Online].   [Accessed: 2019-12-05].   Available   at: https://www.sap.com/docs/download/investors/2018/sap-2018-integrated-report.pdf

50. SAP Integrated Report 2020. pp. 10-11. [online]. [Accessed: 2021- 02-10]. Available at:: www.sapintegratedreport.com,

51. SAP   Investor   Relations   [Online].   [Accessed: 2019–12-05].   Available   at: https://www.sap.com/corporate/en/investors/calendar/agm.html

52. TRAINER David, 2018. *CEOs Who Focus On ROIC (Return On Invested Capital) Outperform. Forbes. ".*   [online]. [Accessed: 2021- 03-10]. Available at: https://www.forbes.com/sites/greatspeculations/2018/09/12/ceos-that-focus-on-roic-outperform/?sh=23367603567b

8 Appendix

Appendix 1. Questionnaire

In the following questions please write your answers in front of the question.

1. Your age _____
2. Your gender: Male ☐   Female ☐
3. Country _____
4. Years of your working experience _____
5. What is your position in the company? _____

In the following questions please select your answer by ticking X in the box.

6. Do you know what an agency problem is about?
   - ☐   Yes
   - ☐   No

7. I agree that the high gap (136 times in Germany in 2018) between the CEO pay and the average worker pay is sufficient

Strongly disagree	Somewhat disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
☐	☐	☐	☐	☐

8. Do you believe the government should do something to change current CEO pay practices?
   - ☐ Yes
   - ☐ No
   - ☐ I don't know

9. Could you please explain your opinion regarding questions 7 and 8? (Optional question)

Source: Own elaboration.