THE RELATIONSHIP BETWEEN CORPORATE GOVERNANCE AND FINANCIAL SUSTAINABILITY

MİRAY GEÇİM

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ABSTRACT

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Advisor: Prof. Dr. Arikan Tarik Saygili

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In recent years due to globalization competition among companies has increased. Corporate governance practices play an important role for companies to survive successfully through this competition. This research aims to explore the idea of OECD (Organization for Economic Corporation and Development) principles while explaining the relationship between corporate governance practices and financial sustainability. In this study, 20 companies listed in public disclosure platform through the years 2013 to 2018 were investigated. Financial ratios of these companies were calculated by using Altman Z-score. Also, corporate governance rating scores of these companies were calculated by TOPSIS method. Then a bankruptcy prediction analysis is performed for these 20 companies by comparing these two methods. The results obtained in this study show that firms' financial sustainability and corporate governance scores do not move in the same direction for the years through 2013 to 2018.

Keywords: TOPSIS, Altman Z-Score, Financial Ratios, Corporate Governance

ÖZET

KURUMSAL YÖNETİM VE FİNANSAL SÜRDÜRÜLEBİLİRLİK ARASINDAKİ İLİŞKİ

GEÇİM, MİRAY

İşletme Yüksek Lisans Bölümü

Tez Danışmanı: Prof. Dr. Arıkan Tarık Saygılı

Mayıs,2020

Son yıllarda küreselleşmenin sonucu olarak şirketler arasında rekabet artmıştır. Kurumsal yönetim, şirketlerin bu rekabette var olmasi ve başarisi icin önemli bir rol oynamaktadir. Bu çalişmada OECD (Organization for Economic Corporation and Development) prensipleri detayli bir şekilde incelenmeye ve anlaşilmaya çalişilarak kurumsal yönetim ile finansal sürdürebilirlik arasindaki ilişkiyi araştirmak ve açiklamak amaçlanmaktadir. Bu çalişmada, 2013 ve 2018 mali yillari arasinda Kamuyu Aydinlatma Platformunda yer alan 20 şirket incelenmeye tabii tutulmuştur. Bu şirketlerin finansal oranlari Altman Z-Skor çerçevesinde değerlendirilmiş ve kurumsal yönetim indeksleri TOPSIS metodu ile hesaplanmiştir. Daha sonra bu iki yöntem karşilaştirilarak 20 şirket için iflas öngörüsü çalişmasi yapilmiştir. Sonuçlar, firmalarin finansal sürdürebilirlik ve kurumsal yönetim notlarinin 2013-2018 yillari arasinda ayni doğrultuda hareket etmediğini göstermektedir.

Anahtar Kelimeler: TOPSIS, Altman Z-Skor, Finansal Oranlar, Kurumsal Yönetim

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ABBREVIATIONS

CMB: Capital Market Board

CSR: Corporate Social Responsibility

ISE: Istanbul Stock Exchange

OECD: Organization for Economic Corporation and Development

SPL: Sermaye Piyasasi Lisanslama

TUSIAD: Turkish Industrialists and Businessmen's Association

TKYD: Turkey Corporate Governance Association

XKURY**:** BIST Corporate Governance Index

CHAPTER 1: INTRODUCTION

In recent years, due to globalization competition among companies has increased. Globalization enabled investors to open to the world and reach data about companies which they want to invest in. A new concept has emerged for dealing with this fierce competition which has been taken into consideration by majority of the companies in both developing and developed countries in the world. Financial crises and economic scandals lived by companies have proven the necessity of a good and reliable management system. Due to this necessity the principles of corporate governance were first published by OECD (Organization for Economic Corporation and Development) in 1999. Afterwards, OECD principles turned into worldwide references for firms, their stakeholders, and all other related parties. In 2000's after experiencing scandals like Enron, Parmalat etc. in the USA and Europe the concept of corporate governance has gained more importance. Solid applications of corporate governance attract both national and international shareholders and establishes successful financial markets. Corporate governance provides a reliable investment environment for investors and therefore raise funds for companies. Foreign capital is not only attracted but also maintained for long term investments that increases and enriches the funds in national financial markets for economic and therefore social prosperity. Companies must have efficient corporate governance systems and practices. However, this, by itself, is not sufficient to attract foreign capital and investors. Both national and foreign investors are curious about financial standings of companies that they consider for investment since they are looking for the best returns from what they invest in. Therefore, they need strong and reliable evidence about financial standings of the companies they consider for investment. Altman Z score is one of the most popular ways to measure companies' financial health. By using Altman Z score analysis, it is possible to evaluate the financial standing of a company from different angles. Therefore, Altman Z score analysis is used in this study to rank the financial standings of the 20 companies taken into evaluation. The aim of this thesis is to determine the influence of corporate governance practices on financial sustainability. In other words, the relationship between corporate governance practices and financial standing of a company is evaluated from the perspectives of investors.

To determine the existence and nature of the relationship between corporate governance practices and financial health, TOPSIS, that is a multi-criteria decision-making method, is used in this study. This research starts with introduction part. Then second part consists of literature review about study. In the last section, corporate governance rating scores of 20 companies which are listed in XKURY for the years from 2013 to 2018 are analyzed by using TOPSIS and then the results of TOPSIS are compared to the result of financial standings of companies obtained through calculations and evaluations of Altman Z-score.

CHAPTER 2: CONCEPTUAL FRAMEWORK

2.1 Company Collapses

Corporate scandals have negatively affected the trust in international capital markets. It has been revealed that management of even the world-renowned companies do not hesitate to use certain creative accounting techniques that will make look the companies more successful and profitable they are. Majority of the creative accounting applications are not necessarily illegal. However, they are still misleading to investors and other decision makers interested or involved in the related company. International and national crises have once again displayed the necessity of well-designed corporate governance systems and their solid applications (Clarke, 2011. p.1). History also reveals on many occasions that when certain groups such as shareholders, managers or other related parties are relatively powerful, would influence misleading and/or fraudulent accounting practices and financial reporting without considering their effects on investors, creditors, other shareholders and other related parties. When looked through a broader perspective the biases and intentional misleading of management of corporations are among the main reasons for deformation of the trust in financial and capital markets and therefore destroying the mechanisms and operations of financial markets and almost every aspect of economy in general. Enron, WorldCom, Kanebo are some of the scandals examples that influence the world economy for both developed and developing countries. The main reasons for the bankruptcy of these companies are an economic difficulty, deceit in fiscal reporting, deficiency of management. Financial reporting has an ambiguous responsibility for limiting or facilitating opportunities for fraudulent applications and therefore preventing financial scandals due to misleading financial information. Unfortunately, scandals are not limited solely to the financial reporting system. Other examples such as bribery scandals like in Brazil or bribery scandals of FIFA can also be prevented or minimized through transparent and timely accounting and financial reporting that rely on objective documentation that favor substance over form and practiced within the concept of social concern. The scandals can be harmed organizational image with falling decline later the scandals are discovered.

The approach of corporate governance has turned into the fundamental subject of protection in business life after the firms' scandals which occurred with following the activities of firms and how they achieve business in the global marketplace (Darman,2008, p.11). The absence of corporate governance may create some company scandals. The ineffectualness of the management of these companies not only affected these companies but also influenced the economies of the countries in which these companies operate. The financial crises and the unexpected company collapse of many international organizations, which had generated via financial dishonesty and abuse of financial accounts and the awful administration of the choices of these firms without clarity. These scandals which affected adversely World financial markets especially in the USA enhanced the significance of corporate governance. Company collapses could have been understood and avoided, if governments, accountants, policy makers and CEO's of organizations had worked collaboratively. In the following years, companies' compliance with corporate governance principles has become as crucial as financial reports for investors. Some scandals from the world have been mentioned in the following parts.

2.1.1 Enron

The Enron scandal is the first case that comes to many people's minds when someone mentions about accounting scandals in the world. The Enron Company has been damaged because of the biggest corruption event in the world; it left one is mark in history. Enron a powerful company operating in America's energy, commodity, and service sectors, had secrets that quickly led to bankruptcy. It had ranked 7th among the finest 500 companies after, trading over $ 100 billion in energy. Laxity of the board of directors and audit firm and an ineffectiveness of them are the most crucial factors that led to the bankruptcy of Enron (Ertikin, 2017). There are many causes of Enron's conflict of interest and incompleteness independent control of power by Enron's committee (Li, 2010). Enron started to invest in different businesses that call special purpose entities, For example, communication, e-trade, mining, etc. After investment in special purpose entities, Enron went beyond the scope of its expertise. The most significant issue for bankruptcy is illegal accounting transactions. For instance, deficits were off-balance sheet items. They wanted to give a powerful and shining image to the company. Arthur Andersen was an independent audit firm that was hidden in these tricks.

Enron was shown to have a trading volume of 55 times its earnings, but its debt was quite high. Although Enron announced its revenue was $1.8 bil1on to its shareholders, a $ 1 billion loss was declared to tax authorities between 1996 and 2000(Shaikh and Talha, 2003). The bankruptcy of Enron raised doubts about the auditing profession and business morality (Suer, 2003, p.2). Another reason is the system which was formed in America for fraudulent audit activities to Arthur Andersen. Advertising and fierce competition were tolerated to prevent major audit firms from taking over the US market. The consultancy revenue of audit firms could compete audit revenues (Saglar and Kandemir,2007). This situation can pressure on audit firms. After this scandal, extreme changes and arrangements have been made in accounting and independent auditing systems, especially in the USA. The US president enacted the Sarbanes Oxley law in 2002 to prevent a market crisis like Enron case and regain confidence in audit (Arnold and Lange, 2004).

2.1.2 Parmalat

At the end of the 2003 period, the company had a huge scandal with a deficit close to $ 8 billion in the history of Italy. There are some main reasons behind the bankruptcy of Parmalat. Firstly, there is a lack of corporate governance systems. The number of public companies that have been managed with family perspective in developed countries is high as well (Faccio and Lang, 2002; Anderson and Reeb, 2003). Parmalat did not have professional management. The effects of having a founding family with majority shareholders and therefore being able to transfer resources of the firm to different firms for their advantages can be witnessed. The second reason is audit mistakes. The independent audit committee of Parmalat consisted of members who had close relationships between family members. This situation creates a risky position for the independence of audit committee and the protection of the rights of minority shareholders (Gocen, 2010, p.115). Parmalat transferred its resources into Boulat Financing Corporation which was a subsidiary of Parmalat to prevent bankruptcy. The audit firm of Parmalat, Grant Thornton, is an American based company which is established in Italy after its bankruptcy in the USA. According to Italian laws, a firm cannot be audited by the same audit company consecutively for more than 9 years. But Grant Thornton found a way to escape from this requirement (Galloni and Reilly, 2004). Finally, the importance of the corporate governance system and the impact of independent auditors have been learned with this scandal.

2.1.3 Kanebo

Kanebo which was founded in 1887 in Japan was operated in the cosmetics sector. Even though Kanebo was one of the largest cosmetic companies, it became famous because of an accounting scandal in 2006. Financial Service Agency distrusted the operation of an audit firm, ChuAoyama, which is the partner of PWC. After investigation, Kanebo acknowledged fraud in financial statements of the previous 5 years. Although the company had 80 billion Dollars debt in 2002, managers reported their net assets to be 7.9 billion dollars. The auditor firm, PWC located in Japan, tolerated such an important accounting distortion in financial statements (Sikka, P., Filling, S., and Liew, P., 2009). After the Kanebo scandal, the partnership was recalled by PWC. ChuAyoma followed its operation under the name of Misuzu Audit Corporation and their financial advisors were arrested (Skinner and Srinivasan, 2012). After these kinds of scandals J-SOX (Financial Instruments and Exchange Law) was enacted in 2006 in Japan.

2.2 Agency Theory

Agency theory which describes the relationship between agent and principal has an important role in theories of corporate governance. According to Ross (1973), the agent is in the position of the director of the company who behaves on behalf of shareholders for every kind of decision (p.134). When firms become larger, more shareholders invest in the firm and if the growth proceeds, professional managers can be hired for managing operation of the firms (Ogbechie,2012, p.37). This creates a relationship of agency theory between the person(s) called principal(s) and employed managers called agent with the authority to operate and decide on behalf of the principals (Jensen & Meckling ,1976). Both the principal and agent aim to maximize their interests which may lead to conflicts between agent and principal. Agent may favor own benefits rather than the benefits of the principle, although he/she is employed and expected to protect and favor the overall benefit and well-being of the principle. Conflict of interest causes agency problems. When companies are taken under close perspective, in almost all of them the problems of conflict of interest or the power of attorney are clear between managers and shareholders.

Principles (shareholder, partner, company owner, etc.) need to set up a system to prevent or minimize the agency problem caused by usually principal’s lack of

information related to material issues. These systems are all components of corporate governance applications more specifically systems related to the auditing committee, transparency, and minority interest concepts. Also, reward systems set up to benefit agency when certain objectives obtained should be designed carefully to prevent and minimize conflict of interest between the principal and the agent (Jensen& Meckling, 1976). However, it is almost impossible to get rid of this problem altogether solely by even the best reward systems. According to Shleifer and Vishny (1997), this issue can vary from country to country based on different cultural and economic parameters. Therefore, it becomes evident once again that the system of corporate governance is extremely important to provide a harmony between shareholders and managers that may be in conflict of interest.

2.3 Definition of Corporate Governance

There are several explanations of corporate governance in the literature. Corporate governance is a management philosophy that evaluates and checks operation of business and at the same time it organizes the relations between companies and partners (Luo, 2005, p.2). In order words, corporate governance is a system that prevents issues which arise from management and financial areas (Sloan, 2001, p.2). The corporate governance systems rely on the separation of rights, duties, and responsibilities among various members of a corporation such as board members, managers, shareholders, and stakeholders. It may be perceived as a setting up a code of conduct including rules and policies to be applied while making decisions, executing decisions made and reporting the financial as well as non-financial consequences of operations and other material corporate issues (OECD, 2004). A comprehensive definition of corporate governance can be simply made as a composition of techniques and rules which are crucial for efficient management of people who have a special aim (TUSIAD, 2002, p.9; Aysan, 2007, p.18). Corporate governance is a system which is guided and controlled with rules and practices that determine the relationships among the owners, managers, board members, employees, customers, suppliers and the stakeholders of the enterprise (Solomon and Solomon , 1999 ; Pauly and Reich,1997 ; Ozsoy, 2011).

It is not possible to conceptualize corporate governance within a micro frame, since its applications have effects on every aspect of social, financial, and economic issues. Corporate governance has extensive applicable areas. Corporate governance practices

have different consequences for different groups. For instance, application of corporate governance may have different impacts and meanings for an investor or for a supplier. According to investor corporate governance is necessary for enduring of profitable business with satisfactory management whereas, it may be perceived as an assurance of collecting receivables for a supplier.

2.4 The Significance of Corporate Governance

Corporate governance is a concept which affects disciplines such as finance, accounting, law, and management so; it helps to expansion and improvement of firms. At the present time, corporate governance applications are incredibly significant in both developed and developing economies, since successful corporate governance practices are the main factor of a reliable investment environment. We need an excellent corporate governance system to cope with the changeless of globalization for both domestic and foreign investors and to ensure the sustainability of economy. Corporate governance practices help to increase stock prices of publicly traded companies and help then to obtain funds more easily. Global investors do not prefer organizations that do not apply corporate governance principles well. For global investors, issues such as transparency, independent board members and audit committee are crucially important. Most of international investment companies have serious doubts about investing in enterprises that do not have good corporate governance scores. The companies that ignore corporate governance applications are facing greater difficulty in obtaining funds due to being perceived riskier (MCGEE, 2009, p.3). The reasons such as failures in partnership management, financial frauds committed, financial crises and audit scandals experienced and increasing economic interdependence of countries have been effective in increasing significance of sound corporate governance practices (Dinc and Abalioglu, 2009).

According to Claessens (2006), we need corporate governance because of five reasons which provide economic improvement (Claessens, 2006, p. 14-23):

- Raised access to financing: Improved creditor and shareholder rights are combined with along with lower financing cost and more advanced banking and capital market operations.
- Higher company appraisal: The worth of company is positively influenced by quality corporate governance which is shaped with low capital cost.

- Improved Operational Work: Companies can achieve better operational efficiency through developing and utilizing better administrative and reporting systems. There are many researches supporting sound corporate governance practices improving operational efficiency and performance of firms.
- Lowered risk of economic disasters: The successful corporate governance practices play important role for mitigating negative effects of economic crises.
- Good relationship with other stakeholders: Firms should pay attention to stakeholders such as investor, creditor, partner, customer etc. All stakeholders can influence company in different approaches.

2.5 Benefits of Corporate Governance

There are some steps for developing good corporate governance systems to protect shareholders' benefits, to promote transparency, to improve operational efficiency and accurate reporting through well designed administrative and internal auditing systems. Although these steps require extra time, effort and financial resources devoted, the returns obtained from good applications of corporate governance are much greater. Good corporate governance systems and applications promote positive firm performance. Improved performance affect investors' decisions and choices. Most of the academic researches and studies report incredibly positive feedbacks related to improved company image, company's ability in attracting both domestic and foreign investors and raising funds for the firms that apply corporate governance systems and practices successfully. Also, it helps to improve the productivity of directors, to encourage using the firm's sources both efficiently and effectively. Successful applications of corporate governance systems provide benefits to companies such as.

- Low Capital Cost
- Increasing liquidity with financing opportunities
- Successful initial public offerings and improved financial market performance for company shares (Yoruk, 2006).

Corporate governance plays significant role for efficiency and effectiveness of financial markets in countries. The efficiency and development are enhanced after the application of Corporate Governance principles. To build good corporate governance systems, transparency between firms and shareholders is crucially important and that

provides a very suitable environment for effective operations of financial markets by building greater investor confidence in the system.

Countries that emphasize corporate governance practices weaker are proven to be subject to negative consequences of economic crisis more than the countries where solid corporate governance applications are promoted. Well-designed corporate governance system promotes full recognition of transparency, internal control system for risk management, high quality of economic environment, prevention of corruption, a healthier private sector, fairer markets and greater institutional development which are also significant factors for developing an efficient financial market and investment environment.

For a country, corporate governance practices help,

- To improve the Status of Country for foreign investors
- To increase Capital Investment
- To promote Competitiveness of Economy and Capital Markets
- More Efficient Use of Resources
- To cope with financial Crises with Lesser Damage
- To Improve and Maintain Welfare of the Country (Aktas et., al 2013).

2.6 OECD Corporate Governance Principles

These principles were agreed by the OECD council in 1999 and became criterion for creditors, investors, managers, owners, decision-makers, and stakeholders all around the world. These principles have been determined via help OECD and non-OECD administration in theirs attempt to assess and develop fair, institutive and administrative structure for corporate governance in their countries (OECD, 2004a:11). Apart from increasing economic effectiveness, corporate governance also helps to improve investors' trust (OECD, 2004a:11).

1) **Providing the Base for an efficient Corporate Governance Structure;**

   The corporate governance structure can be developed by considering general economic conditions, market integrity and market player. Fair and managerial obligations which affect corporate governance principles must be in accordance with the rule of law which is transparent and appropriate.

   The separation of duties between divergent powers must be coherent and the common weal should be protected.

Controller, organizer, and executive forces must have honesty, authority, and sources to achieve their responsibilities in a professional and detached way.

2) **The Rights of Shareowners and Crucial Possession Functions;**

   The corporate governance structures conserve and help an application of shareowners' benefits. Shareholders have some rights such as protected procedures of possession record, bring and transport shares, access related information about firm on a well-timed, regularly attend and vote in meetings, choose associate of the board and take dividend of the firm.

3) **The Impartial Approach of Stockholders;**

   The corporate governance structure assures a fair approach to whole stockholders. The total stockholders must acquire the possibility to gain efficient compensation for derogation of their rights. Insider trading must be banned.

4) **The Function of Stockholders**

   The corporate governance structure can understand the rights of beneficiary provided legislatively and promote collaboration between stakeholders and company

5) **Disclosure and Transparency**

   The corporate governance structure must provide that well-timed and correct announcement about the company, especially the economic position, performance, possession, and administration.

6) **The Responsibilities of the Board**

   The corporate governance structure must provide the key counseling of the corporation, the influential tracing of management by the committee's accountability and loyalty to the firm and the shareowners (OECD, 2004a:14).

2.6.1 Corporate Governance in Turkey

Corporate governance concepts have been very welcomed by most of the developed and developing countries. The authorities all over the world have quickly grasped the main philosophy and understood the benefits to be derived from successful and honest applications of corporate governance systems and practices.

After careful revision of both international systems and applications, corporate governance studies have been started in Turkey in 2002. The first study about corporate governance applications in Turkey is a report which is based on OECD

principles of corporate governance and it was done by Turkish Industrialists and Businessmen's Association-TUSIAD (TUSIAD,2002). In this initial report, published by TUSIAD in 2020, information about actions and obligation of the board of directors were especially emphasized. It has five main parts, namely, shareholders' rights, fair treatment of shareholders, disclosure to public, transparency and responsibilities of board of directors. In 2003, Turkey Corporate Governance Association-TKYD was started for determining the finest corporate governance technics and practices for companies (TKYD, 2003). In 2003, Capital Market Board-CMB has declared corporate governance principles with special circumstances that are suitable for our country (cultural, political environment etc.). This was necessary to enable foreign companies which traded their shares and other forms of securities in Turkish Capital Market (CMB,2005, p.4). Afterwards, CMB corporate governance principles were revised and republished in 2005 because of dynamic economic situations. There are four categories especially: shareholder's obligation and privilege, public disclosure and clarity, the position and obligation of stakeholders and the position and duties of the board of members (CMB Corporate Governance Principles, 2005).

Table 1 : Review of CMB Principles

Shareholder	Public Disclosure and Transparency	Stakeholder	The Board of member
1. Helping the application of shareholders' legal right. 2. Shareholders' right to get and estimate facts. 3. Attending in the General Investor's Assembly. 4.Voting Rights 5.Minority Rights 6. Dividend Rights. 7. Move of percent's. 8.Same attitude to shareholder	1.Standards and Methods for Public Disclosure 2. Informing the people about relationship among firm and its parts. 3.Duties of External Audit 4. Regular financial accounts and its reports. 5. Approach of Trade Secret and insider Trading 6. Important Situation	1.Firm procedures about Stakeholders 2. Stakeholders' attendance for corporation. 3. Safety of corporation assets 4.Corporation procedures on human resources 5.Relationship between customer and supplier 6. Moral Standards 7.Public Obligation	1. Basis duty of the members. 2. Principals of action and tasks and liabilities of the members. 3.Forming and Voting of members 4. Payment of the board of directors. 5. Number framework and independency of the board established by the members. 6. Directors.

(Source: CMB Corporate Governance Principles (2005))

The first section emphasizes issues related to shareholder rights such as the right to get correct data, the right to attend properly in the general shareholders' meeting, and right for equal approach among shareholders. Second section is about public disclosure and transparency issues that focuses on providing accurate, valid, reliable, complete, understandable data to shareholders and investors on a timely manner for their information analysis and decision-making purposes. Third section is about stakeholders and concentrates on the firm's essential strategies related to stakeholders.

Stakeholders of firm consist of employee, creditors, trade unions, non-governmental organizations, potential investors and suppliers, customers, and governmental organizations. It is crucial to create and maintain a mutually beneficial and reliable environment between the company and its stakeholders to prevent any misunderstanding and negative situation by either party for sustainable beneficial or long-term relation. Last section is about the board of directors that is the highest-level administration power of company.

2.6.2 BIST Corporate Governance Index

The stock market of Turkey, BIST accepts a corporate governance index that is called XKURY. In 2005, Istanbul Stock Exchange has identified the main criteria of scoring procedure of the index and declared to the main aim of the index as to compute and evaluate the price and return performances of firms operated in Borsa Istanbul Markets.

XKURY examines listed firms, which are not included in the Watch List and Lists C and D, with a corporate governance rating of minimum 7 and over 10 as a whole and minimum of 6.5 for each of the four main sections (SPL, 2014).

When calculating of corporate governance scores, the firms' compliance with four main sections and their respective weights are considered. These four main sections along with their respective weights are a) public disclosure and transparency (25%) b) board of directors (25%) c) shareholders (25%) and d) stakeholders (15%) according to CMB in 2020.

Table 2: The example of calculating the Corporate Governance Score of any Company

corporate governance Principles	Weight	Note Given by The Rating Committee (Average)	Allocated Note
Shareholders	25%	8,015	2,00375
Transparency	35%	7,555	2,64425
Stakeholders	15%	7,494	1,1241
Board of Directors	25%	7,278	1,8195
Total	100%		7,5916 (7,59)

The companies are assigned a value between 1 and 10 by independent rating agencies for their corporate governance systems and applications regarding each of four main sections. 1 is the lowest value meaning there is a weak corporate governance system

and 10 is the highest value showing an effective management and audit mechanism for investors (www.borsaistanbul.com). In Turkey SAHA is an independent corporate governance rating agency which calculates professionally corporate governance scores of companies that are listed in BIST. There are two dimensions composed of a country assessment and an analysis of company for determining corporate governance scores. Company criterions are consisting of shareholders, transparency and disclosure, stakeholders, and board of directors' parameters while country criterions are consisting of market infrastructure, legal infrastructure etc... Many experts with knowledge and experiences in the fields of finance, economy and other related areas take part in this evaluation process by considering corporate governance systems of companies from the perspectives of investors, creditors, suppliers, customers, owners, partners, shareholders and other interested parties.

After providing information, the rating committee determines a rating for the company (www.saharating.com , 1.12.2019). The explanation of corporate governance rating is in explained in Table 3 (SAHA, 2019). The list of companies in BIST XKURY is in Table 4.

Table 3: The Meaning of Corporate Governance Ratings

RATINGS	EXPLANATION
9-10	The firm operates great in the way of Capital Market Board's corporate governance principles. It described and vigorously conducted measures against an important cg danger through inclusive internal controls and operation procedures. The firm shows best applications which have no imperfections in any of the fields rated.
7-8	The firm operates well in the way of CMB's corporate governance principals and has deserved to be involved in the BIST's Corporate Governance Index. It described all corporate governance dangers and it is vigorously conducting most of the measures against these dangers through internal controls and operation procedures. Insignificant failures were discovered in one or two of the fields.
5-6	The firm operates impartial in the way of CMB's corporate governance principals. It described the plural material corporate governance dangers and started to vigorously operate against them. Administration accountability is accepted to be meeting the national standards. However, the efforts seem to somehow be dropping behind international best practices. Insignificant failures were discovered in one or two of the fields graded.
4	The firm operates feebly and in consequence corporate governance tactics and applications are considered weak. The corporate determined its responsibilities and dangers that may inhibit effectiveness of a standard corporate governance system but does not show an efficient, system to prevent the related risks. Guarantee procedures are weak. The grading has identified important failures in a field rated.
< 4	The firm's operations related to its corporate governance procedures and applications are very weak. The corporation indicates restricted attention to corporate governance hazards. Important inadequacies in rated fields caused material loss and investor concern.

Table 4: Companies which are Operating in XKURY

1	Ag Anadolu Grubu A.S.	26	Lider Faktoring
2	Akis Gayrimenkul Yatirim Ortakligi A.S.	27	Logo Yazilim Sanayi ve Ticaret A.S.
3	Akmerkez Gayrimenkul Yatirim Ortakligi A.S.	28	Migros
4	Aksa Akrilik Kimya Sanayi A.S.	29	Otokar Otomotiv ve Savunma Sanayi A.S.
5	Albaraka Turk Katilim Bankasi A.S.	30	Park Elektrik A.S.
6	Anadolu Efes Biracilik ve Malt Sanayi A.S.	31	Pegasus
7	Anadolu Anonim Turk Sigorta Sirketi	32	Pinar Entegre Et ve Un Sanayi A.S.
8	Arcelik A.S.	33	Pinar Su Sanayi ve Ticaret A.S.
9	Aselsan Elektronik Ticaret A.S.	34	Pinar Sut Mamulleri Sanayi A.S.
10	Aygaz A.S.	35	Sekerbank
11	Baticim Bati Anadolu Cimento Sanayi A.S.	36	TAT Gida
12	Coca Cola Icecek A.S.	37	TAV Havalimanlari Holding A.S.
13	Creditwest Faktoring A.S	38	Tofas Turk Otomobil Fabrikasi A.S.
14	Dogan Sirketler Grubu Holding A.S.	39	Turcas Petrol A.S.
15	Dogus Gayrimenkul Yatirim Ortakligi A.S.	40	Tupras-Turkiye Petrol Rafinerileri A.S.
16	Dogus Otomotiv Servis ve Ticaret A.S.	41	Turk Prysmian Kablo ve Sistemleri A.S.
17	Enerjisa Enerji A.S.	42	Turk Telekomunikasyon A.S.
18	Enka Insaat ve Sanayi A.S.	43	Turk Traktor ve Ziraat Makinalari A.S.
19	Eregli Demir ve Celik Fabrikalari T A.S.	44	Turkiye Garanti Bankasi A.S.
20	Garanti Faktoring	45	Turkiye Halk Bankasi A.S.
21	Global Yatirim Holding A.S.	46	Turkiye Sinai Kalkinma Bankasi A.S.
22	Halk Gayrimenkul Yatirim Ortakligi A.S.	47	Turkiye Sise ve Cam Fabrikalari A.S.
23	Hurriyet Gazetecilik ve Matbaacilik A.S.	48	Vestel Elektronik Sanayi ve Ticaret A.S.
24	Ihlas Ev Aletleri Imalat Sanayi ve Ticaret A.S.	49	Yapi ve Kredi Bankasi A.S.

2.7 Sustainability Concept

Global competition among business firms have been very fierce especially in the last 2-3 decades. Sustainability concept has emerged to be the main topic for the firms trying to continue their existences and maintain their competitiveness. The concept of sustainability is an important and widely discussed topic for the last century (Demir and Sezgin, 2014). It is possible to define sustainability concept in different ways. Sustainability concept can be used for many different areas. For example, sustainable innovation, sustainable tourism, sustainable economy, sustainable operation etc. It is hard to make definition of sustainability concept accepted by everyone (Yavuz, 2010, p.65). The basic definition of sustainability is ability to continue processes, productivity, and functions of ecological system in the future (Chapin, Torn and Tateno, 1996). Within the frame of social sustainability, future generations should be

thought while using resources to provide needs for today's human. Sustainability concept can be used by firms in different fields. Economic sustainability is a strategy include economic, social, and environmental elements. These three factors cannot be considered separately for companies seeking sustainability. When companies emphasize the importance to sustainability concept, they can be passed on to the next generation. If the businesses do not work properly within sustainability concept, they should not expect to long life company (Clarke and Clegg, 2000). When firms enter the international markets and operate in these areas, they need to have additional responsibilities and adopt common values such as preventing discrimination because of race, gender, religion etc. in addition to be more willing to take advantages of developments of communication technologies and to be more sensitive about social and environmental responsibilities.

2.8 Financial Sustainability

Social and environmental sustainability are essential to create economic sustainability. Economic sustainability means to how organizations continue its operation in business life. Staying in business requires making investments with an or above expected rate of return, that is a minimum profit. Although profits may be relatively easy to determine, there are other non-measurable or not very easily measured but especially important factors that determine gauge economic sustainability. A company's financial sustainability can affect customers, shareholders, workers, suppliers, capital owner etc. Good financial sustainability contributes to prosperity of country. Good Corporate Governance plays positive role on business operations. Improved corporate governance is extremely attractive for investors and creditors usually accompanied with excellent operational performance, superior market price and more earnings per share (Drobetz et al, 2003). Sustainability of businesses especially in publicly held corporations is more important. To support economic sustainability, firms may supplement standard financial accounting and reporting systems with more advanced versions and techniques. Corporate governance systems require management and audit committees of corporation to be fully transparent, equitable, answerable, and honest.
All these factors are basics for maintaining financial sustainability for firms (Aras, 2006, p.1-2). Economic sustainability includes issues such as management of equity capital, foreign resources, and intellectual capital. If the company achieves and maintains an effective economic sustainability, it will be able to provide a sustainable

return and liquidity to its stakeholders. Intellectual capital is usually the most important assets of a business and is exceedingly difficult to measure. Especially in the 21st century digitalization and digital know-hows are crucially important. Therefore, intellectual capital should be considered the most important element of financial, economic, and social sustainability for a firm (Karacaer and Aygun, 2009).The purpose of businesses is to create long term value within existing constraints of economic, social, and environmental factors with consideration of inherent risks and opportunities available (Nemli, 2004).

Economic sustainability can be achieved through careful consideration and optimal combination of operating expenses, profitableness, and utilization of resources of the company by giving the highest emphasizes given to human and environmental resources.

2.8.1 Altman Z-Score

What is Altman Z-Score?

Normally, everyone wants to invest in companies that have potential to gain value and to make a profit. So, they try to ignore the companies that are in or have potential to be in financial distress. For this reason, many stakeholders are willing to search techniques to evaluate financial performance and to predict bankruptcy. There are many examples of unexpected bankruptcy, but it is not quite possible to predict them long before they occur. Altman Z-Score is the most popular, numerically predictive method which is applied to estimate a companies' financial sustainability (Moyer, 2004). Edward Altman, who is a professor of finance, established Altman Z score in 1968 which is the first multivariate bankruptcy prediction model. In addition, Altman's model has been used widely by academicians and professionals (Wilson and Sharda ,1994; Coats and Fant,1993). After this model, multivariate prediction models have become widespread around the world by finance and banking researches. Bankruptcy forecasting models are significant mechanisms for rating agencies that they use these models to choose the most suitable companies for their portfolio. Financial difficulties possess danger to investor earnings, but risk can supply higher returns under certain circumstances with short sale strategies.

Rating agencies try to understand and quantify the risks involved with existence and issuance of securities so, they will have a rational prediction for future values and possibility of both favorable and unfavorable outcomes. Altman (1983) suggested that

administration of troubled companies can apply the Z-Score model for financial evaluations. The Z-Score is a model which consists of financial ratios and discriminant analysis is an extremely helpful tool to predict companies' future bankruptcy. It is so popular because Z-Score is applied easily, and data can be acquired effortlessly. In addition, its high predictive power is a reason of its preferences. In accounting, financial ratios can be used for analyzing a company's financial standing through consideration of liquidity, operational efficiency, profitability, financial structure, long term solvency and turnover ratios. In this study, Z-Score model that was developed by Altman is a part of solvency ratios. Solvency ratios test the financial standing of a firm and its capacity to pay back especially long-term loans. These ratios are extremely important for bank loan officers. Solvency ratios supply an evidence for financial health and activity of a business.

The Final Model is as noted below:

$$Z = 3{,}3\ X1 + 0{,}99\ X2 + 0{,}6\ X3 + 1{,}2\ X4 + 1{,}4\ X5$$

Where

Financial Ratios of Altman Z-Score

X1: Return on Total Assets = Earnings before Interest and Taxes / Total Assets

X2: Sales to Total Assets= Net Sales /Total Liabilities

X3: Equity to Debt =Market Value of Equity / Total Liabilities

X4: Working Capital to Total Assets = Working Capital / Total Assets

X5: Retained Earnings to Total Assets =Retained Earnings / Total Assets

After calculation there are some critical values for predicting of company position

Table 5: Altman Z-Score Intervals for Publicly Traded Companies

Score	**Zone**	**Result**
Z < 1.81	Distress	likely to be bankrupt
1.81< Z <2.99	Gray Zone	Stable
Z > 2.99	Safe Zone	Safe

If Z-Score of greater than 2,99, this means that the entity being measured is financially safe and far from bankruptcy. A score of less than 1,23 means that a business is at considerable risk of going into bankruptcy. The other interval means financial position

in between these two extreme ends. High Z-Scores indicate strong financial health while low scores indicate financial distress (Ferrier et al, 2002). Altman's early analysis is applied on a sample of 66 publicly traded, production companies.

Thirty-three of the companies had been classified for having a high risk for bankruptcy and all had resources over $ 1 million. The model did an excellent job for being able to foresee financial failures for 95% of the companies, one year earlier to their collapses. Efficiency decreases to 72% two years and to 52% three years earlier to deficiency (Altman, 1968).

2.8.2 Financial Ratios

Ratio method is the most common method for financial statements analysis. In this technique, purposeful relationships are established between the items in the financial statements. The aim is to evaluate and interpret the ratios which are financial instruments in accordance with the objective of interprets (Akdogan, N. and Tenker, N., 2001). To gain suitable results for the company interests depends on the ratios in the financial statements. The ratios provide to clarify data that has obtained from financial records. Unless the financier evaluates financial ratios analyzes according to certain standards, the assessment is meaningless (Maher et al.1991).

1. Prepared rates evaluated for a given cycle.
2. Rate for identical firm for the earlier period.
3. Rates for a same firm in the similar area.
4. Average rates of other companies in the similar area.

Checking company operation with using financial ratios is a good way to understand reality about firm health. Ratio tests can support stakeholders evaluate the financial situation of a company (Delen, D., Kuzey, C., and Uyar, A., 2013). Financial ratios can be applied for different aims. Financial ratios have always played significant role in determining the performance and financial state of the companies. In this study, Z-Score is a type of solvency ratios will be used. Because solvency ratios give an intense clue about financial well-being and existence of business.

RETURN on TOTAL ASSETS (ROA): This ratio computes of managing effectiveness without any tax or leverage elements. It accepts operational profits as a clue to long term existence. Altman (2000), categories the rate as an excellent criterion of profitableness more than cash flow.

This ratio is supposed to be greatly suitable for investigating company bankruptcy because the final existence of the firm depends on earning power (Altman, 1968).

***SALES to TOTAL ASSETS*:** It is a typical turnover ratio shows the sales developing capability of resources of a company. It should be arranged for different conditions. This ratio is an index of a companies' productive use of assets to create sales (Chuvakhin and Gertmenian, 2003). Altman (2000) has described this as" …. one criteria of management's capability in dealing with competitive conditions" (p.22). If company has higher sales, then the probability of default or financial distress decreases. Nevertheless, it is ranked as the second most important ratio for contributing to the total discriminate ability of the model. This is because it has a unique and quite significant association to other variables in the model (Altman, 2000).

EQUITY to DEBT (Market Value of Equity / Total Liabilities): This ratio equates the firm's market stock financial value to the total liability. Knowledge can be acquired from balance sheet and stock market bulletin for calculation. Altman (2000) describes the market value of equity, or market capitalization, as an addition of both preferred and common stock or market value of equity/book value of total debt (X4). In other saying, a company with a market value of its debt of $500 and its equity of $1000 may experience a two third reduce in asset value prior to bankruptcy. Nevertheless, if assets decrease one third in value, the same firm with $250 equity will failed. A market value, which is not examined in most of the failure researches, is involved in this ratio (Altman, 2000).

***WORKING CAPITAL to TOTAL ASSETS*:** It is liquidity ratio which declares the net liquid assets or working capital of a firm being portion of its total resources. Working capital consists of the difference between current assets and current liabilities. The current assets of the company involve cash, inventory, supplies account receivable, prepaid expenses, temporary investments. Current liabilities include the firm's economic responsibilities short term debt and accounts payable which will be met during the operating cycle. If a company has ordinary operational defeat, it will decline current assets related with total assets. Altman's study presents this ratio is more useful than current and acid test ratio.

***RETAINED EARNINGS to TOTAL ASSETS*:** Retained earnings are a record which describes the firm's earning power via reinvested earnings all its life. It computes cumulative profitableness in time being percentage of total assets. A history of effective processes and decreased debt is signified by firms that retain earnings or reintroduce operational profits. Low retained earnings may indicate a low business year a reduced longevity for the company.

This ratio is discovered to be essentially influenced by the age of a firm and an old firm may have higher retained earnings / total assets ration than a young company. This is because the younger company has not had enough time to expand its cumulative profit. Also, this ratio calculates the leverage of company. A measure of an organization's operating efficiency separated from any leverage impacts is a true description of assets production.

CHAPTER 3: LITERATURE REVIEW

3.1 Corporate Governance and Financial Performance

3.1.1 Researches Conducted by Turkey

Although there may studies related with variety perceptive of corporate governance, in this part the relationship between financial performance and corporate governance will be mentioned with using the international and national studies. In the international literature, some researches applied and analyzed corporate governance variables such as board size, transparency, board independence, ownership structure, corporate governance rating etc. in their studies whereas other researcher preferred to use the combination of these variables. The main findings of some leading studies in this field as follows. The investigations show that relationship between corporate governance variables and financial performance can be positive (Adams and Mehran, 2005) can be negative (Lehmann and Weigand, 2000) or there is no relation (Demsetz and Lehn, 1985; Burkart et al., 1997; Bolton and Von Thadden, 1998; Demsetz and Villalonga,2001). There are some examples of studies about corporate governance from national literature as follows.

Gurbuz, Aybars and Kutlu (2010) determined the impact of corporate ownership on financial performance(ROA). In this study ROA was a dependent variable which is used in panel data regression. They used final sample consists of 164 companies traded in Istanbul Stock Exchange from 2005 to 2008 years. After analysis of data, they found a positive relation between corporate ownership and financial performance.

Ege,Topaloglu and Ozyamanoglu (2013) examined the impact of corporate governance on financial performance. The data set comprised of 18 firms traded in ISE XKURY index from 2009 to 2011 years. The evaluation of this information was provided with using TOPSIS method. 9 financial ratios were used to determine the firm's performance scores for TOPSIS method. According to their exanimation, they found that there is no positive connection between corporate governance grades of firms and its financial performances.

Erdur, Kara, Karabiyik (2014) studied the connection between corporate governance level and financial performance of XKURY businesses from 2006 to 2012 years. Panel data analysis method was used for analyzing data from 33 firms in XKURY.

The results indicated that there is favorable relation between corporate grading points and market to book ratio.

However, there is no relevant link between corporate governance points and return on sales ratio, return on assets ratio, return on sales ratio, and net profit.

The study operated by Alper and Aydogan (2017) calculates efficient corporate governance applications and financial performance of the firms. In their study, they studied with data which were corporate governance scores of 38 firms in XKURY from 2007 and 2015 years. The conclusions display important and affirmative relation between financial performance (ROA) and market-based Tobin's Q ratios (market values and performance) and the corporate governance grades 38 businesses listed in XKURY. In addition, they inferred that corporate governance methods provide a protection structure for stakeholders whereas enhancing the corporate performance and effectiveness of the market.

Coskun and Sayilir (2012) investigated the relationship between a firm's financial worth and its corporate governance applications and in addition to analyze the relation between effectiveness performance and corporate governance for Turkish firms. In this study, corporate governance ratings of 31 firms were used for the measurement of corporate governance, ROE and ROA were used for performance and Tobin's Q was used for firm value in regression model. As a result of this study, no meaningful connection was found between corporate governance and firm performance and firm's financial worth.

Conkar K, Elitaş C., and Gökhan A. (2011) included 7 companies from the year 2007 and 10 companies from the year 2008 in their researches. The stocks of all these companies were actively traded in Istanbul Stock Exchange-ISE in selected years. They used Current Ratio, Profit Capital Ratio and Leverage Ratio to determine the financial standings of the firms and compared financial standings of these firms to their CG scores. TOPSIS method is used in their research. They do not find a meaningful relationship between financial performance and corporate governance scores since the companies' corporate governance scores was assigned by different rating companies without any mutually accepted common standards.

Cengiz H. compares the companies listed in Corporate Governance Index against a set of similar companies that are not in Turkey in his 2016 study. The companies are compared based on their Return On Assets, Return On Equity, Earnings Per Share, Net Profit Margin, Market Book Value by using T-test and Mann- Whitney U test.

The results show that the companies that are listed in the Corporate Governance Index in Turkey have higher financial performances in terms of return on assets, net profit margin, and return on equity compared to the companies that are not listed.

Yıldırım A and Gemici (2018) studied on the relationship between CG and financial performance on food and beverage companies traded in the BIST. Their research was based on financial ratios of 5 Food and Drink Companies listed in ISE for the years between 2013-2016 period. They employed Entropy Based TOPSIS method and according to the result there is no continuous and significant relationship between corporate governance ranking and financial performance ranking among these five companies.

Suadiye (2017) researched the effects of corporate governance practices on firm Performance through consideration of Tobin's Q, ROA and ROE of 107 listed firms in ISE for the period from 2010 to 2015. Regression Model Analysis is used in this study and it is found out that board size and CG index have positive relations to a firm's financial performances, whereas, independent directors and managerial ownership have a negative effect on financial performance.

Esendemirli and Acar (2014) analyses the relationship between financial performance and CG scores of the firms listed in BISTXKURY for the years 2013 and 2014. They consider 10 financial ratios and the research covers data for 24 non-financial companies in 2013 and 28 non-financial companies in 2014. TOPSIS was used for normalization of data as a multi criteria decision analysis method and no relationship was found between corporate governance ratings and financial performances of the companies.

3.1.2 Researches from International Literature

When the studies are examined, it is seen that either a single area is used in the measurement of corporate governance in the firm or index/rating grades are used. Therefore, the literature review is given in this way.

Baxter (2014) searched the relation between the corporate governance grading of Australian publicly held corporations and their financial performance between 2006 to 2008 years. He used the Horwath Corporate Governance Report (HCGR) to calculate the variable for corporate governance, which is the best, accepted scoring in Australia. The corporations were assigned a star rating among a maximum of 5 providing the extent to which they met the finest practice standards and given a ranking related to the other companies. Tobin's Q, ROA and ROE were used being financial variables. The consequences of this research displayed that both stars and rankings are positively correlated with financial performance. Some researchers studied the corporate governance and financial performance relationship by attracting on board aspect like size and independence.

Kiel and Nicholson (2003) researched 348 largest publicly listed corporations of Australia, they used ANOVA and their result shows that board size is positively correlated to financial performance if the firm size is controlled. Individual research has conflicting results as to whether board gender diversity positively affects performance or otherwise.

Erhardt et al (2003) examined 127 large US companies using an independent variable which comprised of ROA and ROI from 1993 and 1998 financial performance data. In this study, demographic diversity was measured in terms of ethnic and gender representation on board as a dependent variable. The regression and correlation analysis were used for analyzing the data. As a result, they explored that board diversity is positively related to ROA and investment which are the financial indicators of the corporate performance of the researched corporations.

Nguyen et al (2014), working with dynamic panel data method, determined the relations between corporate management frameworks and corporate performances (Tobin's Q) of 257 Singapore corporations. They acquired that the diversity and size of the board of directors and ownership structure had a statistically critical impact on corporate performance. Corporate governance performed an important role on improving the management and specification of the performance.

In Gruszczynski's (2006) study, financial performance of 16 Polish listed companies were calculated with using their financial statements. 20 financial ratios were used in his study as an explanatory variable. The ordered panel logit regression analysis was a useful method with using corporate governance grading as a dependent variable. The study explains that the rating of corporate governance for listed companies in Poland is to some extent relevant with their financial performance. The crucial connection has been observed between the governance rating and the operating profit margin and with the debt leverage ratio. The companies with higher profit margin and lower debt leverage ratio are supposed to have more excellent rating of corporate governance. On the other hand, most financial indications show no relation with corporate governance degree.

Ueng, C.J. (2016) analyses of Corporate Governance Policy and Corporate Financial Performance over stock returns of 3068 firms for 2010. The Logistic Regression Model was used in the research and according to results of study firms which have an excellent corporate governance tactics, provides better financial performance to increase shareholders' worth.

Sanda AU, Mikailu, AS, and Garba, T. (2005) study on the relationship between corporate governance mechanisms and firms' financial performance in Nigeria over ROA, ROE, Tobin's Q of 93 listed companies in Nigerian Stock Exchange. The Regression Analysis method was used, and the results show that both director shareholding and board size show no significant relationship with return on assets. Ownership concentration has a significant positive effect in all but one case.

Berthelot S., Morris T. and Morrill C. analyze the relationship between corporate governance rating and financial performance in their 2005 study including 289 listed Canadian companies for the years 2002 to 2005. The Price Model Analysis was used in their research. According to analysis there is a significant relationship between corporate governance rankings and not only firms' market value, but also to financial performance.

Allan Chang Aik Leng (2004) study the impact of corporate governance practices on firms' financial performance over 77 Malaysian companies, listed in corporate governance index for a four-year period from 1996 to 1999. The Panel Regression Analysis method is used in the research and the results revealed that increased level of participation by institutional investors appears to lead to a greater monitoring role of

these investors therefore ensuring a higher degree of CG applications and in return improved financial performance.

Rhoades, Rechner, and Sundaramurthy (2000) research on the relationship between board composition and financial performance over a study including accounting variables of 37 independent samples and across 7644 organizations. The Meta-Analysis is employed in the study and the results show that corporate board position has a small positive relationship with financial performance.

3.2 Corporate Social Responsibility and Financial Performance

Formerly, only profits were enough for any organization. Later, it was understood that the social and environment dimension of the company should be sustainable for the continuity of this profit. So, a new concept has emerged which has called "Corporate Social Responsibility". There are many versions of term "Corporate Social Responsibility" in literature. Different authors explained this term in different ways. The World Business Council for Sustainable Development (1999) says that CSR is the enduring promise by business to treat morally and provide to economic growth while developing the standards of life of the manpower and their people as well as of the society. Barnett (2007) explained the CSR concept "any optional corporate enterprise planned to farther social prosperity." In organization, affirmative social activity helps to increase stakeholders 'idea of a company's output and service and then the firms' financial performance goes up.

According to Ingley et al, (2010), when CSR concept which consists of social, economic, and environmental activities apply, the financial expectations of stakeholders are satisfied. Generally, corporate social responsibility is crucial and basic sustainable processes of companies. Financial performance is necessary for sustaining businesses of any organization. There can be positive, negative, or unconcerned correlation between CSR and financial performance. The examples are as follows from international literature.

Aras et al (2010) researched the relation between CSR and financial performance in emerging states. They used sample data which consist of 40 companies from ISE 100 Index for 4 years period. They preferred to use the regression which has CSR as a dependent variable and financial performance as an independent variable (ROA, ROE and ROS) for this research. According to results of analysis in this study negative link can be found between CSR and financial performance.

Brammer et al (2008) used market-based performance criterion in this study. Data derived from the financial reports and records of 537 firms which were operating in the London Stock Exchange between 1990 and 1999 years. Analysis was happened in three stages. First, the connection between CSR and corporate financial performance was explored for a short term. Then, for five years 1995-1999 was explored and finally ten years period was checked. For analyzing financial performance Tobit model was used. The dependent variable evaluated is the proportion of donations to selling with using Tobit model. They found that companies which have excellent corporate social responsibility, they perform their financial goals for a long time. When they have weak CSR, they perform their financial goals for a short time. So, CSR is crucial factor for making real financial performance of companies. Some studies have a positive correlation in literature. For example, Nelling and Webb (2009) worked with ROA and used stock return as a dependent variable. They discovered positive relations with CSR score.

Rettab et al (2009) in this research are analyzing the connection between CSR and institutional performance. For analyzing, they used sample from 280 firms which operate in Dubai via e mail and faxed. Questions about financial performance as a dependent variable were answered with using a 5-point Likert scale, from 1 = strongly disagree to 5 = strongly agree. Participants were desired to display which each item affected their association (on a 5-point Likert scale, from 1= strongly disagree to 5 = strongly agree) for measure CSR as an independent variable. Descriptive statistics and regression analysis were used for understanding the relation between variables. In conclusion, study has positive connection with different aspects such as financial performance, corporation prestige and worker obligation.

In Karagiorgos' (2010) study, he attempted to examine the link between CSR and financial performance of Greek companies. He took advantages of stakeholder theory for testing hypothesis. For calculating estimating CSR, he accessed firms' CSR reports based on GRI guidelines for two years (2007 and 2008). Data for stock returns (prices and dividends) were obtained by Athens Stock Exchange as a dependent variable (2007, 2008 and 2009). The source of data to calculate the rest financial variables (2007 and 2008) is Athens Stock Exchange and Hellastat.

Regression analysis was applied to examine the link between CSR and financial performance for Greek companies. According to results affirmative relation was found between stock returns and CSR. Some studies have no significance about CSR and

financial performance. Goukasion and Whitney (2008), Fauzi (2009), and Mahoney and Roberts (2007) are some of examples researches.

Fiori et al (2009), the data of analysis consist of 25 firms which are operating in different sectors except banks and insurance firms between 2004 and 2006 years in Italy. Stock price was as dependent variable and CSR parameters (employee, environment, and community), (D/E) ratio; ROE ratio, Beta levered were as independent variables in regression method analysis. According to results there is no relation between stock prices and CSR studies.

3.3 Altman Z-Score and Financial Performance

Following Corporation fiascos which were happened in many sectors, important researches were started to estimate the financial situation of any company. Stakeholders, managers, employees, shareholders of organization are consistently interested in financial sustainability of organization. Financial ratios are often used for analyzing the financial health of any corporation. Altman Z-Score is the basis method which has used the financial ratios to predict financial distress.

Kivuvo and Olweny (2014) studied Sacco financial statement to detect financial performance, predictor variable efficiency and models addition to finance stability. The data consists of 30 companies which are operating in Kenya's SACCO sector. Quantitative research was used for analyzing data between 2008-2013 years. In this study financial analysis was done to identify sector performance, variable potency, and financial stability with using the Z-Score developed by (Altman I.E., 1968) on Kenyan SACCO's. Financial analysis displays a powerful economic situation. When SACCOs in grey area increase their performance, they can move to non-bankrupt position. 24 out of 30 SACCO companies have a positive performance; it means they continue increase sustainability, only six SACCOs having a negative relation. According to this study, the Altman Z-Score analysis provides to sector financial sustainability.

Carton and Hofer (2006) searched a different organizational performance measurement. Altman Z-Score was discovered to suitable method for supplying data about financial performance of the organization. Return ratios (i.e. ROE & ROA), economic profit, growth rate of sales, cash flow, and expenses were used in Altman Z-Score. According to Carton and Hoffer's study, Altman Z-Score can be used not only as a financial distress estimator but also as a performance management tool.

Hayes, Hodge and Hughes (2010) chose suitable companies in accordance with some criteria for this study. Data included 4 pair companies in 2007 and in 2008.
Financial data was acquired from Reuters (www.reuters.com) of these companies. In this study all but two of the bankruptcies were estimated correctly by Altman Z-Score.
Tyagi (2014) studied the financial situation of Indian logistics companies. The data of study was acquired from online resources between 2005 and 2012 years. Ratio analysis was used for analyzing these data. The understanding financial situation of companies cannot possible with one ratio analysis. So, Altman Z-Score which consisted of financial ratios was applied for forecasting the financial health of companies. This study showed that the performance of Indian logistics firms was pleasant.

CHAPTER 4: AN APPLICATION ON COMPANIES WHICH TRADED IN XKURY

4.1 The Aim of the Study

In this study, aim is to find to relationship between corporate governance and financial performance of companies which is traded in XKURY.

4.2 The Method of Study

In this study, corporate governance ratings of 20 firms which are traded at BIST XKURY between 2013 and 2018 fiscal years are calculated by assigning equal weight to each criteria by using the TOPSIS method which is one of the multi-criteria decision making techniques and financial performance of these companies are evaluated by using Altman Z Score. Finally, these methods are compared and evaluated according to results. Financial data were obtained from year-end balance sheet and income statements. Ratings were obtained from Public Disclosure Platform.

4.3 Companies and Financial Ratios used in Research

Although 49 companies are registered in the BIST corporate governance index (XKURY) and there are various classifications, the financial data of 20 companies that can be reached consistently between 2013 and 2018 are selected for evaluation. So, companies which are used in the research are shown in Table 6.

Table 6: Sector Firms are involved in Study

No	Code	Corporate Name
1	AEFES	Anadolu Efes Biracilik ve Malt Sanayi A.S.
2	ARCLK	Arcelik A.S.
3	ASELS	Aselsan Elektronik Ticaret A.S.
4	AYGAZ	Aygaz A.S.
5	CCOLA	Coca Cola Icecek A.S.
6	DOAS	Dogus Otomotiv
7	GLYHO	Global Yatirim Holding A.S.
8	HURGZ	Hurriyet Gazetecilik ve Matbaacilik A.S
9	IHLAS	Ihlas Holding A.S
10	LOGO	Logo Yazilim Sanayi ve Ticaret A.S
11	OTKAR	Otokar Otomotiv ve Savunma Sanayi A.S.
12	PRKME	Park Elektrik A.S
13	TAVHL	TAV Havalimanlari Holding A.S.
14	TOASO	Tofas Turk Otomobil Fabrikasi A.S.
15	TRCAS	Turcas Petrol A.S.
16	TUPRS	Tupras-Turkiye Petrol Rafinerileri A.S
17	TTKOM	Turk Telekomunikasyon A.S.
18	PRKAB	Turk Prysmian Kablo ve Sistemleri A.S
19	TTRAK	Turk Traktor ve Ziraat Makinalari A.S.
20	VESTL	Vestel Elektronik Sanayi ve Ticaret A.S.

Five financial ratios were used in this and financial data is obtained from the financial statements disclosed in Public Disclosure Platform (www.kap.org.tr). These financial ratios are;

1: Return on Total Assets = Earnings before Interest and Taxes / Total Assets
2: Sales to Total Assets= Net Sales /Total Liabilities
3: Equity to Debt =Market Value of Equity / Total Liabilities
4: Working Capital to Total Assets = Working Capital / Total Assets
5: Retained Earnings to Total Assets =Retained Earnings / Total Assets

4.3.1 TOPSIS Method

TOPSIS, which is a multi-criteria decision-making technique, was developed by Hwang and Yoon in 1981(Hwang, C., and Yoon K, 1981). When deciding with the TOPSIS method, the chosen alternative should have the shortest geometric distance from the positive ideal solution and the longest geometric distance from the negative ideal solution (Assari, A., Mahesh, T., &Assari, E. ,2012).

TOPSIS is created with 7 successive steps as follows:

Step 1: Creating the Decision Matrix

The first step of TOPSIS is to arrange of decision matrix by decision maker with m Alternatives, n Attributes (criteria) in Aij matrix.

The representation of the Decision Matrix is as follows:

$$A_{ij} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ . & . & . & . \\ . & . & . & . \\ . & . & . & . \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}$$

Step 2: Obtaining the Normalized Decision Matrix

After decision matrix has formed, the squares of each aij value (a11, a21, a31… am1) are taken and the column sums of these squares are calculated. Then, each aij value is divided by the square root of the column totals to which they belong.

As a result of this process, the normalized decision matrix is obtained which is necessary since each aij value may have quite different absolute values that may distort a rational comparison. The representation of the process with the formula is as follows;

$$N_{ij} = \frac{a_{ij}}{\sqrt{\sum_{i=1}^{m} a_{ij}^2}} \; (i = 1, \ldots\ldots, m \; ve \; j = 1, \ldots\ldots, n$$

After applying the formula, the normalized matrix is created as follows.

$$N_{ij} = \begin{bmatrix} n_{11} & n_{12} & \ldots & n_{1p} \\ n_{21} & n_{22} & \ldots & n_{2p} \\ . & . & . & . \\ . & . & . & . \\ . & . & . & . \\ n_{m1} & n_{m2} & \ldots & n_{mp} \end{bmatrix}$$

Step 3: Determine the Weighted Normalized Decision Matrix

Weight of each criteria is assigned with a value such as wij in the matrix, which is determined according to its level of importance. The only subjective input of the TOPSIS method is the weights. However, in this research weight of each decision criteria is determined to be equal whereas, in ratings of SAHA a different weight for each decision criteria are used. The total of the assigned wij values must be equal to 1. It can be represented as;

$$\sum_{i=1}^{n} w_i = 1$$

In this step, the bij values obtained from the normalized matrix are multiplied by the wij weights so that the weighted normalized matrix side V matrix is obtained.

$$V_{ij} = \begin{bmatrix} w_1 n_{11} & w_2 n_{12} & \ldots & w_n n_{1p} \\ w_1 n_{21} & w_2 n_{22} & \ldots & w_n n_{2p} \\ . & . & . & . \\ . & . & . & . \\ . & . & . & . \\ w_1 n_{m1} & w_2 n_{m2} & \ldots & w_n n_{mp} \end{bmatrix} \overset{V_{ij}}{\Rightarrow} \begin{bmatrix} V_{11} & V_{12} & \ldots & V_{1P} \\ V_{21} & V_{22} & \ldots & V_{2P} \\ . & . & . & . \\ . & . & . & . \\ . & . & . & . \\ V_{m1} & V_{m2} & \ldots & V_{mp} \end{bmatrix}$$

Step 4: Obtaining Ideal and Negative Ideal Solution Values

After obtaining the V matrix, that is, the weighted normalized matrix, the maximum values of each column are selected by adhering to the purpose of the research, that is, if the goal is maximization. These selected values are ideal solution values. Then, the minimum values for each column are selected. These selected values are negative ideal solution values. Formulas for ideal and negative ideal solution values are shown below. Positive ideal solution + A has the form:

$$A^{+} = \left(v_1^{+}, v_2^{+}, ..., v_n^{+}\right) = \max v_{ij}$$

Non-Ideal Solution Values

$$A^{-} = \left(v_1^{-}, v_2^{-}, ..., v_n^{-}\right) = \min v_{ij}$$

Step 5: Calculate the separation measures from the positive ideal solution and the negative ideal solution.

Euclidean is used for calculating distance values.

Ideal Distance

$$S_i^{*} = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^{*})^2}$$

Non-Ideal Distance

$$S_i^{-} = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^{*})^2}$$

Where, i = criterion index, j = alternative index.

As a result of these calculations, S_i^{*} and S_i^{-} values will be found as much as the decision point.

Step 6: Calculate the Relative Closeness to the Ideal Solution

In calculating the relative proximity, distances to non-ideal and ideal points are used. The relative proximity to the ideal solution is indicated by the C_i^* symbol.

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^*}.$$

This value is in the range of $0 \leq C_i^* \leq 1$. The absolute proximity to the ideal solution is shown as $C_i^* = 1$, while the absolute proximity to the negative ideal solution is shown as $C_i^* = 0$.

Step 7: Rank the preference order or select the alternative closest to 1.

A set of alternatives now can be ranked by the descending order of the value of Ci*.

4.4 Application of TOPSIS Method

In this study, corporate governance ratings of 20 firms which are traded at XKURY between 2013 and 2018 fiscal was used. These ratings were converted to digits to show overall performance by using TOPSIS method and companies are listed among themselves based on their financial performance.

Step 1: **Creating the Decision Matrix**

The first step of application is to create decision matrix. In decision matrix, there are 20 firms which are decision points and there are 4 evaluation points as shareholders, transparency, stakeholders, and the board of directors. The decision matrices for all between 2013 - 2018 fiscal years are listed below in Tables 7-8-9-10-11-12.

Table 7: Decision Matrix of 2013 Year

2013	Shareh.	Transp.	Stakeh.	BoD
VESTL	6	7	6	5
TOASO	3	7	9	7
TTRAK	3	7	8	7
HURGZ	6	7	6	4
TUPRS	5	7	7	8
OTKAR	6	7	8	4
AEFES	6	9	6	7
CCOLA	3	8	9	7
ARCLK	6	6	8	7
TAVHL	7	8	7	6
ASELS	3	9	7	6
TTKOM	3	9	4	5
LOGO	5	5	6	6
PRKME	6	3	6	4
AYGAZ	6	6	8	7
PRKAB	5	8	5	5
TRCAS	4	6	6	4
IHLAS	3	5	1	3
GLYHO	5	6	5	5
DOAS	6	6	5	6

Table 8: Decision Matrix of 2014 Year

2014	Shareh.	Transp.	Stakeh.	BoD
VESTL	7	6	6	5
TOASO	4	7	8	6
TTRAK	4	7	8	6
HURGZ	7	7	9	6
TUPRS	8	7	5	7
OTKAR	8	6	8	5
AEFES	7	9	8	6
CCOLA	5	8	8	6
ARCLK	8	8	8	6
TAVHL	7	8	6	7
ASELS	4	9	7	6
TTKOM	4	7	4	4
LOGO	6	5	7	6
PRKME	6	6	7	5
AYGAZ	8	6	9	6
PRKAB	5	7	5	6

"Table 8 (cont'd)"

TRCAS	6	6	6	6
IHLAS	2	3	1	2
GLYHO	6	6	5	5
DOAS	7	7	6	6

Table 9: Decision Matrix of 2015 Year

2015	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**
VESTL	7	6	6	6
TOASO	4	7	8	6
TTRAK	4	7	8	6
HURGZ	7	7	9	6
TUPRS	8	8	6	7
OTKAR	8	7	8	6
AEFES	8	9	9	6
CCOLA	5	9	9	7
ARCLK	8	8	9	6
TAVHL	7	8	9	7
ASELS	4	9	7	6
TTKOM	4	8	5	5
LOGO	6	4	8	7
PRKME	6	7	7	5
AYGAZ	8	6	9	6
PRKAB	5	8	5	6
TRCAS	7	7	7	6
IHLAS	2	3	1	3
GLYHO	5	5	5	5
DOAS	7	8	7	7

Table 10: Decision Matrix of 2016 Year

2016	Shareh.	Transp.	Stakeh.	BoD
VESTL	7	8	6	6
TOASO	4	7	9	6
TTRAK	4	8	9	6
HURGZ	7	7	9	6
TUPRS	8	7	8	7
OTKAR	8	7	8	6
AEFES	8	9	9	7
CCOLA	5	9	9	7
ARCLK	8	8	7	7
TAVHL	7	8	9	7
ASELS	4	9	8	6
TTKOM	4	8	7	5
LOGO	6	5	8	6
PRKME	6	7	7	5
AYGAZ	8	6	9	6
PRKAB	5	8	5	6
TRCAS	7	7	7	7
IHLAS	2	3	1	3
GLYHO	6	6	6	5
DOAS	7	8	7	7

Table 11: Decision Matrix of 2017 Year

2017	Shareh.	Transp.	Stakeh.	BoD
VESTL	7	8	8	7
TOASO	4	7	9	6
TTRAK	4	8	9	6
HURGZ	6	7	7	6
TUPRS	8	7	9	7
OTKAR	8	7	8	6
AEFES	8	9	9	7
CCOLA	5	9	9	7
ARCLK	8	8	9	7
TAVHL	8	8	9	7
ASELS	4	9	9	6
TTKOM	5	8	8	6
LOGO	5	5	8	6
PRKME	6	7	7	5

"Table 11 (cont'd)"

AYGAZ	8	7	9	6
PRKAB	5	8	5	6
TRCAS	7	8	8	7
IHLAS	3	4	3	4
GLYHO	7	7	6	5
DOAS	8	8	8	8

Table 12: Decision Matrix of 2018 Year

2018	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**
VESTL	7	8	9	7
TOASO	4	7	9	7
TTRAK	4	8	9	7
HURGZ	6	8	7	6
TUPRS	8	7	9	7
OTKAR	6	7	8	4
AEFES	8	9	9	7
CCOLA	5	9	9	7
ARCLK	8	8	9	7
TAVHL	8	8	9	7
ASELS	4	9	9	6
TTKOM	5	9	9	6
LOGO	5	6	8	6
PRKME	6	7	7	6
AYGAZ	8	7	5	6
PRKAB	5	8	5	5
TRCAS	7	8	8	8
IHLAS	2	3	2	4
GLYHO	6	7	6	6
DOAS	8	8	8	8

Step 2: Obtaining the Normalized Decision Matrix

Each value in the decision matrix created is divided into the square root of the sum of the squares of the values in the column where it is located so normalizing process is completed. This process is repeated for each year through 2013 to 2018). The normalized matrices created are listed below in Tables 13-14-15-16-17-18.

Table 13: Normalized Matrix of 2013 Year

2013	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,2664694	0,2249885	0,2030692	0,1924501
TOASO	0,1462111	0,2249885	0,3046038	0,2694301
TTRAK	0,1462111	0,2249885	0,270759	0,2694301
HURGZ	0,2924221	0,2249885	0,2030692	0,1539601
TUPRS	0,2436851	0,2249885	0,2369141	0,3079201
OTKAR	0,2924221	0,2249885	0,270759	0,1539601
AEFES	0,2924221	0,289271	0,2030692	0,2694301
CCOLA	0,1462111	0,2571297	0,3046038	0,2694301
ARCLK	0,2924221	0,1928473	0,270759	0,2694301
TAVHL	0,3411591	0,2571297	0,2369141	0,2309401
ASELS	0,1462111	0,289271	0,2369141	0,2309401
TTKOM	0,1462111	0,289271	0,1353795	0,1924501
LOGO	0,2436851	0,1607061	0,2030692	0,2309401
PRKME	0,2924221	0,0964237	0,2030692	0,1539601
AYGAZ	0,2924221	0,1928473	0,270759	0,2694301
PRKAB	0,2436851	0,2571297	0,1692244	0,1924501
TRCAS	0,1949481	0,1928473	0,2030692	0,1539601
IHLAS	0,1462111	0,1607061	0,0338449	0,1154701
GLYHO	0,2436851	0,1928473	0,1692244	0,1924501
DOAS	0,2924221	0,1928473	0,1692244	0,2309401

Table 14: Normalized Matrix of 2014 Year

2014	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,253417	0,194974	0,196854	0,196116
TOASO	0,158362	0,227469	0,262471	0,235339
TTRAK	0,158362	0,227469	0,262471	0,235339
HURGZ	0,277133	0,227469	0,29528	0,235339
TUPRS	0,316723	0,227469	0,164045	0,274563
OTKAR	0,316723	0,194974	0,262471	0,196116
AEFES	0,277133	0,292461	0,262471	0,235339
CCOLA	0,197952	0,259965	0,262471	0,235339
ARCLK	0,316723	0,259965	0,262471	0,235339
TAVHL	0,277133	0,259965	0,196854	0,274563
ASELS	0,158362	0,292461	0,229663	0,235339
TTKOM	0,158362	0,227469	0,131236	0,156893
LOGO	0,237542	0,162478	0,229663	0,235339
PRKME	0,237542	0,194974	0,229663	0,196116
AYGAZ	0,316723	0,194974	0,29528	0,235339
PRKAB	0,197952	0,227469	0,164045	0,235339
TRCAS	0,237542	0,194974	0,196854	0,235339
IHLAS	0,079181	0,097487	0,032809	0,078446
GLYHO	0,237542	0,194974	0,164045	0,196116
DOAS	0,277133	0,227469	0,196854	0,235339

Table 15: Normalized Matrix of 2015 Year

2015	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,2506402	0,1857843	0,1820691	0,2228344
TOASO	0,1565321	0,2167484	0,2427589	0,2228344
TTRAK	0,1565321	0,2167484	0,2427589	0,2228344
HURGZ	0,2739312	0,2167484	0,2731037	0,2228344
TUPRS	0,3130642	0,2477124	0,1820691	0,2599735
OTKAR	0,3130642	0,2167484	0,2427589	0,2228344
AEFES	0,3130642	0,2786765	0,2731037	0,2228344
CCOLA	0,1956651	0,2786765	0,2731037	0,2599735
ARCLK	0,3130642	0,2477124	0,2731037	0,2228344
TAVHL	0,2739312	0,2477124	0,2731037	0,2599735
ASELS	0,1565321	0,2786765	0,212414	0,2228344
TTKOM	0,1565321	0,2477124	0,1517243	0,1856953
LOGO	0,2347981	0,1238562	0,2427589	0,2599735
PRKME	0,2347981	0,2167484	0,212414	0,1856953
AYGAZ	0,3130642	0,1857843	0,2731037	0,2228344
PRKAB	0,1956651	0,2477124	0,1517243	0,2228344
TRCAS	0,2739312	0,2167484	0,212414	0,2228344
IHLAS	0,078266	0,0928922	0,0303449	0,1114172
GLYHO	0,1956651	0,1548203	0,1517243	0,1856953
DOAS	0,2739312	0,2477124	0,212414	0,2599735

Table 16: Normalized Matrix of 2016 Year

2016	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,2488913	0,2422019	0,1757122	0,2189431
TOASO	0,1565321	0,2119267	0,2635683	0,2189431
TTRAK	0,1565321	0,2422019	0,2635683	0,2189431
HURGZ	0,2739312	0,2119267	0,2635683	0,2189431
TUPRS	0,3130642	0,2119267	0,234283	0,2554336
OTKAR	0,3130642	0,2119267	0,234283	0,2189431
AEFES	0,3130642	0,2724772	0,2635683	0,2554336
CCOLA	0,1956651	0,2724772	0,2635683	0,2554336
ARCLK	0,3130642	0,2422019	0,2049976	0,2554336
TAVHL	0,2739312	0,2422019	0,2635683	0,2554336
ASELS	0,1565321	0,2724772	0,234283	0,2189431
TTKOM	0,1565321	0,2422019	0,2049976	0,1824526
LOGO	0,2347981	0,1513762	0,234283	0,2189431
PRKME	0,2347981	0,2119267	0,2049976	0,1824526
AYGAZ	0,3130642	0,1816515	0,2635683	0,2189431
PRKAB	0,1956651	0,2422019	0,1464269	0,2189431

"Table 16 (cont'd)"

TRCAS	0,2739312	0,2119267	0,2049976	0,2554336
IHLAS	0,078266	0,0908257	0,0292854	0,1094716
GLYHO	0,2347981	0,1816515	0,1757122	0,1824526
DOAS	0,2739312	0,2422019	0,2049976	0,2554336

Table 17: Normalized Matrix of 2017 Year

2017	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**
VESTL	0,2438566	0,2370435	0,2235195	0,2479527
TOASO	0,1565321	0,2074131	0,2514594	0,2125309
TTRAK	0,1565321	0,2370435	0,2514594	0,2125309
HURGZ	0,2347981	0,2074131	0,1955796	0,2125309
TUPRS	0,3130642	0,2074131	0,2514594	0,2479527
OTKAR	0,3130642	0,2074131	0,2235195	0,2125309
AEFES	0,3130642	0,266674	0,2514594	0,2479527
CCOLA	0,1956651	0,266674	0,2514594	0,2479527
ARCLK	0,3130642	0,2370435	0,2514594	0,2479527
TAVHL	0,3130642	0,2370435	0,2514594	0,2479527
ASELS	0,1565321	0,266674	0,2514594	0,2125309
TTKOM	0,1956651	0,2370435	0,2235195	0,2125309
LOGO	0,1956651	0,1481522	0,2235195	0,2125309
PRKME	0,2347981	0,2074131	0,1955796	0,1771091
AYGAZ	0,3130642	0,2074131	0,2514594	0,2125309
PRKAB	0,1956651	0,2370435	0,1396997	0,2125309
TRCAS	0,2739312	0,2370435	0,2235195	0,2479527
IHLAS	0,1173991	0,1185218	0,0838198	0,1416873
GLYHO	0,2739312	0,2074131	0,1676396	0,1771091
DOAS	0,3130642	0,2370435	0,2235195	0,2833745

Table 18: Normalized Matrix of 2018 Year

2018	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,2509622	0,233384	0,2541521	0,24312
TOASO	0,16	0,204211	0,2541521	0,24312
TTRAK	0,16	0,233384	0,2541521	0,24312
HURGZ	0,24	0,233384	0,1976739	0,2083886
TUPRS	0,32	0,204211	0,2541521	0,24312
OTKAR	0,24	0,204211	0,225913	0,1389257
AEFES	0,32	0,262557	0,2541521	0,24312
CCOLA	0,2	0,262557	0,2541521	0,24312
ARCLK	0,32	0,233384	0,2541521	0,24312
TAVHL	0,32	0,233384	0,2541521	0,24312
ASELS	0,16	0,262557	0,2541521	0,2083886
TTKOM	0,2	0,262557	0,2541521	0,2083886
LOGO	0,2	0,175038	0,225913	0,2083886
PRKME	0,24	0,204211	0,1976739	0,2083886
AYGAZ	0,32	0,204211	0,1411956	0,2083886
PRKAB	0,2	0,233384	0,1411956	0,1736572
TRCAS	0,28	0,233384	0,225913	0,2778515
IHLAS	0,08	0,087519	0,0564782	0,1389257
GLYHO	0,24	0,204211	0,1694347	0,2083886
DOAS	0,32	0,233384	0,225913	0,2778515

Step 3: **Determine the Weighted Normalized Decision Matrix**

In this step, the assigned the weight of 0,25 for each criterion is multiplied by the values in the columns in the normalized decision matrix. The values obtained are shown in the tables 19-20-21-22-23-24.

Table 19: Weighted Normalized Decision Matrix of 2013 Year

2013	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,0666	0,0562	0,0508	0,0481
TOASO	0,0366	0,0562	0,0762	0,0674
TTRAK	0,0366	0,0562	0,0677	0,0674
HURGZ	0,0731	0,0562	0,0508	0,0385
TUPRS	0,0609	0,0562	0,0592	0,0770
OTKAR	0,0731	0,0562	0,0677	0,0385
AEFES	0,0731	0,0723	0,0508	0,0674
CCOLA	0,0366	0,0643	0,0762	0,0674
ARCLK	0,0731	0,0482	0,0677	0,0674
TAVHL	0,0853	0,0643	0,0592	0,0577
ASELS	0,0366	0,0723	0,0592	0,0577
TTKOM	0,0366	0,0723	0,0338	0,0481
LOGO	0,0609	0,0402	0,0508	0,0577
PRKME	0,0731	0,0241	0,0508	0,0385
AYGAZ	0,0731	0,0482	0,0677	0,0674
PRKAB	0,0609	0,0643	0,0423	0,0481
TRCAS	0,0487	0,0482	0,0508	0,0385
IHLAS	0,0366	0,0402	0,0085	0,0289
GLYHO	0,0609	0,0482	0,0423	0,0481
DOAS	0,0731	0,0482	0,0423	0,0577

Table 20: Weighted Normalized Decision Matrix of 2014 Year

2014	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,0634	0,0487	0,0492	0,0490
TOASO	0,0396	0,0569	0,0656	0,0588
TTRAK	0,0396	0,0569	0,0656	0,0588
HURGZ	0,0693	0,0569	0,0738	0,0588
TUPRS	0,0792	0,0569	0,0410	0,0686
OTKAR	0,0792	0,0487	0,0656	0,0490
AEFES	0,0693	0,0731	0,0656	0,0588
CCOLA	0,0495	0,0650	0,0656	0,0588
ARCLK	0,0792	0,0650	0,0656	0,0588
TAVHL	0,0693	0,0650	0,0492	0,0686
ASELS	0,0396	0,0731	0,0574	0,0588
TTKOM	0,0396	0,0569	0,0328	0,0392

"Table 20 (cont'd)"

LOGO	0,0594	0,0406	0,0574	0,0588
PRKME	0,0594	0,0487	0,0574	0,0490
AYGAZ	0,0792	0,0487	0,0738	0,0588
PRKAB	0,0495	0,0569	0,0410	0,0588
TRCAS	0,0594	0,0487	0,0492	0,0588
IHLAS	0,0198	0,0244	0,0082	0,0196
GLYHO	0,0594	0,0487	0,0410	0,0490
DOAS	0,0693	0,0569	0,0492	0,0588

Table 21: Weighted Normalized Decision Matrix of 2015 Year

2015	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**
VESTL	0,0627	0,0464	0,0455	0,0557
TOASO	0,0391	0,0542	0,0607	0,0557
TTRAK	0,0391	0,0542	0,0607	0,0557
HURGZ	0,0685	0,0542	0,0683	0,0557
TUPRS	0,0783	0,0619	0,0455	0,0650
OTKAR	0,0783	0,0542	0,0607	0,0557
AEFES	0,0783	0,0697	0,0683	0,0557
CCOLA	0,0489	0,0697	0,0683	0,0650
ARCLK	0,0783	0,0619	0,0683	0,0557
TAVHL	0,0685	0,0619	0,0683	0,0650
ASELS	0,0391	0,0697	0,0531	0,0557
TTKOM	0,0391	0,0619	0,0379	0,0464
LOGO	0,0587	0,0310	0,0607	0,0650
PRKME	0,0587	0,0542	0,0531	0,0464
AYGAZ	0,0783	0,0464	0,0683	0,0557
PRKAB	0,0489	0,0619	0,0379	0,0557
TRCAS	0,0685	0,0542	0,0531	0,0557
IHLAS	0,0196	0,0232	0,0076	0,0279
GLYHO	0,0489	0,0387	0,0379	0,0464
DOAS	0,0685	0,0619	0,0531	0,0650

Table 22: Weighted Normalized Decision Matrix of 2016 Year

2016	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,0622	0,0606	0,0439	0,0547
TOASO	0,0391	0,0530	0,0659	0,0547
TTRAK	0,0391	0,0606	0,0659	0,0547
HURGZ	0,0685	0,0530	0,0659	0,0547
TUPRS	0,0783	0,0530	0,0586	0,0639
OTKAR	0,0783	0,0530	0,0586	0,0547
AEFES	0,0783	0,0681	0,0659	0,0639
CCOLA	0,0489	0,0681	0,0659	0,0639
ARCLK	0,0783	0,0606	0,0512	0,0639
TAVHL	0,0685	0,0606	0,0659	0,0639
ASELS	0,0391	0,0681	0,0586	0,0547
TTKOM	0,0391	0,0606	0,0512	0,0456
LOGO	0,0587	0,0378	0,0586	0,0547
PRKME	0,0587	0,0530	0,0512	0,0456
AYGAZ	0,0783	0,0454	0,0659	0,0547
PRKAB	0,0489	0,0606	0,0366	0,0547
TRCAS	0,0685	0,0530	0,0512	0,0639
IHLAS	0,0196	0,0227	0,0073	0,0274
GLYHO	0,0587	0,0454	0,0439	0,0456
DOAS	0,0685	0,0606	0,0512	0,0639

Table 23: Weighted Normalized Decision Matrix of 2017 Year

2017	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,0610	0,0593	0,0559	0,0620
TOASO	0,0391	0,0519	0,0629	0,0531
TTRAK	0,0391	0,0593	0,0629	0,0531
HURGZ	0,0587	0,0519	0,0489	0,0531
TUPRS	0,0783	0,0519	0,0629	0,0620
OTKAR	0,0783	0,0519	0,0559	0,0531
AEFES	0,0783	0,0667	0,0629	0,0620
CCOLA	0,0489	0,0667	0,0629	0,0620
ARCLK	0,0783	0,0593	0,0629	0,0620
TAVHL	0,0783	0,0593	0,0629	0,0620
ASELS	0,0391	0,0667	0,0629	0,0531
TTKOM	0,0489	0,0593	0,0559	0,0531
LOGO	0,0489	0,0370	0,0559	0,0531
PRKME	0,0587	0,0519	0,0489	0,0443
AYGAZ	0,0783	0,0519	0,0629	0,0531
PRKAB	0,0489	0,0593	0,0349	0,0531
TRCAS	0,0685	0,0593	0,0559	0,0620
IHLAS	0,0293	0,0296	0,0210	0,0354
GLYHO	0,0685	0,0519	0,0419	0,0443
DOAS	0,0783	0,0593	0,0559	0,0708

Table 24: Weighted Normalized Decision Matrix of 2018 Year

2018	Shareh.	Transp.	Stakeh.	BoD
VESTL	0,0627	0,0583	0,0635	0,0608
TOASO	0,0400	0,0511	0,0635	0,0608
TTRAK	0,0400	0,0583	0,0635	0,0608
HURGZ	0,0600	0,0583	0,0494	0,0521
TUPRS	0,0800	0,0511	0,0635	0,0608
OTKAR	0,0600	0,0511	0,0565	0,0347
AEFES	0,0800	0,0656	0,0635	0,0608
CCOLA	0,0500	0,0656	0,0635	0,0608
ARCLK	0,0800	0,0583	0,0635	0,0608
TAVHL	0,0800	0,0583	0,0635	0,0608
ASELS	0,0400	0,0656	0,0635	0,0521
TTKOM	0,0500	0,0656	0,0635	0,0521
LOGO	0,0500	0,0438	0,0565	0,0521
PRKME	0,0600	0,0511	0,0494	0,0521
AYGAZ	0,0800	0,0511	0,0353	0,0521
PRKAB	0,0500	0,0583	0,0353	0,0434
TRCAS	0,0700	0,0583	0,0565	0,0695
IHLAS	0,0200	0,0219	0,0141	0,0347
GLYHO	0,0600	0,0511	0,0424	0,0521
DOAS	0,0800	0,0583	0,0565	0,0695

Step 4: Obtaining Ideal and Negative Ideal Solution Values

The ideal A^+ set was created by selecting the highest values of each column in the weighted normalized decision matrices and A^- set was created by selecting the lowest values in the columns. Values were shown in tables 25-26-27-28-29-30.

Table 25: Ideal Set of A+ and A- of 2013 Year

2013	Shareh.	Transp.	Stakeh.	BoD
A+	0,0853	0,0723	0,0762	0,0770
A-	0,0366	0,0241	0,0085	0,0289

Table 26: Ideal Set of A+ and A- of 2014 Year

2014	Shareh.	Transp.	Stakeh.	BoD
A+	0,0792	0,0731	0,0738	0,0686
A-	0,0198	0,0244	0,0082	0,0196

Table 27: Ideal Set of A+ and A- of 2015 Year

2015	Shareh.	Transp.	Stakeh.	BoD
A+	0,0783	0,0697	0,0683	0,0650
A-	0,0196	0,0232	0,0076	0,0279

Table 28: Ideal Set of A+ and A- of 2016 Year

2016	Shareh.	Transp.	Stakeh.	BoD
A+	0,0783	0,0681	0,0659	0,0639
A-	0,0196	0,0227	0,0073	0,0274

Table 29: Ideal Set of A+ and A- of 2017 Year

2017	Shareh.	Transp.	Stakeh.	BoD
A+	0,0783	0,0667	0,0629	0,0708
A-	0,0293	0,0296	0,0210	0,0354

Table 30: Ideal Set of A+ and A- of 2018 Year

2018	Shareh.	Transp.	Stakeh.	BoD
A+	0,0800	0,0656	0,0635	0,0695
A-	0,0200	0,0219	0,0141	0,0347

Step 5: Calculate the separation measures from the positive ideal solution and the negative ideal solution

Ideal solution values and negative ideal solution were determined by using Euclidean formula. Distance Values to Ideal Points were shown in Tables 31-32-33-34-35-36.

Table 31: Values of Ideal Distances for 2013

2013	Shareh.	Transp.	Stakeh.	BoD	s+
VESTL	0,00035	0,00026	0,00064	0,00083	0,03537
TOASO	0,00238	0,00026	0,00000	0,00009	0,05132
TTRAK	0,00238	0,00026	0,00007	0,00009	0,05201
HURGZ	0,00015	0,00026	0,00064	0,00148	0,03242
TUPRS	0,00059	0,00026	0,00029	0,00000	0,03374
OTKAR	0,00015	0,00026	0,00007	0,00148	0,02187
AEFES	0,00015	0,00000	0,00064	0,00009	0,02816
CCOLA	0,00238	0,00006	0,00000	0,00009	0,04939
ARCLK	0,00015	0,00058	0,00007	0,00009	0,02830
TAVHL	0,00000	0,00006	0,00029	0,00037	0,01873
ASELS	0,00238	0,00000	0,00029	0,00037	0,05159
TTKOM	0,00238	0,00000	0,00179	0,00083	0,06454
LOGO	0,00059	0,00103	0,00064	0,00037	0,04766
PRKME	0,00015	0,00232	0,00064	0,00148	0,05583
AYGAZ	0,00015	0,00058	0,00007	0,00009	0,02830
PRKAB	0,00059	0,00006	0,00115	0,00083	0,04247
TRCAS	0,00134	0,00058	0,00064	0,00148	0,05061
IHLAS	0,00238	0,00103	0,00458	0,00231	0,08939
GLYHO	0,00059	0,00058	0,00115	0,00083	0,04817
DOAS	0,00015	0,00058	0,00115	0,00037	0,04330

Table 32: Values of Ideal Distances for 2014

2014	Shareh.	Transp.	Stakeh.	BoD	s+
VESTL	0,00025	0,00059	0,00061	0,00038	0,03808
TOASO	0,00157	0,00026	0,00007	0,00010	0,04357
TTRAK	0,00157	0,00026	0,00007	0,00010	0,04357
HURGZ	0,00010	0,00026	0,00000	0,00010	0,01903
TUPRS	0,00000	0,00026	0,00108	0,00000	0,03661
OTKAR	0,00000	0,00059	0,00007	0,00038	0,02571
AEFES	0,00010	0,00000	0,00007	0,00010	0,01285
CCOLA	0,00088	0,00007	0,00007	0,00010	0,03186
ARCLK	0,00000	0,00007	0,00007	0,00010	0,01154
TAVHL	0,00010	0,00007	0,00061	0,00000	0,02774
ASELS	0,00157	0,00000	0,00027	0,00010	0,04285
TTKOM	0,00157	0,00026	0,00168	0,00087	0,05927
LOGO	0,00039	0,00106	0,00027	0,00010	0,04144
PRKME	0,00039	0,00059	0,00027	0,00038	0,03543

"Table 32 (cont'd)"

AYGAZ	0,00000	0,00059	0,00000	0,00010	0,02437
PRKAB	0,00088	0,00026	0,00108	0,00010	0,04714
TRCAS	0,00039	0,00059	0,00061	0,00010	0,03989
IHLAS	0,00353	0,00238	0,00431	0,00240	0,10104
GLYHO	0,00039	0,00059	0,00108	0,00038	0,04541
DOAS	0,00010	0,00026	0,00061	0,00010	0,03110

Table 33: Values of Ideal Distances for 2015

2015	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**	**s+**
VESTL	0,00024	0,00054	0,00052	0,00009	0,03607
TOASO	0,00153	0,00024	0,00006	0,00009	0,04276
TTRAK	0,00153	0,00024	0,00006	0,00009	0,04276
HURGZ	0,00010	0,00024	0,00000	0,00009	0,01831
TUPRS	0,00000	0,00006	0,00052	0,00000	0,02404
OTKAR	0,00000	0,00024	0,00006	0,00009	0,01724
AEFES	0,00000	0,00000	0,00000	0,00009	0,00000
CCOLA	0,00086	0,00000	0,00000	0,00000	0,02935
ARCLK	0,00000	0,00006	0,00000	0,00009	0,00774
TAVHL	0,00010	0,00006	0,00000	0,00000	0,01248
ASELS	0,00153	0,00000	0,00023	0,00009	0,04197
TTKOM	0,00153	0,00006	0,00092	0,00034	0,05012
LOGO	0,00038	0,00150	0,00006	0,00000	0,04403
PRKME	0,00038	0,00024	0,00023	0,00034	0,02920
AYGAZ	0,00000	0,00054	0,00000	0,00009	0,02322
PRKAB	0,00086	0,00006	0,00092	0,00009	0,04292
TRCAS	0,00010	0,00024	0,00023	0,00009	0,02378
IHLAS	0,00345	0,00216	0,00368	0,00138	0,09636
GLYHO	0,00086	0,00096	0,00092	0,00034	0,05235
DOAS	0,00010	0,00006	0,00023	0,00000	0,01964

Table 34: Values of Ideal Distances for 2016

2016	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**	**s+**
VESTL	0,00026	0,00006	0,00048	0,00008	0,02823
TOASO	0,00153	0,00023	0,00000	0,00008	0,04196
TTRAK	0,00153	0,00006	0,00000	0,00008	0,03986
HURGZ	0,00010	0,00023	0,00000	0,00008	0,01802
TUPRS	0,00000	0,00023	0,00005	0,00000	0,01682
OTKAR	0,00000	0,00023	0,00005	0,00008	0,01682
AEFES	0,00000	0,00000	0,00000	0,00000	0,00000
CCOLA	0,00086	0,00000	0,00000	0,00000	0,02935
ARCLK	0,00000	0,00006	0,00021	0,00000	0,01648
TAVHL	0,00010	0,00006	0,00000	0,00000	0,01237

"Table 34 (cont'd)"

ASELS	0,00153	0,00000	0,00005	0,00008	0,03981
TTKOM	0,00153	0,00006	0,00021	0,00033	0,04246
LOGO	0,00038	0,00092	0,00005	0,00008	0,03678
PRKME	0,00038	0,00023	0,00021	0,00033	0,02875
AYGAZ	0,00000	0,00052	0,00000	0,00008	0,02271
PRKAB	0,00086	0,00006	0,00086	0,00008	0,04215
TRCAS	0,00010	0,00023	0,00021	0,00000	0,02322
IHLAS	0,00345	0,00206	0,00343	0,00133	0,09454
GLYHO	0,00038	0,00052	0,00048	0,00033	0,03716
DOAS	0,00010	0,00006	0,00021	0,00000	0,01917

Table 35: Values of Ideal Distances for 2017

2017	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**	**s+**
VESTL	0,00030	0,00005	0,00005	0,00008	0,02008
TOASO	0,00153	0,00022	0,00000	0,00031	0,04184
TTRAK	0,00153	0,00005	0,00000	0,00031	0,03983
HURGZ	0,00038	0,00022	0,00020	0,00031	0,02824
TUPRS	0,00000	0,00022	0,00000	0,00008	0,01482
OTKAR	0,00000	0,00022	0,00005	0,00031	0,01638
AEFES	0,00000	0,00000	0,00000	0,00008	0,00000
CCOLA	0,00086	0,00000	0,00000	0,00008	0,02935
ARCLK	0,00000	0,00005	0,00000	0,00008	0,00741
TAVHL	0,00000	0,00005	0,00000	0,00008	0,00741
ASELS	0,00153	0,00000	0,00000	0,00031	0,03913
TTKOM	0,00086	0,00005	0,00005	0,00031	0,03107
LOGO	0,00086	0,00088	0,00005	0,00031	0,04229
PRKME	0,00038	0,00022	0,00020	0,00071	0,02824
AYGAZ	0,00000	0,00022	0,00000	0,00031	0,01482
PRKAB	0,00086	0,00005	0,00078	0,00031	0,04119
TRCAS	0,00010	0,00005	0,00005	0,00008	0,01412
IHLAS	0,00239	0,00137	0,00176	0,00125	0,07430
GLYHO	0,00010	0,00022	0,00044	0,00071	0,02746
DOAS	0,00000	0,00005	0,00005	0,00000	0,01018

Table 36: Values of Ideal Distances for 2018

2018	Shareh.	Transp.	Stakeh.	BoD	s+
VESTL	0,00030	0,00005	0,00000	0,00008	0,01874
TOASO	0,00160	0,00021	0,00000	0,00008	0,04258
TTRAK	0,00160	0,00005	0,00000	0,00008	0,04066
HURGZ	0,00040	0,00005	0,00020	0,00030	0,02555
TUPRS	0,00000	0,00021	0,00000	0,00008	0,01459
OTKAR	0,00040	0,00021	0,00005	0,00121	0,02574
AEFES	0,00000	0,00000	0,00000	0,00008	0,00000
CCOLA	0,00090	0,00000	0,00000	0,00008	0,03000
ARCLK	0,00000	0,00005	0,00000	0,00008	0,00729
TAVHL	0,00000	0,00005	0,00000	0,00008	0,00729
ASELS	0,00160	0,00000	0,00000	0,00030	0,04000
TTKOM	0,00090	0,00000	0,00000	0,00030	0,03000
LOGO	0,00090	0,00048	0,00005	0,00030	0,03780
PRKME	0,00040	0,00021	0,00020	0,00030	0,02850
AYGAZ	0,00000	0,00021	0,00080	0,00030	0,03178
PRKAB	0,00090	0,00005	0,00080	0,00068	0,04184
TRCAS	0,00010	0,00005	0,00005	0,00000	0,01425
IHLAS	0,00360	0,00191	0,00244	0,00121	0,08920
GLYHO	0,00040	0,00021	0,00045	0,00030	0,03258
DOAS	0,00000	0,00005	0,00005	0,00000	0,01015

Distance Values to Negative Ideal Points were shown in Tables 37-38-39-40-41-42.

Table 37: Values of Ideal Distances for 2013

2013	Shareh.	Transp.	Stakeh.	BoD	s-
VESTL	0,00090	0,00103	0,00179	0,00037	0,06401
TOASO	0,00000	0,00103	0,00458	0,00148	0,08424
TTRAK	0,00000	0,00103	0,00351	0,00148	0,07761
HURGZ	0,00134	0,00103	0,00179	0,00009	0,06520
TUPRS	0,00059	0,00103	0,00258	0,00231	0,08074
OTKAR	0,00134	0,00103	0,00351	0,00009	0,07726
AEFES	0,00134	0,00232	0,00179	0,00148	0,08326
CCOLA	0,00000	0,00161	0,00458	0,00148	0,08762
ARCLK	0,00134	0,00058	0,00351	0,00148	0,08311
TAVHL	0,00238	0,00161	0,00258	0,00083	0,08602
ASELS	0,00000	0,00232	0,00258	0,00083	0,07573
TTKOM	0,00000	0,00232	0,00064	0,00037	0,05778
LOGO	0,00059	0,00026	0,00179	0,00083	0,05895
PRKME	0,00134	0,00000	0,00179	0,00009	0,05673

"Table 37(cont'd)"

AYGAZ	0,00134	0,00058	0,00351	0,00148	0,08311
PRKAB	0,00059	0,00161	0,00115	0,00037	0,06102
TRCAS	0,00015	0,00058	0,00179	0,00009	0,05111
IHLAS	0,00000	0,00026	0,00000	0,00000	0,01607
GLYHO	0,00059	0,00058	0,00115	0,00037	0,05187
DOAS	0,00134	0,00058	0,00115	0,00083	0,06242

Table 38: Values of Ideal Distances for 2014

2014	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**	**s-**
VESTL	0,00190	0,00059	0,00168	0,00087	0,07098
TOASO	0,00039	0,00106	0,00330	0,00154	0,07926
TTRAK	0,00039	0,00106	0,00330	0,00154	0,07926
HURGZ	0,00245	0,00106	0,00431	0,00154	0,09669
TUPRS	0,00353	0,00106	0,00108	0,00240	0,08979
OTKAR	0,00353	0,00059	0,00330	0,00087	0,09101
AEFES	0,00245	0,00238	0,00330	0,00154	0,09829
CCOLA	0,00088	0,00165	0,00330	0,00154	0,08583
ARCLK	0,00353	0,00165	0,00330	0,00154	0,10006
TAVHL	0,00245	0,00165	0,00168	0,00240	0,09047
ASELS	0,00039	0,00238	0,00242	0,00154	0,08203
TTKOM	0,00039	0,00106	0,00061	0,00038	0,04938
LOGO	0,00157	0,00026	0,00242	0,00154	0,07610
PRKME	0,00157	0,00059	0,00242	0,00087	0,07382
AYGAZ	0,00353	0,00059	0,00431	0,00154	0,09982
PRKAB	0,00088	0,00106	0,00108	0,00154	0,06747
TRCAS	0,00157	0,00059	0,00168	0,00154	0,07336
IHLAS	0,00000	0,00000	0,00000	0,00000	0,00000
GLYHO	0,00157	0,00059	0,00108	0,00087	0,06406
DOAS	0,00245	0,00106	0,00168	0,00154	0,08201

Table 39: Values of Ideal Distances for 2015

2015	Shareh.	Transp.	Stakeh.	BoD	s-
VESTL	0,00186	0,00054	0,00144	0,00078	0,06790
TOASO	0,00038	0,00096	0,00282	0,00078	0,07027
TTRAK	0,00038	0,00096	0,00282	0,00078	0,07027
HURGZ	0,00239	0,00096	0,00368	0,00078	0,08838
TUPRS	0,00345	0,00150	0,00144	0,00138	0,08810
OTKAR	0,00345	0,00096	0,00282	0,00078	0,08944
AEFES	0,00345	0,00216	0,00368	0,00078	0,10031
CCOLA	0,00086	0,00216	0,00368	0,00138	0,08990
ARCLK	0,00345	0,00150	0,00368	0,00078	0,09697
TAVHL	0,00239	0,00150	0,00368	0,00138	0,09462
ASELS	0,00038	0,00216	0,00207	0,00078	0,07340
TTKOM	0,00038	0,00150	0,00092	0,00034	0,05609
LOGO	0,00153	0,00006	0,00282	0,00138	0,07610
PRKME	0,00153	0,00096	0,00207	0,00034	0,07005
AYGAZ	0,00345	0,00054	0,00368	0,00078	0,09189
PRKAB	0,00086	0,00150	0,00092	0,00078	0,06369
TRCAS	0,00239	0,00096	0,00207	0,00078	0,07874
IHLAS	0,00000	0,00000	0,00000	0,00000	0,00000
GLYHO	0,00086	0,00024	0,00092	0,00034	0,04865
DOAS	0,00239	0,00150	0,00207	0,00138	0,08569

Table 40: Values of Ideal Distances for 2016

2016	Shareh.	Transp.	Stakeh.	BoD	s-
VESTL	0,00182	0,00143	0,00134	0,00075	0,07308
TOASO	0,00038	0,00092	0,00343	0,00075	0,07402
TTRAK	0,00038	0,00143	0,00343	0,00075	0,07742
HURGZ	0,00239	0,00092	0,00343	0,00075	0,08654
TUPRS	0,00345	0,00092	0,00263	0,00133	0,09122
OTKAR	0,00345	0,00092	0,00263	0,00075	0,08796
AEFES	0,00345	0,00206	0,00343	0,00133	0,10134
CCOLA	0,00086	0,00206	0,00343	0,00133	0,08767
ARCLK	0,00345	0,00143	0,00193	0,00133	0,09022
TAVHL	0,00239	0,00143	0,00343	0,00133	0,09267
ASELS	0,00038	0,00206	0,00263	0,00075	0,07629
TTKOM	0,00038	0,00143	0,00193	0,00033	0,06386
LOGO	0,00153	0,00023	0,00263	0,00075	0,07167
PRKME	0,00153	0,00092	0,00193	0,00033	0,06863
AYGAZ	0,00345	0,00052	0,00343	0,00075	0,09023
PRKAB	0,00086	0,00143	0,00086	0,00075	0,06245

"Table 40 (cont'd)"

TRCAS	0,00239	0,00092	0,00193	0,00133	0,08106
IHLAS	0,00000	0,00000	0,00000	0,00000	0,00000
GLYHO	0,00153	0,00052	0,00134	0,00033	0,06099
DOAS	0,00239	0,00143	0,00193	0,00133	0,08418

Table 41: Values of Ideal Distances for 2017

2017	**Shareh.**	**Transp.**	**Stakeh.**	**BoD**	**s-**
VESTL	0,00100	0,00088	0,00122	0,00071	0,06167
TOASO	0,00010	0,00049	0,00176	0,00031	0,05157
TTRAK	0,00010	0,00088	0,00176	0,00031	0,05517
HURGZ	0,00086	0,00049	0,00078	0,00031	0,04949
TUPRS	0,00239	0,00049	0,00176	0,00071	0,07314
OTKAR	0,00239	0,00049	0,00122	0,00031	0,06648
AEFES	0,00239	0,00137	0,00176	0,00071	0,07891
CCOLA	0,00038	0,00137	0,00176	0,00071	0,06494
ARCLK	0,00239	0,00088	0,00176	0,00071	0,07572
TAVHL	0,00239	0,00088	0,00176	0,00071	0,07572
ASELS	0,00010	0,00137	0,00176	0,00031	0,05948
TTKOM	0,00038	0,00088	0,00122	0,00031	0,05286
LOGO	0,00038	0,00005	0,00122	0,00031	0,04440
PRKME	0,00086	0,00049	0,00078	0,00008	0,04706
AYGAZ	0,00239	0,00049	0,00176	0,00031	0,07040
PRKAB	0,00038	0,00088	0,00020	0,00031	0,04207
TRCAS	0,00153	0,00088	0,00122	0,00071	0,06584
IHLAS	0,00000	0,00000	0,00000	0,00000	0,00000
GLYHO	0,00153	0,00049	0,00044	0,00008	0,05043
DOAS	0,00239	0,00088	0,00122	0,00125	0,07580

Table 42: Values of Ideal Distances for 2018

2018	Shareh.	Transp.	Stakeh.	BoD	s-
VESTL	0,00183	0,00133	0,00244	0,00068	0,07923
TOASO	0,00040	0,00085	0,00244	0,00068	0,06612
TTRAK	0,00040	0,00133	0,00244	0,00068	0,06965
HURGZ	0,00160	0,00133	0,00125	0,00030	0,06691
TUPRS	0,00360	0,00085	0,00244	0,00068	0,08702
OTKAR	0,00160	0,00085	0,00179	0,00000	0,06516
AEFES	0,00360	0,00191	0,00244	0,00068	0,09293
CCOLA	0,00090	0,00191	0,00244	0,00068	0,07704
ARCLK	0,00360	0,00133	0,00244	0,00068	0,08972
TAVHL	0,00360	0,00133	0,00244	0,00068	0,08972
ASELS	0,00040	0,00191	0,00244	0,00030	0,07112
TTKOM	0,00090	0,00191	0,00244	0,00030	0,07456
LOGO	0,00090	0,00048	0,00179	0,00030	0,05895
PRKME	0,00160	0,00085	0,00125	0,00030	0,06323
AYGAZ	0,00360	0,00085	0,00045	0,00030	0,07212
PRKAB	0,00090	0,00133	0,00045	0,00008	0,05248
TRCAS	0,00250	0,00133	0,00179	0,00121	0,08265
IHLAS	0,00000	0,00000	0,00000	0,00000	0,00000
GLYHO	0,00160	0,00085	0,00080	0,00030	0,05958
DOAS	0,00360	0,00133	0,00179	0,00121	0,08905

Step 6: Calculate the Relative Closeness to the Ideal Solution

The relative proximity formula was applied with using the ideal and negative ideal distance values which were calculated in step 5. The following values were obtained in Table 43.

Table 43: Calculate the Relative Closeness to the Ideal Solution

The Relative closeness to ideal solution between 2013-2015 is follows:

2013	Ci*	2014	Ci*	2015	Ci*
VESTL	0,64407	**VESTL**	0,65086	**VESTL**	0,65311
TOASO	0,62143	**TOASO**	0,64528	**TOASO**	0,62167
TTRAK	0,59873	**TTRAK**	0,64528	**TTRAK**	0,62167
HURGZ	0,66791	**HURGZ**	0,83559	**HURGZ**	0,82835
TUPRS	0,70527	**TUPRS**	0,71036	**TUPRS**	0,78563
OTKAR	0,77939	**OTKAR**	0,77969	**OTKAR**	0,8384
AEFES	0,74728	**AEFES**	0,88434	**AEFES**	1
CCOLA	0,6395	**CCOLA**	0,7293	**CCOLA**	0,75387
ARCLK	0,74595	**ARCLK**	0,89656	**ARCLK**	0,92607
TAVHL	0,82117	**TAVHL**	0,76534	**TAVHL**	0,88351
ASELS	0,59479	**ASELS**	0,65684	**ASELS**	0,63621
TTKOM	0,4724	**TTKOM**	0,45445	**TTKOM**	0,52812
LOGO	0,55297	**LOGO**	0,64747	**LOGO**	0,63348
PRKME	0,504	**PRKME**	0,67572	**PRKME**	0,70578
AYGAZ	0,74595	**AYGAZ**	0,80376	**AYGAZ**	0,79826
PRKAB	0,58962	**PRKAB**	0,58871	**PRKAB**	0,5974
TRCAS	0,50244	**TRCAS**	0,64776	**TRCAS**	0,76802
IHLAS	0,15239	**IHLAS**	0	**IHLAS**	0
GLYHO	0,5185	**GLYHO**	0,58516	**GLYHO**	0,48166
DOAS	0,59041	**DOAS**	0,72502	**DOAS**	0,81351

The Relative closeness to ideal solution between 2016-2018 is follows:

2016	Ci*	2017	Ci*	2018	Ci*
VESTL	0,72133	**VESTL**	0,75441	**VESTL**	0,80874
TOASO	0,63822	**TOASO**	0,55207	**TOASO**	0,6083
TTRAK	0,66015	**TTRAK**	0,58075	**TTRAK**	0,63139
HURGZ	0,82763	**HURGZ**	0,63671	**HURGZ**	0,72371
TUPRS	0,84435	**TUPRS**	0,83155	**TUPRS**	0,85644
OTKAR	0,83952	**OTKAR**	0,80233	**OTKAR**	0,71681
AEFES	1	**AEFES**	1	**AEFES**	1
CCOLA	0,74919	**CCOLA**	0,68872	**CCOLA**	0,71974
ARCLK	0,84552	**ARCLK**	0,91088	**ARCLK**	0,92483
TAVHL	0,88224	**TAVHL**	0,91088	**TAVHL**	0,92483
ASELS	0,6571	**ASELS**	0,60316	**ASELS**	0,64004
TTKOM	0,60061	**TTKOM**	0,62985	**TTKOM**	0,71307
LOGO	0,66082	**LOGO**	0,51218	**LOGO**	0,60931
PRKME	0,7048	**PRKME**	0,62495	**PRKME**	0,68934
AYGAZ	0,79894	**AYGAZ**	0,82615	**AYGAZ**	0,6941
PRKAB	0,59706	**PRKAB**	0,50525	**PRKAB**	0,55638
TRCAS	0,77731	**TRCAS**	0,82341	**TRCAS**	0,85294
IHLAS	0	**IHLAS**	0	**IHLAS**	0
GLYHO	0,6214	**GLYHO**	0,64739	**GLYHO**	0,64651
DOAS	0,81453	**DOAS**	0,88158	**DOAS**	0,89768

Step 7: Rank the preference order or select the alternative closest to 1

The following table was obtained after the ideal solution values of companies which are traded in BIST between 2013-2018 years, are ranked from the largest to the smallest in Table 44.

Table 44: Rank the Alternatives between 2013-2018

2013		2014		2015	
FIRM	**TOTAL**	**FIRM**	**TOTAL**	**FIRM**	**TOTAL**
TAVHL	0,8211743	**ARCLK**	0,8965566	**AEFES**	1
OTKAR	0,7793874	**AEFES**	0,8843396	**ARCLK**	0,9260713
AEFES	0,7472802	**HURGZ**	0,8355876	**TAVHL**	0,8835142
ARCLK	0,7459455	**AYGAZ**	0,8037629	**OTKAR**	0,8383955
AYGAZ	0,7459455	**OTKAR**	0,7796933	**HURGZ**	0,8283465
TUPRS	0,7052707	**TAVHL**	0,7653405	**DOAS**	0,8135093
HURGZ	0,6679101	**CCOLA**	0,7292984	**AYGAZ**	0,7982614
VESTL	0,6440687	**DOAS**	0,7250195	**TUPRS**	0,7856333
CCOLA	0,6394962	**TUPRS**	0,710363	**TRCAS**	0,768016
TOASO	0,6214314	**PRKME**	0,6757153	**CCOLA**	0,7538706
TTRAK	0,5987301	**ASELS**	0,6568363	**PRKME**	0,7057768
ASELS	0,5947943	**VESTL**	0,6508576	**VESTL**	0,6531075
DOAS	0,590411	**TRCAS**	0,6477645	**ASELS**	0,6362109
PRKAB	0,5896236	**LOGO**	0,6474741	**LOGO**	0,6334779
LOGO	0,5529688	**TOASO**	0,6452751	**TOASO**	0,6216695
GLYHO	0,5185026	**TTRAK**	0,6452751	**TTRAK**	0,6216695
PRKME	0,5039989	**PRKAB**	0,5887062	**PRKAB**	0,5974026
TRCAS	0,5024365	**GLYHO**	0,585158	**TTKOM**	0,5281181
TTKOM	0,4723974	**TTKOM**	0,4544509	**GLYHO**	0,4816574
IHLAS	0,1523875	**IHLAS**	0	**IHLAS**	0
2016		**2017**		**2018**	
FIRM	**TOTAL**	**FIRM**	**TOTAL**	**FIRM**	**TOTAL**
AEFES	1	**AEFES**	1	**AEFES**	1
TAVHL	0,8822374	**ARCLK**	0,9108849	**ARCLK**	0,9248257
ARCLK	0,8455182	**TAVHL**	0,9108849	**TAVHL**	0,9248257
TUPRS	0,8443484	**DOAS**	0,8815813	**DOAS**	0,8976796
OTKAR	0,8395186	**TUPRS**	0,8315518	**TUPRS**	0,8564356
HURGZ	0,8276258	**AYGAZ**	0,8261524	**TRCAS**	0,8529441
DOAS	0,8145299	**TRCAS**	0,8234111	**VESTL**	0,8087388
AYGAZ	0,7989381	**OTKAR**	0,802333	**HURGZ**	0,7237118
TRCAS	0,777313	**VESTL**	0,7544105	**CCOLA**	0,7197385
CCOLA	0,7491872	**CCOLA**	0,6887197	**OTKAR**	0,7168106
VESTL	0,7213324	**GLYHO**	0,6473937	**TTKOM**	0,7130733
PRKME	0,7047952	**HURGZ**	0,636706	**AYGAZ**	0,6941011
LOGO	0,6608231	**TTKOM**	0,629846	**PRKME**	0,689338
TTRAK	0,6601525	**PRKME**	0,6249496	**GLYHO**	0,6465077
ASELS	0,6571046	**ASELS**	0,6031582	**ASELS**	0,6400423
TOASO	0,6382203	**TTRAK**	0,5807518	**TTRAK**	0,6313906
GLYHO	0,6214016	**TOASO**	0,5520713	**LOGO**	0,6093064
TTKOM	0,6006087	**LOGO**	0,512176	**TOASO**	0,6082967
PRKAB	0,5970628	**PRKAB**	0,5052454	**PRKAB**	0,5563817
IHLAS	0	**IHLAS**	0	**IHLAS**	0

4.5 Altman Z-Score

At this stage of study, Altman Z-Score was used to measure the financial performance of 20 companies which are traded in BIST between 2013 and 2018 years. The Altman Z-Scores for the years through 2013 and 2018 are shown in Table 45-46-47-48-49-50.

Table 45: Altman Z-Score for 2013

FIRM	X1	X2	X3	X4	X5	TOTAL
VESTL	0,0637396	1,4488608	0,1211564	0,0291532	0,0424526	1,6229893
TOASO	0,0630576	1,7466558	1,6627835	0,1391127	0,1160036	3,2642896
TTRAK	0,2701737	1,45544	1,9906968	0,4682828	0,1757504	4,3348668
HURGZ	0,0279419	1,1410658	0,4691322	0,0867087	0,1014975	1,4652965
TUPRS	0,0533962	2,5672616	0,6477673	0,0298934	0,0958287	3,2047449
OTKAR	0,117289	1,0191258	0,9598254	0,0934634	0,054127	2,1598172
AEFES	0,1725243	0,4111316	0,6154804	0,0810044	0,0984985	1,5807419
CCOLA	0,1547859	0,74031	1,8673595	0,1408982	0,2180992	2,8385327
ARCLK	0,1389696	1,5260543	1,086233	0,3126809	0,1332967	3,1829659
TAVHL	0,1136581	0,3734382	0,8077278	0,1636475	0,0207779	1,4548783
ASELS	0,0478894	0,906464	1,7929527	0,277776	0,1327157	2,6503393
TTKOM	0,2083989	1,0154876	1,5471971	0,0111583	0,0070764	2,6178844
LOGO	0,1717934	1,0779455	1,7183113	0,2755235	0,090392	3,1222481
PRKAB	0,0195545	1,8130805	0,3439113	0,210511	0,0130568	2,3367189
AYGAZ	0,0796081	6,3562965	2,438792	0,0627214	0,3852689	8,6333576
PRKME	0,1160515	4,07979	10,494237	0,4667563	0,3984774	11,83648
TRCAS	0,1119026	0,1032535	1,1660981	0,0635033	0,3460671	1,731856
IHLAS	0,0018402	0,5357764	0,1764085	0,2371119	0,0111101	0,8991711
GLYHO	0,079755	0,1769125	0,229018	0,0184253	0,0136356	0,5727251
DOAS	0,1394699	4,9043685	0,9706733	0,0836656	0,0693612	6,0954837

Table 46: Altman Z-Score for 2014

FIRM	X1	X2	X3	X4	X5	TOTAL
VESTL	0,097888	1,3052764	0,3579658	0,0397419	0,0456997	1,8137443
TOASO	0,07482	1,5236201	1,6331795	0,0613923	0,108332	2,9605331
TTRAK	0,1913645	1,4228062	2,1427938	0,3037076	0,111205	3,8458935
HURGZ	0,0003787	1,4171021	0,9348848	0,0213748	-0,215937	1,6346509
TUPRS	0,0418538	2,5269013	0,8809308	0,0715659	0,1315322	3,2665743
OTKAR	0,1104303	0,9968285	1,6850763	0,0300593	0,0494676	2,4676519
AEFES	0,0584846	0,5011054	0,6682367	0,0966349	0,2392404	1,5409341
CCOLA	0,1495826	0,8310867	1,7836691	0,1119078	0,2413922	2,8588383
ARCLK	0,1192382	1,5649766	1,2675751	0,3260147	0,1445985	3,2970135
TAVHL	0,1405144	0,354703	0,9294259	0,2134346	0,0350677	1,6777253

"Table 46 (cont'd)"

ASELS	0,0689681	0,9029721	2,1687738	0,2315602	0,1485677	2,9086685
TTKOM	0,2470113	1,002002	1,8744778	0,1100367	0,0224525	3,0952837
LOGO	0,1882213	1,3240817	8,8776444	0,2785128	0,181227	7,8464911
PRKAB	0,0221058	1,9146292	0,319608	0,225019	0,0142518	2,4501723
AYGAZ	0,0848284	6,7056868	2,8004953	0,0003303	0,361246	9,1042089
PRKME	0,0181584	4,0793036	11,045218	0,4685183	0,4532333	11,922312
TRCAS	0,0865643	0,1434293	1,3523642	0,1785145	0,3828715	1,9893134
IHLAS	0,0304183	0,450382	0,1309936	0,3867395	0,0934827	0,9580665
GLYHO	0,0143007	0,1815708	0,1551509	0,0072325	0,0300026	0,3533626
DOAS	0,1484389	4,8353735	1,6525009	0,0306453	0,0525124	6,3051117

Table 47: Altman Z-Score for 2015

FIRM	**X1**	**X2**	**X3**	**X4**	**X5**	**TOTAL**
VESTL	0,1388717	1,2212473	0,2726729	0,0669926	0,0301516	1,9535188
TOASO	0,1410108	1,6045467	1,386344	0,0458202	0,1067676	3,090102
TTRAK	0,2332695	1,4957394	1,6795235	0,3458312	0,0324236	3,7186757
HURGZ	-0,050194	1,0909352	0,7792977	0,0031473	-0,475144	0,7205395
TUPRS	0,1182027	1,5133789	0,7698125	0,0322504	0,1718167	2,6294452
OTKAR	0,6667988	1,0604714	2,0616235	0,2149861	0,0258548	4,781457
AEFES	0,0658501	0,4065877	0,4209426	0,1296295	0,1416676	1,2262826
CCOLA	0,083533	0,6742809	0,8091453	0,1565401	0,1665615	1,8497182
ARCLK	0,1549025	1,4760642	1,3087253	0,2590086	0,1490968	3,2772628
TAVHL	0,1054468	0,2998768	0,4414134	-0,034551	0,0695795	0,9656505
ASELS	0,1028843	0,7668929	1,2221471	0,3285039	0,1159388	2,3885493
TTKOM	0,1064481	0,6858273	0,7882806	0,0328867	0,0166071	1,5659301
LOGO	0,1681334	1,1652291	8,1405749	-0,028394	0,243863	6,9000975
PRKAB	0,0368278	1,8862533	0,475098	0,1989867	0,0423556	2,5720632
AYGAZ	0,1814106	4,2909404	2,1801979	0,0818434	0,3971973	6,8090931
PRKME	0,0448951	2,1631883	4,8752657	0,1784003	0,2790279	5,5232815
TRCAS	0,1284062	0	0,7720309	0,0460215	0,2576998	1,3029644
IHLAS	0,0698133	0,6376723	0,1350781	0,2363708	0,1743509	0,9822802
GLYHO	0,0169933	0,2020928	0,1050272	0,1040056	0,0228746	0,2263838
DOAS	0,1129113	3,1944081	0,5174195	0,1122969	0,0124812	3,693293

Table 48: Altman Z-Score for 2016

FIRM	X1	X2	X3	X4	X5	TOTAL
VESTL	0,1388717	1,2212473	0,2726729	0,0669926	0,0301516	1,9535188
TOASO	0,1410108	1,6045467	1,386344	0,0458202	0,1067676	3,090102
TTRAK	0,2332695	1,4957394	1,6795235	0,3458312	0,0324236	3,7186757
HURGZ	-0,050194	1,0909352	0,7792977	0,0031473	-0,475144	0,7205395
TUPRS	0,1182027	1,5133789	0,7698125	0,0322504	0,1718167	2,6294452
OTKAR	0,6667988	1,0604714	2,0616235	0,2149861	0,0258548	4,781457
AEFES	0,0658501	0,4065877	0,4209426	0,1296295	0,1416676	1,2262826
CCOLA	0,083533	0,6742809	0,8091453	0,1565401	0,1665615	1,8497182
ARCLK	0,1549025	1,4760642	1,3087253	0,2590086	0,1490968	3,2772628
TAVHL	0,1054468	0,2998768	0,4414134	-0,034551	0,0695795	0,9656505
ASELS	0,1028843	0,7668929	1,2221471	0,3285039	0,1159388	2,3885493
TTKOM	0,1064481	0,6858273	0,7882806	0,0328867	0,0166071	1,5659301
LOGO	0,1681334	1,1652291	8,1405749	-0,028394	0,243863	6,9000975
PRKAB	0,0368278	1,8862533	0,475098	0,1989867	0,0423556	2,5720632
AYGAZ	0,1814106	4,2909404	2,1801979	0,0818434	0,3971973	6,8090931
PRKME	0,0448951	2,1631883	4,8752657	0,1784003	0,2790279	5,5232815
TRCAS	0,1284062	0	0,7720309	0,0460215	0,2576998	1,3029644
IHLAS	0,0698133	0,6376723	0,1350781	0,2363708	0,1743509	0,9822802
GLYHO	0,0169933	0,2020928	0,1050272	0,1040056	0,0228746	0,2263838
DOAS	0,1129113	3,1944081	0,5174195	0,1122969	0,0124812	3,693293

Table 49: Altman Z-Score for 2017

FIRM	X1	X2	X3	X4	X5	TOTAL
VESTL	0,1177846	1,0461032	0,2195265	0,0898887	0,0045231	1,454513
TOASO	0,1563201	1,6972034	1,6041413	0,0634681	0,1333865	3,4214753
TTRAK	0,1952937	1,5114764	1,4544562	0,3166683	0,0855588	3,5132888
HURGZ	0,0275348	1,0420861	1,5872026	0,079351	0,6430383	1,2698191
TUPRS	0,1638944	1,948618	1,0989908	0,0704965	0,1480965	3,4213087
OTKAR	0,1201799	1,0343209	1,7214039	0,2782821	0,0249176	2,8222368
AEFES	0,0766289	0,4311723	0,4852394	0,1110521	0,1104035	1,2587069
CCOLA	0,1021683	0,6265525	0,6498785	0,1177904	0,1236784	1,6618676
ARCLK	0,1298363	1,5413038	1,0754543	0,2494624	0,166875	3,132603
TAVHL	0,1230513	0,3435333	0,5981602	0,0283384	0,0713185	1,1709032
ASELS	0,1330275	0,7877555	4,6285023	0,203347	0,1219408	4,4107036
TTKOM	0,1373464	0,7375767	0,9165043	0,0650054	0,0095385	1,8247069
LOGO	0,1609297	1,4731663	8,4464306	0,1230332	0,2934066	7,61577
PRKAB	0,010947	2,013257	0,6161258	0,1877711	0,0499369	2,6941619
AYGAZ	0,1530073	4,145191	2,3595837	0,0621648	0,3285928	6,5590411
PRKME	0,0300653	0,0018993	13,198008	0,3661291	0,243635	8,8003443

"Table 49 (cont'd)"

TRCAS	0,1910804	0	0,9748209	0,0047539	0,2199678	1,5291174
IHLAS	0,0422212	0,3790426	0,2228919	0,220467	0,1291729	0,7320356
GLYHO	0,0332083	0,2753773	0,2516119	0,0435423	0,0442687	0,4282302
DOAS	0,1121361	3,4433072	0,4721526	0,1112348	0,0342793	3,976724

Table 50: Altman Z-Score for 2018

FIRM	**X1**	**X2**	**X3**	**X4**	**X5**	**TOTAL**
VESTL	0,1177846	1,0461032	0,2195265	0,0898887	0,0045231	1,454513
TOASO	0,1563201	1,6972034	1,6041413	0,0634681	0,1333865	3,4214753
TTRAK	0,1952937	1,5114764	1,4544562	0,3166683	0,0855588	3,5132888
HURGZ	0,0275348	1,0420861	1,5872026	0,079351	0,6430383	1,2698191
TUPRS	0,1638944	1,948618	1,0989908	0,0704965	0,1480965	3,4213087
OTKAR	0,1201799	1,0343209	1,7214039	0,2782821	0,0249176	2,8222368
AEFES	0,0766289	0,4311723	0,4852394	0,1110521	0,1104035	1,2587069
CCOLA	0,1021683	0,6265525	0,6498785	0,1177904	0,1236784	1,6618676
ARCLK	0,1298363	1,5413038	1,0754543	0,2494624	0,166875	3,132603
TAVHL	0,1230513	0,3435333	0,5981602	0,0283384	0,0713185	1,1709032
ASELS	0,1330275	0,7877555	4,6285023	0,203347	0,1219408	4,4107036
TTKOM	0,1373464	0,7375767	0,9165043	0,0650054	0,0095385	1,8247069
LOGO	0,1609297	1,4731663	8,4464306	0,1230332	0,2934066	7,61577
PRKAB	0,010947	2,013257	0,6161258	0,1877711	0,0499369	2,6941619
AYGAZ	0,1530073	4,145191	2,3595837	0,0621648	0,3285928	6,5590411
PRKME	0,0300653	0,0018993	13,198008	0,3661291	0,243635	8,8003443
TRCAS	0,1910804	0	0,9748209	0,0047539	0,2199678	1,5291174
IHLAS	0,0422212	0,3790426	0,2228919	0,220467	0,1291729	0,7320356
GLYHO	0,0332083	0,2753773	0,2516119	0,0435423	0,0442687	0,4282302
DOAS	0,1121361	3,4433072	0,4721526	0,1112348	0,0342793	3,976724

Table 51: Ranking of the calculation of Altman Z-Scores according to years

2013		2014		2015	
FIRM	**TOTAL**	**FIRM**	**TOTAL**	**FIRM**	**TOTAL**
PRKME	11,84	**PRKME**	11,92	**LOGO**	9,35
AYGAZ	8,63	**AYGAZ**	9,10	**AYGAZ**	7,36
DOAS	6,10	**LOGO**	7,85	**PRKME**	5,66
TTRAK	4,33	**DOAS**	6,31	**DOAS**	5,18
TOASO	3,26	**TTRAK**	3,85	**TUPRS**	3,26
TUPRS	3,20	**ARCLK**	3,30	**PRKAB**	3,15
ARCLK	3,18	**TUPRS**	3,27	**TTRAK**	3,13
LOGO	3,12	**TTKOM**	3,10	**ARCLK**	3,11
CCOLA	2,84	**TOASO**	2,96	**TOASO**	2,80
ASELS	2,65	**ASELS**	2,91	**OTKAR**	2,74
TTKOM	2,62	**CCOLA**	2,86	**ASELS**	2,74
PRKAB	2,34	**OTKAR**	2,47	**CCOLA**	2,08
OTKAR	2,16	**PRKAB**	2,45	**TTKOM**	1,99
TRCAS	1,73	**TRCAS**	1,99	**VESTL**	1,97
VESTL	1,62	**VESTL**	1,81	**HURGZ**	1,64
AEFES	1,58	**TAVHL**	1,68	**AEFES**	1,40
HURGZ	1,47	**HURGZ**	1,63	**TAVHL**	1,39
TAVHL	1,45	**AEFES**	1,54	**TRCAS**	0,89
IHLAS	0,90	**IHLAS**	0,96	**IHLAS**	0,70
GLYHO	0,57	**GLYHO**	0,35	**GLYHO**	0,48
2016		**2017**		**2018**	
FIRM	**TOTAL**	**FIRM**	**TOTAL**	**FIRM**	**TOTAL**
LOGO	6,90	**PRKME**	8,80	**ASELS**	8,54
AYGAZ	6,81	**LOGO**	7,62	**PRKME**	6,45
PRKME	5,52	**AYGAZ**	6,56	**AYGAZ**	5,35
OTKAR	4,78	**ASELS**	4,41	**TUPRS**	4,55
TTRAK	3,72	**DOAS**	3,98	**LOGO**	4,03
DOAS	3,69	**TTRAK**	3,51	**HURGZ**	3,72
ARCLK	3,28	**TOASO**	3,42	**TOASO**	3,70
TOASO	3,09	**TUPRS**	3,42	**DOAS**	3,57
TUPRS	2,63	**ARCLK**	3,13	**PRKAB**	2,85
PRKAB	2,57	**OTKAR**	2,82	**ARCLK**	2,76
ASELS	2,39	**PRKAB**	2,69	**TTRAK**	2,72
VESTL	1,95	**TTKOM**	1,82	**OTKAR**	2,46
CCOLA	1,85	**CCOLA**	1,66	**CCOLA**	2,14
TTKOM	1,57	**TRCAS**	1,53	**VESTL**	1,75
TRCAS	1,30	**VESTL**	1,45	**TTKOM**	1,49
AEFES	1,23	**HURGZ**	1,27	**AEFES**	1,28
IHLAS	0,98	**AEFES**	1,26	**IHLAS**	1,15
TAVHL	0,97	**TAVHL**	1,17	**TAVHL**	1,10
HURGZ	0,72	**IHLAS**	0,73	**TRCAS**	1,02
GLYHO	0,23	**GLYHO**	0,43	**GLYHO**	0,65

4.6 Result of Analysis

The aim of study is to predict relationship between financial sustainability and corporate governance between 2013 and 2018 fiscal years. The data comparisons in the research are summarized below.

Results of 2013: When the analysis results of 2013 year are evaluated, according to Altman Z-Score calculation, Park Elektrik A.Ş. (PRKME) ranks the top in terms of financial sustainability. However, it has ranked 17th in TOPSIS ranking with a corporate governance score of 89,80. AYGAZ A.Ş. (AYGAZ), Doğuş Otomotiv (DOAS) and Türk Traktör ve Ziraat Makineleri A.Ş. (TTRAK) are ranked respectively 2nd, 3rd and 4th places according to Altman Z-Score analysis. When corporate governance ratings are taken into consideration same firms are ranked respectively 5th, 13th and 11th places.

Table 52: Comparison of the results of 2013

	2013			
	TOPSIS		ALTMAN Z-SCORE	
1	TAVHL	0,8211743	PRKME	11,84
2	OTKAR	0,7793874	AYGAZ	8,63
3	AEFES	0,7472802	DOAS	6,10
4	ARCLK	0,7459455	TTRAK	4,33
5	AYGAZ	0,7459455	TOASO	3,26
6	TUPRS	0,7052707	TUPRS	3,20
7	HURGZ	0,6679101	ARCLK	3,18
8	VESTL	0,6440687	LOGO	3,12
9	CCOLA	0,6394962	CCOLA	2,84
10	TOASO	0,6214314	ASELS	2,65
11	TTRAK	0,5987301	TTKOM	2,62
12	ASELS	0,5947943	PRKAB	2,34
13	DOAS	0,590411	OTKAR	2,16
14	PRKAB	0,5896236	TRCAS	1,73
15	LOGO	0,5529688	VESTL	1,62
16	GLYHO	0,5185026	AEFES	1,58
17	PRKME	0,5039989	HURGZ	1,47
18	TRCAS	0,5024365	TAVHL	1,45
19	TTKOM	0,4723974	IHLAS	0,90
20	IHLAS	0,1523875	GLYHO	0,57

According to Table 52, although TAV Havalimanlari Holding A.Ş. (TAVHL) has the highest corporate governance score, it has financial difficulties according to Altman-Z test results. Likewise, Anadolu Efes Biracilik ve Malt Sanayi A.Ş. (AEFES) has also a high corporate governance score but it is going through financially tough times too. On the other hand, Park Elektrik A.Ş. (PRKME) is in a financially safe zone but it has an average corporate rating score lower compared to TAHVL and AEFES. The results show that firms' financial sustainability levels and corporate governance scores do not move in the same direction in 2013.

Results of 2014: When the analysis results of 2014 year are evaluated, according to Altman Z-Score calculation, Park Elektrik A.Ş. (PRKME) ranks at the top in terms of financial sustainability. However, it is ranked 10th in TOPSIS ranking with 89,45 which is corporate governance score. AYGAZ A.Ş. (AYGAZ), Logo Yazilim Sanayi ve Ticaret A.Ş (LOGO) and Doğuş Otomotiv (DOAS) are ranking respectively in 2nd, 3rd and 4th places according to Altman Z-Score analysis. When corporate cg ratings are taken into consideration same firms are ranking respectively 4th, 15th and 8th.

Table 53: Comparison of the results of 2014

	2014			
	TOPSIS		ALTMAN Z-SCORE	
1	ARCLK	0,8965566	PRKME	11,92
2	AEFES	0,8843396	AYGAZ	9,10
3	HURGZ	0,8355876	LOGO	7,85
4	AYGAZ	0,8037629	DOAS	6,31
5	OTKAR	0,7796933	TTRAK	3,85
6	TAVHL	0,7653405	ARCLK	3,30
7	CCOLA	0,7292984	TUPRS	3,27
8	DOAS	0,7250195	TTKOM	3,10
9	TUPRS	0,710363	TOASO	2,96
10	PRKME	0,6757153	ASELS	2,91
11	ASELS	0,6568363	CCOLA	2,86
12	VESTL	0,6508576	OTKAR	2,47
13	TRCAS	0,6477645	PRKAB	2,45
14	LOGO	0,6474741	TRCAS	1,99
15	TOASO	0,6452751	VESTL	1,81
16	TTRAK	0,6452751	TAVHL	1,68
17	PRKAB	0,5887062	HURGZ	1,63
18	GLYHO	0,585158	AEFES	1,54
19	TTKOM	0,4544509	IHLAS	0,96
20	IHLAS	0	GLYHO	0,35

According to Table 53, although Hürriyet Gazetecilik ve Matbaacilik A.Ş. (HURGZ) has a high corporate governance score, while experiencing financial difficulties. Likewise, (AEFES) Anadolu Efes Biracilik ve Malt Sanayi A.Ş. has a high corporate governance score but it has financial challenge as well. On the other hand, Türk Traktör ve Ziraat Makinalari A.Ş. (TTRAK) is in a financially safe zone but it has a lower corporate rating score compared to HURGZ and AEFES. The results show that firms' financial sustainability and corporate governance scores do not move in the same direction in 2014.

Results of 2015: When the analysis results of 2015 year are evaluated, according to Altman Z-Score calculation, Logo Yazilim Sanayi ve Ticaret A.Ş (LOGO) ranks at the top in terms of financial sustainability. However, it has ranked 14th in TOPSIS ranking with a corporate governance score of 90,76. AYGAZ A.Ş. (AYGAZ), Park Elektrik A.Ş. (PRKME) and Doğuş Otomotiv (DOAS) are ranking respectively in 2nd, 3rd and 4th places according to Altman Z-Score analysis. When cg ratings are taken into consideration same firms are ranking in 7th, 11th and 6th respectively.

Table 54: Comparison of the results of 2015

	2015			
	TOPSIS		ALTMAN Z-SCORE	
1	AEFES	1	LOGO	9,35
2	ARCLK	0,9260713	AYGAZ	7,36
3	TAVHL	0,8835142	PRKME	5,66
4	OTKAR	0,8383955	DOAS	5,18
5	HURGZ	0,8283465	TUPRS	3,26
6	DOAS	0,8135093	PRKAB	3,15
7	AYGAZ	0,7982614	TTRAK	3,13
8	TUPRS	0,7856333	ARCLK	3,11
9	TRCAS	0,768016	TOASO	2,80
10	CCOLA	0,7538706	OTKAR	2,74
11	PRKME	0,7057768	ASELS	2,74
12	VESTL	0,6531075	CCOLA	2,08
13	ASELS	0,6362109	TTKOM	1,99
14	LOGO	0,6334779	VESTL	1,97
15	TOASO	0,6216695	HURGZ	1,64
16	TTRAK	0,6216695	AEFES	1,40
17	PRKAB	0,5974026	TAVHL	1,39
18	TTKOM	0,5281181	TRCAS	0,89
19	GLYHO	0,4816574	IHLAS	0,70
20	IHLAS	0	GLYHO	0,48

According to Table 54, Anadolu Efes Biracilik ve Malt Sanayi A.Ş. (AEFES) has the best corporate governance score. However,it is in a financially unfavorable situation. Although TAV Havalimanlari Holding A.Ş. (TAVHL) has a high corporate governance score, it has financial difficulties as well.

The results show that firms' financial sustainability and corporate governance scores do not move in the same direction in 2015.

Results of 2016: When the analysis results of 2016 year are evaluated, according to Altman Z-Score calculation, Logo Yazilim Sanayi ve Ticaret A.Ş (LOGO) ranks at the top in terms of financial sustainability. However, it has ranked 13th in TOPSIS ranking with a 91,24 corporate governance score.

AYGAZ A.Ş. (AYGAZ), Park Elektrik A.Ş. (PRKME) and Doğuş Otomotiv (DOAS) are ranking 2nd, 3rd and 4th places respectively according to Altman Z-Score analysis. When corporate governance ratings are taken into consideration same firms are ranking 8th, 12th and 5th respectively.

Table 55: Comparison of the results of 2016

	2016			
	TOPSIS		ALTMAN Z-SCORE	
1	AEFES	1	LOGO	6,90
2	TAVHL	0,8822374	AYGAZ	6,81
3	ARCLK	0,8455182	PRKME	5,52
4	TUPRS	0,8443484	OTKAR	4,78
5	OTKAR	0,8395186	TTRAK	3,72
6	HURGZ	0,8276258	DOAS	3,69
7	DOAS	0,8145299	ARCLK	3,28
8	AYGAZ	0,7989381	TOASO	3,09
9	TRCAS	0,777313	TUPRS	2,63
10	CCOLA	0,7491872	PRKAB	2,57
11	VESTL	0,7213324	ASELS	2,39
12	PRKME	0,7047952	VESTL	1,95
13	LOGO	0,6608231	CCOLA	1,85
14	TTRAK	0,6601525	TTKOM	1,57
15	ASELS	0,6571046	TRCAS	1,30
16	TOASO	0,6382203	AEFES	1,23
17	GLYHO	0,6214016	IHLAS	0,98
18	TTKOM	0,6006087	TAVHL	0,97
19	PRKAB	0,5970628	HURGZ	0,72
20	IHLAS	0	GLYHO	0,23

According to Table 55, Anadolu Efes Biracilik ve Malt Sanayi A.Ş. (AEFES) has the best corporate governance score but it has financial problems. Although TAV Havalimanlari Holding A.Ş. (TAVHL) has a high corporate governance score, it has financial difficulties as well. On the other hand, Global Yatirim Holding A.Ş. (GLYHO) has an average corporate governance score but it has financial difficulty too. The results show that firms' financial sustainability and corporate governance scores do not move in the same direction in 2016.

Results of 2017: When the analysis results of 2017 year are evaluated, according to Altman Z-Score calculation, Park Elektrik A.Ş. (PRKME) ranks at the top in terms of financial sustainability. However, it has ranked 14th in TOPSIS ranking with a 90,79 corporate governance score. Logo Yazilim Sanayi ve Ticaret A.Ş (LOGO) AYGAZ A.Ş. (AYGAZ), and Aselsan Elektronik Ticaret A.Ş.(ASELS) are ranking respectively in 2nd, 3rd and 4th places according to Altman Z-Score analysis. When corporate governance ratings are taken into consideration same firms are ranked 18th, 6th and 15th respectively.

Table 56: Comparison of the results of 2017

	2017			
	TOPSIS		ALTMAN Z-SCORE	
1	AEFES	1	PRKME	8,80
2	ARCLK	0,9108849	LOGO	7,62
3	TAVHL	0,9108849	AYGAZ	6,56
4	DOAS	0,8815813	ASELS	4,41
5	TUPRS	0,8315518	DOAS	3,98
6	AYGAZ	0,8261524	TTRAK	3,51
7	TRCAS	0,8234111	TOASO	3,42
8	OTKAR	0,802333	TUPRS	3,42
9	VESTL	0,7544105	ARCLK	3,13
10	CCOLA	0,6887197	OTKAR	2,82
11	GLYHO	0,6473937	PRKAB	2,69
12	HURGZ	0,636706	TTKOM	1,82
13	TTKOM	0,629846	CCOLA	1,66
14	PRKME	0,6249496	TRCAS	1,53
15	ASELS	0,6031582	VESTL	1,45
16	TTRAK	0,5807518	HURGZ	1,27
17	TOASO	0,5520713	AEFES	1,26
18	LOGO	0,512176	TAVHL	1,17
19	PRKAB	0,5052454	IHLAS	0,73
20	IHLAS	0	GLYHO	0,43

According to Table 56, Anadolu Efes Biracilik ve Malt Sanayi A.Ş. (AEFES) has the best corporate governance score but it has financial challenge. Although TAV Havalimanlari Holding A.Ş. (TAVHL) has a high corporate governance score, it has financial difficulties too. The results show that firms' financial sustainability and corporate governance scores do not move in the same direction in 2017.

Results of 2018: When the analysis results of 2018 year are evaluated, according to Altman Z-Score calculation Aselsan Elektronik Ticaret A.Ş. (ASELS) ranks at the top in terms of financial sustainability. However, it has ranked 15th in TOPSIS ranking with 92,04 which is its corporate governance score. Park Elektrik A.Ş. (PRKME) AYGAZ A.Ş. (AYGAZ) and Tüpraş-Türkiye Petrol Rafinerileri A.Ş. (TUPRS) are ranked 2nd, 3rd and 4th respectively according to Altman Z-Score analysis. When corporate governance ratings are taken into consideration same firms are ranked13th, 12th and 5th respectively.

Table 57: Comparison of the results of 2018

	2018			
	TOPSIS		ALTMAN Z-SCORE	
1	AEFES	1	ASELS	8,54
2	ARCLK	0,9248257	PRKME	6,45
3	TAVHL	0,9248257	AYGAZ	5,35
4	DOAS	0,8976796	TUPRS	4,55
5	TUPRS	0,8564356	LOGO	4,03
6	TRCAS	0,8529441	HURGZ	3,72
7	VESTL	0,8087388	TOASO	3,70
8	HURGZ	0,7237118	DOAS	3,57
9	CCOLA	0,7197385	PRKAB	2,85
10	OTKAR	0,7168106	ARCLK	2,76
11	TTKOM	0,7130733	TTRAK	2,72
12	AYGAZ	0,6941011	OTKAR	2,46
13	PRKME	0,689338	CCOLA	2,14
14	GLYHO	0,6465077	VESTL	1,75
15	ASELS	0,6400423	TTKOM	1,49
16	TTRAK	0,6313906	AEFES	1,28
17	LOGO	0,6093064	IHLAS	1,15
18	TOASO	0,6082967	TAVHL	1,10
19	PRKAB	0,5563817	TRCAS	1,02
20	IHLAS	0	GLYHO	0,65

According to Table 57, Anadolu Efes Biracilik ve Malt Sanayi A.Ş. (AEFES) has the best corporate governance score but it has fianancial problems. Although TAV Havalimanlari Holding A.Ş. (TAVHL) has a high corporate governance score, it has financial difficulties. The results show that firms' financial sustainability and corporate governance scores do not move in the same direction in 2018.

CHAPTER 5: CONCLUSION

There are various definitions of Corporate governance. It can be simply described as the systems by which business corporations are directed and controlled. Corporate governance system specifies the distribution of rights and responsibilities among different participants such as the board members, managers, shareholders, and other stakeholders of a corporation. Corporate governance describes the rules and procedures for making decisions on corporate affairs. There are many reasons for why corporate governance systems and practices become so important in the world. The most dominant reasons among these are declining levels of investors and creditors trust in company reporting due to financial scandals and crisis. The OECD principles of Corporate Governance was first published in 1999 and have been adopted and used in by many firms since. The components of the initial corporate governance systems suggested were shareholders, stakeholder, board of directors and transparency and disclosure. The principles related to each of these components were defined clearly and the main aim was to achieve the objectives of accurate measurement and improvement of company performance. Turkish economy is a developing economy and as it is in most other developing economies, companies have problems of raising funds for sufficient financing of their investments and operations in Turkey. Therefore, need for adoption of solid corporate governance systems and practices have been clearly understood by Turkish Companies. Corporate governance systems and applications play a crucial role for companies in Turkey to attract foreign investors to raise necessary funds. One of the objectives aimed to be achieved through successful applications of corporate governance systems and applications is Financial sustainability. Financial sustainability does not have an agreed definition, but it can be simply defined as being able to be financially secure and provide an expected rate of return for your beneficiaries in the long term. It is the opposite of having to cease a corporation’s activities simply because lack of funds, financial resources, and operational failure. There are various studies examining the relationship between corporate governance and financial performance of firms both in Turkey and around the world. In this study, the literature related to corporate governance applications and their relations to financial performance and sustainability have been studied very thoroughly.

One of the main purposes of this study is to contribute to the existing literature by examining the most up to date data related to financial standings of the companies listed in Borsa Istanbul Corporate Governance Index. The efforts were directed towards finding a relationship between corporate governance applications and financial strength and sustainability of the companies. In the research Altman–Z test method is one of the techniques used. The Altman–Z score is the output of a credit-strength test that measures likelihood of bankruptcy of a publicly-traded companies. The Altman-Z test uses five groups of financial ratios that are profitability, leverage, liquidity, solvency, and activity to predict whether a company has a high probability of becoming insolvent. Altman-Z test techniques is used to measure the financial sustainability of firms. After calculating the 5 financial ratios, according to Z score bankruptcy model, the results are in safe, neutral or distress zones.

The other technique which was used in the research part is TOPSIS which is a multi-criteria decision analysis method. It is a method of compensatory aggregation that compares a set of alternatives by identifying weights for each criterion, normalizing scores for each criterion and calculating the geometric distance between each alternative and the ideal alternative, which is the best score in each criterion. TOPSIS is used in this research because compensatory methods such as TOPSIS allow trade-offs between criteria, where a poor result in one criterion can be negated by a good result in another criterion. This provides a more realistic form of modelling than non-compensatory methods, which include or exclude alternative solutions based on hard cut-offs. It is based on the principle of proximity of decision points to the ideal solution. It includes a 6 steps solution process. This method was used to rank corporate governance ratings. In this study data of 20 firms listed in BIST for the years between 2013 and 2018 were used. The aim of my thesis is to find the relationship between corporate governance and financial sustainability of companies which are traded in BIST. Results show that firms' financial sustainability and corporate governance scores do not move in the same direction for the years between 2013 and 2018. The findings of this study are somehow like most of the studies conducted in other developing countries and Turkey. There can be various reasons for this situation. The main reasons for such a relationship can be explained as follows:

One reason may be due to methods used. The recent studies conducted in Turkey using TOPSIS reached the same conclusion. Future studies may apply different research methodologies.

However, the real reason is thought to be related be the nature of the business and finance world, that is, Corporate Governance systems and applications are adopted more seriously by companies that are experiencing financial difficulties and in need of sufficient financial sources. They focus their efforts to developing and maintaining very solid corporate governance systems to attract investors and in return their corporate governance scores are generally higher than other companies. However, this does not change the fact that these are the companies have with less advantageous financial standings and having more serious financial problems compared to others.

Finally, it should be noted that corporate governance systems and successful applications undeniably help to improve a company's operational efficiency and create a positive and attractive environment for the investors. Therefore, it is possible to say that companies that have been taking advantage of corporate governance applications and that have been in this system for long time will have future advantages. In short, corporate governance system is a start point for companies seeking long term benefits of operational efficiency and sufficient, sustainable financial resources.

REFERENCES

Adams, R. B., & Mehran, H. (2005, August*). Corporate performance, board structure and its determinants in the banking industry.* In *EFA 2005 Moscow meetings*.

Akdogan, N., & Tenker, N. (2001). *Finansal Tablolar ve Mali Analiz Teknikleri*, Gazi Kitabevi, 7. Baski, Ankara.

Aktas, R., Doganay, M., Murat, A., & Basci, E. S. (2013). *Finansal Yönetim*. Baskı, Sakarya Universitesi SAUSEM yayınları,Sakarya

Alper, D., & Aydoğan, E. (2017). *Prediction of Corporate Governance-Performance Relationship with a Dynamic Model.* Journal of Accounting & Taxation Studies (JATS), vol.10(1), pp. 91-106.

Altman, E. I. (2000). *Predicting financial distress of companies: revisiting the Z-score and ZETA® models*. In Handbook of research methods and applications in empirical finance. Available at Edward Elgar Publishing. (Accessed 15 February 2020).

Altman, E. I. (1968). *Financial ratios, discriminant analysis and the prediction of corporate bankruptcy.* The journal of finance, vol. 23(4), pp, 589-609.

Altman E.I. (1983). *Corporate Financial Distress. A Complete Guide to Predicting, Avoiding, and Dealing with Bankruptcy.*Wiley-Interscience. New York,103-119.

Anderson, R. C., & Reeb, D. M. (2003). *Founding-family ownership and firm performance: evidence from the S&P 500*. The journal of finance, Vol. 58(3), pp. 1301-1328.

Aras, Güler (2006), *"Kurumsal Yönetim ve Sürdürülebilir İşletme Performansı"* http://www.denetimnet.net/UserFiles/Documents/G%C3%BCler%20Aras%20makale.pdf (Accessed 23 February 2020).

Aras, G., Aybars, A. and Kutlu, O., 2010, *"Managing corporate performance Investigating the relationship between corporate social responsibility and financial performance in emerging markets",* International Journal of Productivity and Performance Management vol.59(3), pp.229-254.

Arnold, Beth-De Lange, Paul (2004), *"Enron: an examination of agency problems",* Critical Perspectives on Accounting, vol.15, No.6-7, pp. (751-765).

Assari, A., & Assari, E. (2012). *Role of public participation in sustainability of historical city: usage of TOPSIS method*. Indian Journal of Science and Technology, vol.5(3), pp. 2289-2294.

Aysan, M. A. (2007). *Muhasebe ve kurumsal yönetim.* Muhasebe ve Finansman Dergisi,Vol.(35), pp.17-24.

Barnett, M.L. (2007). *Stakeholder influence capacity and the variability of financial returns to corporate social responsibility*. Academy of Management Review, Vol (32), pp.794–816.

Baxter, P. (2014). *Corporate governance ratings and financial performance: evidence from Australia*. International Journal of Corporate Governance, Vol 5(3/4), pp.178-196.

Brammer, S., & Millington, A. (2008). *Does it pay to be different? An analysis of the relationship between corporate social and financial performance.* Strategic management journal, vol.29(12), pp.1325-1343.

Berthelot, S., Morris, T., & Morrill, C. (2010). *Corporate governance rating and financial performance: A Canadian study*. Corporate Governance, vol.10 no.5, pp.635-646.

Bolton, P., & Von Thadden, E. L. (1998). *Blocks, liquidity, and corporate control.* The journal of finance, vol.53(1), pp.1-25.

Burkart, M., Gromb, D., & Panunzi, F. (1997). *Large shareholders, monitoring, and the value of the firm.* The quarterly journal of economics, vol.112(3), pp.693-728.

Corporate Governance Principles (2005). 2nd edition Ankara: Capital Markets Board of Turkey.

Carton, R. B., & Hofer, C. W. (2006). *Measuring organizational performance: Metrics for entrepreneurship and strategic management research*. 6th edition. Edward Elgar Publishing.

Cengiz, H. (2016). *Corporate Governance and Firm Profitability: Evidence from Turkey.* International Journal of Trade, Economics and Finance, Vol 7(6), pp. 238-241.

Chapin III, F. S., Torn, M. S., & Tateno, M. (1996). *Principles of ecosystem sustainability*. The American Naturalist, Vol 148(6), pp. 1016-1037.

Chuvakhin, N., & Gertmenian, L. W. (2003). *Predicting bankruptcy in the WorldCom age*. Journal of Contemporary Business Practice, vol 6(1), pp.3-8.

Claessens, S. (2006). *Corporate governance and development*. The World bank research observer, Vol 21(1), pp. 91-122.

Clarke, T. (2011). "*Corporate governance causes of the global financial crisis," in Sun, W., Stewart, J. and Pollard, D.(eds)* Corporate Governance and the Global *Financial Crisis*: International Perspectives. Cambridge: Cambridge University Press, pp.28-46.

Clarke, T., & Clegg, S. (2000). *Management paradigms for the new millennium*. International Journal of Management Reviews, vol *2*(1), pp.45-64.

Coats, P. K., & Fant, L. F. (1993). *Recognizing financial distress patterns using a neural network tool.* Financial management, vol.22 no.3, pp.142-155.

Conkar, K., Elitas, C., & Gokhan, A. T. A. R. (2011). *IMKB Kurumsal Yönetim Endeksi'ndeki (XKURY) Firmaların Finansal Performanslarının TOPSIS Yöntemi ile Ölçümü ve Kurumsal Yönetim Notu ile Analizi*. Istanbul Universitesi Iktisat Fakültesi Mecmuası, Vol 61(1), pp. 81-115.

Coskun, M., & Sayilir, Ö. (2012). *Relationship between corporate governance and financial performance of Turkish companies*. International Journal of Business and Social Science, Vol.3(14), pp.59-64.

Darman, G. M. (2008). *Küresel ekonomilerde kurumsal yönetim anlayışı ve Türkiye.* ICC Milletlerarası Ticaret Odası Yayını, Ankara.

Delen, D., Kuzey, C., & Uyar, A. (2013). *Measuring firm performance using financial ratios*: *A decision tree approach*. Expert Systems with Applications, Vol.40(10), pp. 3970-3983.

Demir, O., & Sezgin, E. E. (2014). *Aile işletmelerinde kurumsallaşma ve sürdürülebilirlik: TRB1 Bölgesinde yapılan bir araştırma.* Electronic Turkish Studies, vol. 9(5), pp.707-725.

Demsetz, H., & Lehn, K. (1985). *The structure of corporate ownership: Causes and Consequences*. Journal of Political Economy, vol.93(6), pp.1155-1177.

Demsetz, H., & Villalonga, B. (2001). *Ownership structure and corporate performance*. Journal of corporate finance, vol.7(3), pp. 209-233.

Dinc E., Abdioglu H. (2009), *Isletmelerde kurumsal yönetim anlayışı ve muhasebe bilgi sistemi iliskisi: IMKB100 şirketleri üzerine ampirik bir arastırma*, Balıkesir Universitesi Sosyal Bilimler Enstitüsü Dergisi, vol.12(21), pp.157-184.

Drobetz, W., Schillhofer, A., & Zimmermann, H. (2003). *Corporate governance and firm performance: Evidence from Germany*. Basel, Switzerland: University of Basel. Mimeographed document. http://www. cofar. uni-mainz. de/dgf2003/paper/paper146. pdf. (Accessed 12 January 2020)

Ege, I., & Topaloglu, E. (2013). Ozyamanoglu, Murat, ". *Finansal Performans ile Kurumsal Yönetim Notları Arasındaki Ilişki: BIST üzerine bir uygulama*", Akademik Arastirmalar ve Calismalar Dergisi, Vol.5(9), pp. 100-117.

Erdur, D. A., & Kara, E. (2014). *Analyzing the effects of corporate social responsibility level on the financial performance of companies: An application on BIST Corporate Governance Index included companies*. International Journal of Management Economics & Business, vol.10(23), pp. 227-242.

Erhardt, N. L., Werbel, J. D., & Shrader, C. B. (2003). *Board of director diversity and firm financial performance. Corporate governance:* An international review, Vol. 11(2), pp.102-111.

Ertikin, K. (2017). *Bağımsız denetimde bir dönüm noktası: Enron olayı ve Sarbanes-Oxley yasası*. Mali Cözüm Dergisi, Vol.27(141), pp.101-119.

Esendemirli, E. & Erdener Acar, E. (2016). *Finansal performans ve kurumsal yönetim derecelendirme notları: Borsa İstanbul Kurumsal Yönetim Endeksi 2013-2014 Yılları Karşılaştırması*. World of Accounting Science, vol.18(1), pp.625-671.

Faccio, M., & Lang, L. H. (2002). *The ultimate ownership of Western European corporations.* Journal of financial economics, vol.65(3), pp.365-395.

Fauzi, H., (2009), *"Corporate social and financial performance: Empirical Evidence from American Companies"*, Globsyn Management Journal, Forthcoming, Available at SSRN: http://ssrn.com/abstract=1489494 (accessed 14 January 2020).

Ferrier, W. J., Fhionnlaoich, C. M., Smith, K. G., & Grimm, C. M. (2002*). The impact of performance distress on aggressive competitive behavior: A reconciliation of conflicting views*. Managerial and Decision Economics, 23(4-5), pp. 301-316.

Fiori, G., Di Donato, F., & Izzo, M. F. (2007). *Corporate social responsibility and firm's performance-an analysis on Italian listed companies*. Available at SSRN https://ssrn.com/abstract=1032851 (Accessed 10 January 2020).

Galloni, A., & Reilly, D. (2004). *How Parmalat spent and spent*. Wall Street Journal, 23. Available at https://www.wsj.com/articles/SB109053963603171779

(Accessed 01 January 2020).

Goukasian, L., & Whitney, L. K. (2008). *Corporate Socially Responsible Firms Perform Well! Evidence from Financial and Operating Performances. Evidence from Financial and Operating Performances (May 20, 2008)*.Available at SSRN: https://ssrn.com/abstract=972649 or http://dx.doi.org/10.2139/ssrn.972649 (Accessed 15 December 2019).

Gocen, C. A. (2010). *Kurumsal yönetim, iç kontrol ve bağımsız denetim: Parmalat vakası*. Mali Çözüm Dergisi, Vol.97, pp. 107-129.

Gruszczynski, M. (2006). *Corporate governance and financial performance of companies in Poland*. International Advances in Economic Research, Vol.12(2), pp.251-259.

Gurbuz, A. O., Aybars, A., & Kutlu, O. (2010). *Corporate Governance and Financial Performance with a Perspective on Institutional Ownership: Empirical Evidence from Turkey*. Journal of Applied Management Accounting Research, Vol. 8(2), pp.21-38.

Hayes, Hodges, Hudghes L.W, 2010, *A study of the efficacy of Altman's Z to predict bankruptcy of speciality retail firms doing business in contemporary times*. Economic & Bussiness Journal: Inquiries & Perspectives; Vol 3(1), pp.122-134.

http://www.tkyd.org/tr/tkyd-kurumsal-yonetim-komisyonlar-calisma-gruplarisermaye-piyasasi-ve-bist-kurumsal-yonetim-endeksi-calisma-grubu.html (Accessed 08 September 2019).

https://www.borsaistanbul.com/en/indices/bist-stock-indices/corporate-governance-index (Accessed 28 October 2019).

https://www.gurufocus.com/term/zscore/EBIT/Altman-Z-Score/

(Accessed 20 January 2020).

https://www.tusiad.org/tr/yayinlar/raporlar/item/1877-kurumsal-yonetim-en-iyi-uygulama-kodu--yonetim-kurulunun-yapisi-ve-isleyisi (Accessed 20 January 2020)

Hwang, C.L.; Yoon, K. (1981). *Multiple Attribute Decision Making: Methods and Applications.* New York: Springer-Verlag.

Ingley, C., Mueller, J. and Cocks, G., 2010, *"The financial crisis, investor activists and corporate strategy: will this mean shareholder in the boardroom*?", Journal of Management and Governance, Vol 15(4), pp.557-587.

Jensen, M. C., & Meckling, W. H. (1976). *Theory of the firm: Managerial behavior, agency costs and ownership structure.* Journal of financial economics, vol. 3(4), pp.305-360.

Karacaer, S., Aygun, M., & Suleyman, I. C. (2009). *Araştırma ve geliştirme giderlerinin firma performansı üzerindeki etkisi: Istanbul Menkul Kıymetler Borsası üzerine bir inceleme*. World of Accounting Science, vol.11(2), pp.65-86.

Karagiorgos, T. (2010). *Corporate social responsibility and financial performance: An empirical analysis on Greek companies.* European Research Studies, Vol.13(4), pp.85-108.

Kiel, G. C. and Nicholson, G. J. (2003), *Board composition and corporate performance: how the Australian experience informs contrasting theories of corporate governance‖, Corporate Governance*: An International Review, Vol. 11, No. 3, pp. 189-205.

Kivuvo, R. M., & Olweny, T. (2014). *Financial performance analysis of Kenya's SACCO Sector using the Altman Z Score model of corporate bankruptcy.* International Journal of Business and Social Science, vol.5(9), pp.34-52.

Lehmann, E., & Weigand, J. (2000). *Does the governed corporation perform better? Governance structures and corporate performance in Germany*. Review of Finance, vol.4(2), pp.157-195.

Leng, A. C. A. (2004). *The impact of corporate governance practices on firms' financial performance: Evidence from Malaysian companies*. ASEAN Economic Bulletin, Vol. 21(3), pp.308-318.

Li, Y. (2010). *The case analysis of the scandal of Enron*. International Journal of business and management, Vol.5(10), pp.37-41.

Luo, Y. (2005). Corporate governance and accountability in multinational enterprises: Concepts and agenda. Journal of International Management, Vol.11, pp.1-18.

Maher, M. W., Stickney, C. P., Weil, R. L., Davidson, S., (1991*). Managerial Accounting: An International to Concepts, Methods and Use*, Fourth Edition, America: Harcourt Brace Jovanovich Publishers.

Mahoney, L., & Roberts, R. W. (2007, September). *Corporate social performance, financial performance, and institutional ownership in Canadian firms*. In Accounting forum (vol. 31, No. 3, pp. 233-253). Taylor & Francis.

McGee, R. W. (2009). *Corporate governance in developing economies. In Corporate Governance in Developing Economies*, Boston, MA: Springer Press,3-22.

Moyer, S. G. (2004). *Distressed debt analysis: Strategies for speculative investors*.4th edition, Florida: J. Ross Publishing.

Nemli, E. 2004. *Sürdürülebilir Kalkınma: şirketlerin çevresel ve sosyal yaklaşımları*. 1 st edition, Istanbul: Filiz Kitabevi.

Nelling, E., & Webb, E. (2009). *Corporate social responsibility and financial performance: the "virtuous circle" revisited*. Review of Quantitative Finance and Accounting, vol.32 no.2, pp.197-209.

Nguyen, T., Locke, S., & Reddy, K. (2014). *A dynamic estimation of governance structures and financial performance for Singaporean companies. Economic Modelling*, Vol.40, pp.1-11.

OECD (2004). *OECD Principles of Corporate Governance. Retrieved August 15, 2019,* from http://www.oecd.org/dataoecd/32/18/31557724.pdf

Ogbechie, C. I. (2012). *Key determinants of effective board of directors-evidence from Nigeria*. Doctoral Thesis,London, Brunel University Publishing.

Ozsoy, Z. (2011). *Kurumsal yönetim ve yönetim kurulları*.1 st edition. İstanbul: Imge Kitabevi Yayınları.

Pauly, L.W. and Reich, S., 1997. *"National structures and multinational corporate behavior: enduring differences in the age of globalization",* International Organization, vol. 51(1), pp. 1-30.

Rettab, B., Brik, A. B., & Mellahi, K. (2009). *A study of management perceptions of the impact of corporate social responsibility on organizational performance in emerging economies: the case of Dubai*. Journal of Business Ethics, Vol.89(3), pp.371-390.

Rhoades, D. L., Rechner, P. L., & Sundaramurthy, C. (2000). *Board composition and financial performance: A meta-analysis of the influence of outside directors*. Journal of Managerial issues, vol.12(1), pp.76-91.

Ross, S. (1973*). The Economic Theory of Agency: The Principal's Problem*. The American Economic Review, Vol.63(2), pp.134-139.

Saglar, J., & Kandemir, C. (2007). Enron Olayı: *Muhasebe hilesi mi, sistem hatası mi?* Cukurova Universitesi Iktisadi ve Idari Bilimler Fakültesi Dergisi, vol.11(1), pp.20-39.

SAHA Kurumsal Yönetim ve Kredi Derecelendirme A.S.

saharating.com/~saharati/en/services/corporate-governance-rating/corporate-governance-rating-definitions/ (Accessed: 28 October 2019)

Sanda, A. U., Mikailu, A. S., & Garba, T. (2010). *Corporate governance mechanisms and firms' financial performance in Nigeria*. Afro-Asian Journal of Finance and Accounting, vol.2(1), pp. 22-39.

Sermaye Piyasasi Lisanslama Sicil Ve Egitim Kurulusu A.S., (2014), "Lisanslama Sinavlari Calisma Kitaplari: Kurumsal Yonetim", Spl Yayinlari,Istanbul.

Shaikh, J. M., & Talha, M. (2003). *Credibility and expectation gap in reporting on uncertainties.* Managerial auditing journal, vol.18(6/7), pp.517-529.

Shleifer, A., & Vishny, R. W. (1997). *A survey of corporate governance.* The journal of finance, vol.52(2), pp.737-783.

Sikka, P., Filling, S., & Liew, P. (2009). *The audit crunch: reforming auditing*. Managerial Auditing Journal, Vol. 24(2), pp.135-155.

Skinner, D. J., & Srinivasan, S. (2012). *Audit quality and auditor reputation: Evidence from Japan.* The Accounting Review, vol.87(5), pp.1737-1765.

Sloan, R. G. (2001*). Financial accounting and corporate governance: a discussion*. Journal of accounting and economics, Vol.32(1-3), pp.335-347.

Solomon, A., & Solomon, J. (1999). *Empirical evidence of long-termism and shareholder activism in UK unit trusts.* Corporate Governance: An International Review, vol.7(3), pp.288-300.

Suadiye, G. (2017). *The effects of corporate governance practices on firm performance: Empirical evidence from Turkey*. CLEAR International Journal of Research in Commerce & Management, vol.8(11), pp.45-50.

Symes, C. B., & Suer, A. Z. (2003*). Profesyonel Muhasebe Mesleğinde Enron Skandalı ve Sonrası Gelişmeler.* VI. Türkiye Muhasebe Denetim Sempozyomu, ISMMM Odası, Yayın, vol. (49), pp.11-126.

Turkish Industrialists' and Businessmen's Association (2002). Corporate Governance Code of Best Practice: Composition and Functioning Board of Directors. Istanbul.

Tyagi, R. (2014). *CSR bequeath competitive advantage: a relative study of indian firms.* International Journal of Management Research and Business Strategy, Vol. 3(3), pp.49-69.

Ueng, C. J. (2016). *The analysis of corporate governance policy and corporate financial performance.* Journal of Economics and Finance, Vol.40(3), pp.514-523.

Wilson, R. L., & Sharda, R. (1994). *Bankruptcy prediction using neural networks.* Decision support systems, vol. 11(5), pp.545-557.

World Business Council for Sustainable Development (1999) "Corporate Social Responsibility: Meeting Changing Expectations" Conches-Geneva[online]. Available at www.wbcsd.org. (Accessed 22 January 2020).

Yavuz, V. A. (2010). *Sürdürülebilirlik kavramı ve işletmeler açısından sürdürülebilir üretim stratejileri.*Mustafa Kemal Universitesi Sosyal Bilimler Enstitüsü Dergisi, Vol.7(14), pp.63-86.

Yıldırım, M., Altan, İ. M., & Gemici, R. (2018). *Kurumsal yönetim ile finansal performans arasındaki ilişkinin entropi ağırlıklandırmalı TOPSIS yöntemi ile değerlendirilmesi: Bist'te işlem gören gıda ve içecek şirketlerinde bir araştırma.* Muhasebe ve Vergi Uygulamaları Dergisi, vol.11(2), pp.130-152.

Yörük, N. (2006*). Aile şirketlerinde kurumsallaşma ve halka açılmanın finansal performans üzerine etkisi: halka açık bir aile şirketi üzerinde vaka çalışması.* Sosyal Ekonomik Arastirmala Dergisi, Vol.6(12), pp.180-202.