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PROF. DR. GÜLSÜN İŞSEVEROĞLU
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CONTENTS

CHAPTER 1

SUSTAINABLE HEALTH ECONOMY IN TERMS OF TECHNOLOGICAL INDEX INCLUDED IN MULTIDIMENSIONAL COMPLEXITY INDICES

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INTRODUCTION

Economic growth is among the ultimate goals of countries. It is important in the sustainability of growth. There are multiple factors affecting the change in growth.The concept of economic complexity has been added to these variables, which stand out as micro and macro variables in economics. The concept of economic complexity was introduced to the literature with the theory put forward by Hidalgo (2009). The concept of economic complexity was inspired by the information in Adam Smith's book. In order to reduce the burden on each worker, ensure rapid production and increase efficiency, it is necessary to divide labor among workers. In addition, if workers work intensively on jobs in which they specialize, production becomes efficient. In this case, more products are produced. Increasing the production of the product in qualitative and quantitative terms causes the product range to expand. This result, which emerged in support of Adam Smith's view, gave rise to the concept of economic complexity. Economic complexity shows how many different products there are in the country. Instead of producing a large number of products, it is necessary to produce a large number of quality products. The quantity of products, their quality is also important. A wide range of products balances the production and consumption of countries and ensures market balance. Selling products within the country and selling them abroad increases the income of citizens living in the country. The country's income also increases. This allows the country's economy to grow and the country's income level to rise to a higher level. According to Hidalgo, who introduced the concept of economic complexity, the production of complex products depends on the knowledge, skills and experience of the citizens living in the country. Technology plays an important role in these situations. With the development of technology, citizens' access to information is accelerating. Citizens actively present their skills and gain experience is increasing.

The economic complexity index started to be published as a multidimensional complexity index in the studies of Stojkoski, Koch and Hidalgo (2023). The multidimensional complexity index includes commercial, technological and research complexity indices. The study supported that these three complexity indexes increase the income levels of countries and ensure their economic growth. In addition, the effect of environmental factors in terms of multidimensional complexity indices was also examined in the study. It is thought that this study, which takes into account the technological complexity index within the three-dimensional complexity index, which is a newly introduced concept to the literature, will contribute to the literature. Additionally, there is no study that analyzes the multidimensional complexity index with health indicators. However, the number of studies analyzing the economic complexity index, which was before it was published as a multidimensional complexity index, with health indicators is very limited.

Analysis was made to see the role of the multidimensional complexity index in making the health economy sustainable.

Before moving on to the analysis, the Gross Domestic Product per capita (named as GDP in the study), technological complexity index (named as TECHNOLOGY in the study) and health economy of the CIVETS (Colombia, Indonesia, Vietnam, Egypt, Turkey, South Africa) countries discussed in the study. Among the indicators, infant mortality rates (called IMR in the study) are shown on the graph.

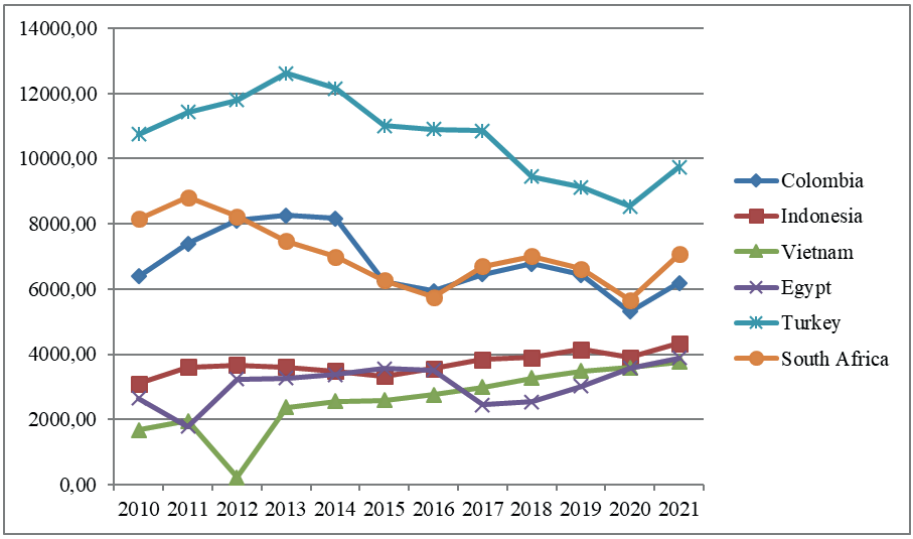

Figure 1. GDP datas of CIVETS

Source: The World Bank, 2024.

Among CIVETS countries, Turkey has the highest GDP ratio. Turkey is followed by Colombia and South Africa. Indonesia, Egypt and Vietnam follow. Although Turkey has the highest GDP rate, its income level decreased after 2012 and 2017. This decrease has started to increase again as of 2020. South Africa, Colombia and Egypt GDP rates did not follow a stable course, there were jumps. The country with the most stable GDP data is Indonesia. Vietnamese income level had a huge decrease in 2012, but it has increased continuously after 2013. This information can be seen in figure 1.

TECHNOLOGY rates of Türkiye and South Africa are the highest among CIVETS countries. In 2015, this rate was the same in both countries, but after 2015, Turkey ranked first again. Unlike GDP data, Colombia is clearly in third place in Technology data. TECHNOLOGY data of the remaining CIVETS countries are very close to each other. Although GDP data in Indonesia,

Vietnam and Egypt have followed an increasing trend in recent years, TECHNOLOGY data has followed a decreasing trend. These can be seen in figure 2.

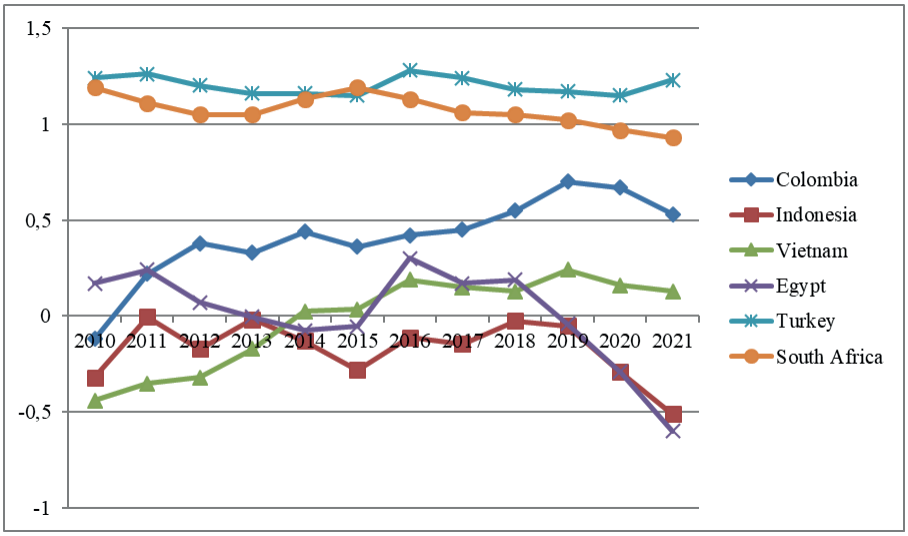

Figure 2. Technology Complexity Indexes of CIVETS

Source: The Obsarvatory of Economic Complexity, 2024.

The country with the lowest IMR rate among CIVETS countries is Turkey. In ascending order, they are Colombia, Vietnam, Egypt, Indonesia and South Africa. Generally speaking, IMR rates appear to be decreasing in CIVETS countries. However, there is a stable situation in Vietnam. IMR rates reflect the health indicator of a country as well as its social structure and economic situation. The fact that this ratio is small shows that the education, health and economic conditions of individuals growing up in the country are good.

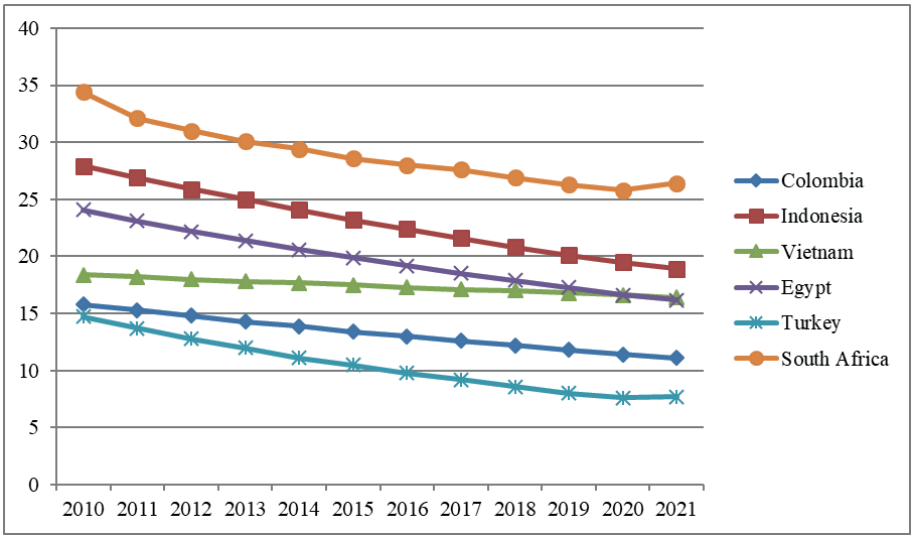

Figure 3. IMR datas of CIVETS

Source: The World Bank, 2024.

LITERATURE REVIEW

No study containing multidimensional complexity indices has been found in the literature. Since there is no study using the technological complexity index variable, which is among the multidimensional complexity indices, economic complexity studies in the literature are included in Table 1.

Studies in which the economic complexity variable is analyzed together with health indicator variables are included in the table. Since studies on health indicators are limited, a few studies on income and economic growth are also included in Table 1.

Table 1. Literature Summary

Author(s)/Working Year	Variables (Method)	Result
-Zhu and Li (2016) /1995-2010	-Economic Complexity, Economic Growth, Human Capital (Panel)	- A positive relationship was found.
-Stojkoski and Kocarev (2017)/1995-2013	-Economic Complexity, Economic Growth (Panel)	-The variables considered have a positive effect. No relationship was detected in the short term.
-Cestepe and Caglar (2017)	-Economic Complexity, Per Capita İncome (Panel)	- A positive relationship was found.
- Soyyigit (2018) /1990-2016	-Economic Complexity, Per Capita İncome (Cointegration)	-The variables are not cointegrated.

-Soyyigit, Topuz and Ozekicioglu (2019) /1970-2016	-Economic Complexity, Per Capita İncome, Fixed Capital İnvestments, Export (Panel)	- A positive relationship was found.
-Ucar, Soyyigit and Nisancı (2019)	-Economic Complexity, Per Capita İncome, Export (Causality Test)	-There is causality from both exports and per capita income level to the economic complexity index.
-Yıldız ve Yıldız (2019)/1970-2016	-Economic Complexity, Per Capita İncome (Causality Test)	-Causality from economic complexity to growth has been identified.
-Doyar and Yaman (2020)/1989-2017	-Economic Complexity, Per Capita İncome, Export (Causality Test)	- Economic complexity index and high technology exports are explained by the income variable.
-Bayar (2022) /1995-2019	-Economic Complexity, Economic Growth (Causality Test)	- It has been determined that there is positive and bidirectional causality.
-Ergun Tatar (2023)/ 1995-2020	-Economic Complexity, Life Expectancy (Cointegration and Causality Test)	- It has been determined that cointegration and causality are bidirectional.

When Table 1 is summarized, in studies analyzing the relationship between economic complexity and income, Soyyigit, Topuz and Ozekicioglu (2019), Bayar (2022) and Cestepe and Caglar (2017) concluded that there is a positive relationship. Ucar, Soyyigit and Nisancı (2019) and Doyar and Yaman (2020) found that income is the cause of economic complexity. However, Soyyigit (2018) determined that there is no cointegration between them. A few of the studies analyzing the causality relationship between economic growth and complexity are Bayar (2022) and Yıldız and Yıldız (2019). Stojkoski and Kocarev (2017) found positivity.

METHOD

In panel data analysis, stationary data is used to ensure that the tests give healthy results and the interpretation is made correctly. This is looked at with unit root tests. There are two tests that should be used when deciding which of these tests to use. After homogeneity and cross-section tests, it is decided which group of unit root will be used. The most common of these tests are Swamy S and Breusch Pagan LM tests (Swamy, 1970; Pesaran, 2004).

If heterogeneity and dependency are detected, the second group is used. Among the second group is the Madfuller Unit Root test. The quantity of unit and time is also important. Additionally, the balance of the panel is important for the Madfuller unit root test (Yerdelen Tatoglu, 2018).

If stationarity is detected in the variables, the analysis continues. However, if not, the variables are made stationary. For this, the degree difference of the variable must be taken. For reliable results, the analysis continues with the variables whose differences are taken. These results change the course of the analysis.

Tests made with variables that become stationary when the level or first difference is taken are different from tests made with variables that become stationary at different levels. If different levels are found, Toda Yamamoto causality test is performed. Cointegration tests cannot be performed.

Before making Toda Yamamoto, the basic problems in the drying model should be examined. There should be no fundamental problems. These problems are autocorrelation and heteroskedasticity. In addition to these problems, the inverse roots of the polynomial must take values less than one and be inside the circle. If it is not in it, it means that the model is not stable (Toda and Yamamoto, 1995).

VAR model is established for Toda Yamamoto causality test. To establish this model, the lag length must be selected and the analysis is continued using this length. While performing the test, the Wald test option is selected and the Wald test results are checked (Riyath, 2018).

In interpreting the analysis results, interpretations are made based on the 0.05 significance level. The probability values resulting from the tests are compared with this significance level. Hypotheses are used in comparisons. The first hypothesis of each test includes negativity, and the second hypothesis includes positivity. Negativity means absence, positivity means existence.

The zero hypothesis of cross-section, heteroscedasticity, autocorrelation and causality tests states that these situations do not exist, and the first hypothesis states that they do. In the homogeneity and unit root tests, the first hypothesis was homogeneity and non-stationarity, respectively; The other hypothesis states that there is heterogeneity and stationarity (Jaber et al., 2022).

FINDINGS

In the current study, technological complexity index, one of the multidimensional complexity indices of CIVETS countries, Gross Domestic Product per capita and health indicator infant mortality rates data were used. The data covered the years 2000 and 2021. TECHNOLOGY used in the model refers to the technological complexity index, GDP refers to GDP per capita, and IMR refers to infant mortality rates. The TECHNOLOGY variable is dependent and the other variables are independent variables.

The value of 0.0000 seen in Table 2 reveals the interpretation that the model is heterogeneous. Taking into account the heterogeneity of the model, other tests were selected and the analysis continued.

Table 2. Homogeneity Test

Chi-Square Value	Statistical Value	Probability Value
Chi2 (15)	659.38	0.0000

In Table 3, a result value of 0.0000 indicates that there is cross-sectional dependence in the model. Analyzes were continued taking this dependency into account.

Table 3. Cross Section Dependency Test

Chi-Square Value	Statistical Value	Probability Value
Chi2 (15)	58.063	0.000

According to this test, if the value is greater than 5% CV, the difference is continued without taking into consideration. Differences of TECHNOLOGY and IMR variables were not taken. However, since the IMR variable was not stationary at its level value, the analysis was continued by taking the difference.

Table 4. Unit Root Test

Variables	Values			
	I (0)		I (1)	
	MADF	Approx %5 CV	MADF	Approx %5 CV
TECHNOLOGY	46.399	36.616	-	-
GDP	19.011	36.616	146.467	38.897
IMR	89.761	36.616	-	-

Before moving on to causality testing, a VAR model was established. The result of determining the lag length of the established model is reflected in Table 5. In determining the delay length, the number of star notations that exceed the information criteria is taken into consideration. Therefore, the delay length was chosen as 2.

Table 5. Determination of Delay Length

Lag	AIC	SC	HQ
0	3.709414	3.796229	3.744313
1	-5.321137	-4.973878	-5.181542
2	-5.913414*	-5.305710*	-5.669122*
3	-5.791960	-4.923811	-5.442972

Tables 6 and 7 show the result of diagnosing problems. According to the heteroscedasticity test result 0.3252, the heteroscedasticity problem; According to the value of 0.1823 in the autocorrelation test, it was determined that there was no problem. It was determined that this problem did not occur in the first three delays. However, it is more important that the specified delay length is not 2. For this reason, the value of delay 2 is taken as basis.

Table 6. Heteroscedasticity Test

Statistical Value	Degree of freedom	Probability Value
36.05	162	0.3252

Table 7. Autocorrelation Test

Lags	Statistical Value	Probability Value
1	3.9613	0.9139
2	**12.5847**	**0.1823**
3	4.0656	0.9070

After concluding that there are no problems, it is seen that the inverse roots of the polynoe are located within the unit circle. This situation, shown in Figure 4, proves that the model is stable.

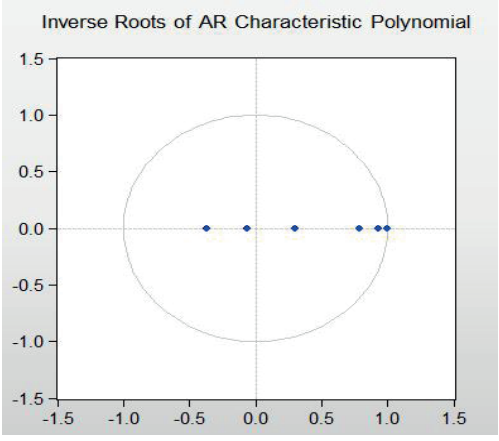

Figure 4. Appearance of Inverted Roots

In table 8, which contains the causality results, it is concluded that the TECHNOLOGY variable has an impact on the GDP and IMR variables, but the GDP and IMR variables did not cause the TECHNOLOGY variable.

Table 8. Causality Test

Variable 1	Direction of Causality	Variable 2	Probability Value
TECHNOLOGY		GDP	0.0313
TECHNOLOGY		IMR	0.0021
GDP		TECHNOLOGY	0.7556
IMR		TECHNOLOGY	0.4386

The change in the TECHNOLOGY variable changes the GDP and IMR variables. The change in GDP and IMR variables does not affect the TECHNOLOGY variable.

CONCLUSIONS AND SUGGESTIONS

There are situations that can and cannot change among the basic principles of economic growth. While the geopolitical and geographical location of the country cannot be changed, its social, demographic and economic situation and factors can be changed. These situations support the economic growth of countries. These factors, which are also factors in the sustainability of economic growth, include health indicators and per capita income variables. When a country balances its production and consumption, its growth follows an increasing path. Because the balance of production and consumption creates the balance of demand and supply.

In increasing production, quality is also important as well as quantitative increase. A country should keep its product range wide. If it is large, it is easier to sell the products produced in the domestic and foreign markets. Technology has a great impact on increasing the quality of products. It is expected that product increase and technological development will mutually affect each other. The income generated from the increase, sale and sale of products encourages technological development in the country. As technology develops, product production also accelerates. The concept of economic complexity, which has been introduced to the literature in recent years, is related to the products produced by countries. By developing this concept, the concept of multidimensional complexity was introduced. The concept of multidimensional complexity includes technological, commercial and research complexity indices.

The analysis of the study includes the effect of the technological complexity index on infant mortality rates, which are a health indicator. Data on the per capita income variable was also added to the study, which

is based on the sustainable impact of the health economy on growth. These variables were analyzed with the Toda Yamamoto causality test. Among the CIVETS countries discussed in the study, Turkey is in the best position in terms of technological complexity index, infant mortality rates and per capita income. Colombia comes behind Turkey. However, the remaining countries need to adopt policies that increase their per capita income and support their technological development. It is suggested that these countries with high infant mortality rates should open health institutions that protect the health of mothers and babies, support mothers to increase their education levels, provide educational seminars to parents, protect environmental health, improve water and sewage structures, and ensure income justice in the country. CIVETS countries other than Türkiye and Colombia need to implement practices that support these policies. While doing these, technological innovations are used greatly. The analysis revealed that the technological complexity index affects infant mortality rates and national income per capita. The analysis result in the research supports the theoretically expected result.

REFERENCES

Cestepe, H. & Caglar, O. (2017). The relationship between product sophistication and economic growth: Panel data analysis. *International Journal of Management Economics and Business*, 13(13), 992-1000. https://dergipark.org.tr/tr/pub/ijmeb/issue/54601/744540

Doyar, B. V., & Yaman, H. (2020). Analysis of the interrelationships between economic complexity index, income and high technology exports: The case of Turkey. *Pearson Journal*, *5*(8), 41–52. doi: https://doi.org/10.46872/pj.141

Ergun Tatar, H. (2023). The impact of economic complexity on life expectancy: The example of Turkey. *Trakya University Faculty of Economics and Administrative Sciences E-Journal*, 12(1), 118-132. doi: https://doi.org/10.47934/tife.12.01.06

Hidalgo, C. A. (2009). The Dynamics of Economic Complexity and the Product Space over a 42 Year Period. *Center for International Development at Harvard University* (CID Working Paper, No: 189).

Jaber, Y., Kabourı, I., Bouzahzah, M., Ibourk, A. & Karım, M. (2022). Economic growth and education in Morocco: Cointegration and toda yamamoto granger causality. *International Journal Of Accounting, Finance, Auditing, Management And Economics*, *3*(4-1), 1-20. doi: https://doi.org/10.5281/zenodo.6611974

Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. Cambridge: IZA.

Riyath, M. I. M. (2018). Toda and yamamoto causality test between us & exchange rates and stock market prices in Sri Lanka. *South Asian Journal of Social Studies and Economics*, 2(3), 1-9. doi: http://dx.doi.org/10.9734/SAJSSE/2018/45304

Soyyigit, S. (2018). The relationship between the level of economic complexity and GDP per capita in OECD constituent countries: Panel cointegration analysis. *Journal of Selçuk University Vocational School of Social Sciences*, 21(2), 374-392. doi: https://doi.org/10.29249/selcuksbmyd.452901

Soyyigit, S., Topuz, H., & Ozekicioglu, H. (2019). The impact of economic complexity, exports and fixed capital investments on per capita income: The example of G-20 countries. *Mehmet Akif Ersoy University Faculty of Economics and Administrative Sciences Journal*, 6(2), 393-407. doi: https://doi.org/10.30798/makuiibf.518334

Stojkoski, V. & Kocarev, L. (2017). The relationship between growth and economic complexity: evidence from Southeastern and Central Europe. *Munich Personal RePEc Archive*, Paper No. 77837.

Stojkoski, V., Koch, P & Hidalgo, C.A. (2023) Multidimensional economic complexity and inclusive green growth. *Communications Earth & Envıronment* 4, 130.

Swamy, P. A. V. B. (1970). Efficient ınference in a random coefficient regresion model. *Econometrica*, 38(2), 311. doi: https://doi.org/10.2307/1913012

The Observatory of Economic Complexity, https://oec.world/en/rankings/eci/hs6/hs96, (Erişim Tarihi: 10.12.2023).

Toda, H.Y. & Yamamoto, T. (1995) Statistical ınference in vector autoregressions with possibly ıntegrated processes. *Journal of Econometrics*, 66, 225-250. doi: http://dx.doi.org/10.1016/0304-4076(94)01616-8

Ucar, M., Soyyigit, S., & Nisancı, M. (2019). The relationship between countries' economic development and economic complexity levels: The example of G8 countries. *Cumhuriyet University Journal of Economics and Administrative Sciences*. 20(1), 138-148. http://esjournal.cumhuriyet.edu.tr/tr/pub/issue/45599/524670

Yerdelen Tatoglu, F. (2018). *Panel Time Series Analysis Stata Applied* (2.ed.), Istanbul: Beta Publications.

Yıldız, G., & Yıldız, B. (2019). The relationship between economic complexity and economic growth: panel bootstrap granger causality analysis. *International Journal of Management Economics and Business.* 15(2), 329-340. doi: https://doi.org/10.17130/ijmeb.2019252097

Zhu, S., & Li, R. (2016). Economic complexity, human capital and economic growth: Empirical research based on cross-country panel data. *Applied Economics*. 49(38), 3815-3828. doi: 10.1080/00036846.2016.1270413

CHAPTER 2

EXTERNALITIES IN REGIONAL ECONOMY[1]

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Esra Sena TÜRKO[3]

1 This study was derived from the doctoral dissertation of the corresponding author. Güneş, Hasan (2022). Bölgesel Ekonomide Dışsallıklar ve Uluslararasılaşma Kararı: Antalya İlinde Medikal Turizm Üzerine Bir Araştırma [Externalities in The Regional Economy and The Decision on Internationalization: A Research on Medical Tourism in Antalya Province]. (Unpublished doctoral dissertation). Erzurum Technical University Graduate School of Social Sciences, Dept. Of Economics. (Advisor, Assoc. Prof. Dr. Esra Sena Türko)

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1. Introduction

Externalities are defined as the entirety of benefits and costs not that are paid by the benefiter or cannot be imposed on them. From this perspective, externalities can be defined as the benefits provided by or costs borne by one economic decision unit as a result of the activities of another economic decision unit. When considered from a general perspective, changes in the benefit or cost functions of one economic unit resulting from the production or consumption activities of another unit are defined as externalities. Moreover, individuals or firms do not bear any costs for the benefits they acquire due to another unit. Similarly, individuals or firms are not compensated for the costs imposed by externalities. Both of these situations can be considered as externalities (Stiglitz, 2000: 80).

In externalities, other firms can benefit from the innovations, knowledge, and discoveries created by a firm without bearing any costs. The externalities occurring in this way as beneficial are referred to as positive externalities. These spillovers lead to the clustering of industries in certain areas and the concentration of employment in these areas. External economies have significant effects on efficiency and growth. External economies enhance development through effects such as the dissemination of knowledge, the provision of qualified and skilled labor, and the creation and application of new production techniques (Yücer, 2008: 49).

The positive or negative effects on the activities of another economic unit as a result of the activities of one economic unit are at the core of the concept of externality. The main detail here is the absence of pricing of the benefit or cost interactions between economic units within the market mechanism. There is no externality if these interactions between economic units are priced (Berk, 2006: 25).

According to the generally accepted view in the economics literature, the concept of externality was first introduced by Knut Wicksell, and then, the first theory was developed by Alfred Marshall. Marshall examined the development in industrialized countries and explained the external economies by making use of internal economies (Sönmez, 1987: 123). Therefore, Marshall used the concept of external economy to explain the increases in yields resulting from small firms coming together to form a large industry (Kargı and Yüksel, 2010:184).

Defined by Marshall by making use of the external economies, the concept of externality was considered positive externalities discussed within the scope of scale economies. Then, Arthur Cecil Pigou examined externalities within the framework of welfare economics, also including the negative externalities. Pigou discussed imperfect competition markets in his examination of externalities. He emphasized the necessity for government intervention

in cases of externalities in a market. Pigou considered externalities within the context of market failure and focused on the duties of the public sector (Sönmez, 1987: 124).

2. External Economies

Scale economies refer to increases in production higher than the increase in costs as a result of the expansion of production capacity in a firm or industry in proportion to the scale. Long-term average costs exhibit a decreasing trend due to scale economies. (Seyidoğlu, 1999: 454.)

The factors leading to the emergence of scale economies are grouped into two categories: internal and external economies. These two effects can lead to either a decrease or an increase in costs. However, the term "scale economies" is generally used to describe positive scale economies that have a cost-reducing effect. In addition, positive scale economies are sometimes referred to as mass-production economies. (Seyidoğlu, 1999: 454.)

Internal scale economies, one of the factors contributing to the emergence of scale economies, refer to the scale economies that arise as a result of an expansion in a firm's production volume, independently of the production scales of other firms in the industry. Factors such as workers' specialization in their jobs, increased efficiency in management, increased productivity, and increased capitalization are examples of internal scale economies. (Seyidoğlu, 1999: 454.)

External scale economies refer to the scale economies that occur as a result of the expansion of production volume in the industry, leading to a decrease in costs for all firms in the industry. These positive effects that reduce costs for firms arise due to the growth of the industry beyond the control of firms. Some examples of external scale economies include cost reductions thanks to technological developments or decreases in input prices resulting from increased demand in the industry. The decrease in input prices resulting from the expansion of the industry causes the cost curves of individual firms in the industry to shift downward. (Seyidoğlu, 2006: 228.)

Scale economies can be classified into two groups: static external economies and dynamic external economies, based on the effects they create. In this context, static external economies occur at higher efficiency levels, while dynamic external economies denote higher rates of efficiency increase. It is important to distinguish between static and dynamic external economies, which are predominant in agglomeration economies. (Junius, 1997: 81).

Effects of External Economies on the Costs

A decrease in firms' costs is observed in the case of positive external economies, while an increase in firms' costs occurs in the case of negative

external economies. If external economies emerge as a result of the development and growth of an industry in a region, then there will be a decrease in average costs and consequently long-term average costs for firms. (Türko, 2017: 51).

In practice, industries with constant and decreasing long-term costs are common. In addition, it is acknowledged that there might be conditions of decreasing costs in the long run in some manufacturing industry sectors. The fact that industries have decreasing costs indicates that the long-run curve has a negative slope. The market prices decrease with the increase in production in the long run. The decreasing costs of industries imply an increase in efficiency for all firms along with an increase in production. (Seyidoğlu, 2006: 228).

Growth and development in industries can also lead to increased efficiency in complementary industries. The effects of developments in the automotive industry in the early 19th century can be shown as an example. The expansion in the automotive industry during this period led to the expansion of some other industries as well. As a result, technological innovations and advancements were achieved with the growth of complementary industries to the automotive industry. This resulted in a decrease in long-term average costs for industries supplying intermediate goods to the automotive industry. This outcome was a result of the decrease in prices in the automotive industry. (Seyidoğlu, 2006: 228).

When a firm has a large number of inputs for a product it produces, if the firm attempts to produce all the parts and semi-finished products required for production itself, then it will face significant financial problems and production costs will be very high. The automotive industry, where there are thousands of inputs, can be cited as an example of this situation. External economies achieved in this way lead to internal economies created by subsidiary industry firms producing semi-finished products. (Dinler, 2008: 50-51).

The effects arising from connections between firms are examined within the scope of external economies. The existence of external economies is one of the significant factors that trigger development in large industrial cities (Sullivan, 2003). Moreover, external economies denote the benefits that firms derive from market-driven developments and the places they operate. (Cabellero and Lyons, 1990: 806).

Externalities represent a significant source of agglomeration. One of the factors playing an important role in bringing economic actors together is the existence of external economies. There are many different reasons why firms producing the same goods and services are located in close proximity to each other. Some of these reasons include the presence of intermediary institutions, the existence of a pool of qualified personnel, ease of access to technical facilities, ease of access to new information, and the ability to benefit from common infrastructure services. Agglomeration economies formed in

this way are generally referred to as external economies. These effects occur as a result of the increase in total output in industries in a region. However, another important point is that the formation of external economies occurs beyond the control of individual firms. (Fujita, 1989: 271)

External economies, defined as the benefits obtained by firms as a result of the decrease in costs due to the increase in production resulting from the effect of external economies, are generally divided into localization economies and urbanization economies. Divided into two within the scope of urban economy literature, these economies are classified by following the classification by Isard. (Nakamura, 1985: 108).

Classifying with a Marshallian approach, Ohlin stated that agglomeration economies could vary according to settlements. Bertil Ohlin (1933: 203) classifies agglomeration economies as follows;

- Scale economies,
- Localization economies,
- Urbanization economies.

In Ohlin's classification, scale economies represent the savings achieved as a result of growth. Localization and urbanization economies are determined externally for firms. They emerge as benefits provided by other firms' activities for other firms (Scitovsky, 1954).

Firms prefer to be located in certain regions to benefit from external economies resulting from the activities of the government or other firms. These regions are generally characterized by the completed infrastructure and superstructure and the presence of economic activity (Dinler, 2008: 49).

Considering the location choices for firms, external economies indicate why firms need to be located in certain regions. Especially in less developed countries, some firms start operating in certain regions as a result of infrastructure investments made by the government. Therefore, newly established firms also establish their operations in the same regions to benefit from the external economies in these regions (Dinler, 2008: 49).

External economies that influence the choice of location for firms can be classified into two main groups. The first group consists of external economies resulting from the activities of other firms. The second group, however, consists of external economies originating from the activities of the government sector. External economies resulting directly from the activities of the state or institutions representing the state represent the second group of external economies. External economies resulting from the activities of other firms represent the advantages provided by the increase in the number of firms in an industry (Dinler, 2008: 50).

Advantages leading to cost reductions for firms operating in an industry in a certain region originate from the growth and development of that industry. Some of these advantages include obtaining qualified personnel, ease of finding capital, and marketing-related advantages. As a result, new firms starting operations will continue to prefer regions where the industry is developed (Dinler, 2008: 50).

When infrastructure investments that are impossible for one or a group of firms to make are made by the government or government-related institutions, the economies resulting from firms benefiting from these facilities at no cost or very low cost as a result of public activities represent external economies caused by state's economic activities. Government investments causing public external economies represent infrastructure facilities with indivisible characteristics. These include investments such as electricity, water, social housing, etc. (Dinler, 2008: 53-56).

2.1. Historical Development of The Concept of Externality

The concept of externality in economic theory was initially developed by economist Alfred Marshall. Therefore, economic theory related to externalities is based on the studies carried out by Marshall. In his studies aiming to explain the development in industrialized countries, Marshall examined the factors influencing the production costs of a firm in an industry. To explain the increases in firm returns, Marshall considered both internal and external economies. As stated by Marshall, the effects of internal economies within firms are weaker when compared to external economies resulting from advancements within the industry. Marshall categorized external economies as benefits obtained by firms as a result of developments in the industry. He examined whether these benefits disrupt the competitive conditions among firms. (Manisalı, 1971: 5).

T. Scitovsky (1969) addressed externalities in two main groups. T. Scitovsky classified externalities based on whether they occur outside or inside the market mechanism. As stated by Scitovsky, externalities occurring outside the market mechanism are termed "Technological externalities," while those occurring within the market mechanism are termed "Monetary externalities." Technological externalities refer to the effects of non-market interactions on the utility or production functions of economic entities. Monetary externalities, on the other hand, refer to the benefits arising through prices. (Brakman, et al., 2001: 28).

A. C. Pigou (1960) was the first to establish the relationship between external economies and welfare economics. Pigou advocated for government intervention in the case of imperfect competitive market structures. As mentioned earlier, Pigou categorized externalities as positive and negative externalities. Pigou argued that the difference between the marginal private

product and the marginal social product is the source of externality.

J. E. Meade (1962) examined externalities as a characteristic of the production function. Meade emphasized that externalities arise when the product of a firm depends not only on the inputs used by the firm but also on the inputs and products of other firms.

R. Coase (1960) addressed externalities within the framework of natural resources and property rights. Coase characterized the absence of ownership of natural resources as the basis of externalities. As stated by Coase, no price is paid for the use of natural resources. In this case, externalities cannot be considered if the natural resources are transferred (Katz and Rosen, 1998: 602). Coase was the first researcher to address externalities within the framework of property rights. He argued that besides government intervention, agreements could also be a solution to externalities.

J. M. Buchanan and W. C. Stubblebine (1962) developed Coase's approach to externalities. They also emphasized that externalities could be compatible with "Pareto Optimality." In their study, the authors aimed to prove that government intervention is not necessary to achieve optimality in the market. (Yücer, 2008: 51).

2.2. Externality Types

Externalities are classified in various ways. It would not be accurate to claim that any of these classifications have gained general acceptance. Externalities can be named differently based on their sources, the nature of the benefits they provide, and the characteristics of the beneficiaries. After conducting a literature review in our study, it is planned to classify them as Static Externalities, Dynamic Externalities, Positive-Negative Externalities, Production-Consumption Externalities, Marginal-Inframarginal Externalities, Technological-Monetary Externalities, Marshallian Externalities, and Knowledge Externalities.

2.2.1. Static External Economies

The situation where the elasticity value of unit costs of a firm is less than one relative to industry production indicates the presence of static external economies. The unit costs of a firm decrease as a result of increases in the production of other firms. The increase in production due to external effects can occur at the industry or regional level. In the case of externalities originating from the industry in which the firm operates, then there are "localization externalities" (LocEOS). The unit costs of firms decrease with the increase in the production of all firms in the industry. Localization offers some advantages, such as the formation of a labor market pool, the sharing of assets, and the existence of specialized input suppliers. When the source of externalities is the region or city where the firm is located, then they are

called "urbanization externalities" (UrbEOS). In this case, there is a decrease in unit production costs for all firms in the region. Examples of urbanization externalities include cost-reducing effects related to transportation and marketing due to proximity to consumers. (Junius, 1997: 65).

2.2.2. Dynamic External Economies

Dynamic external economies refer to externalities that accelerate together with the growth rate of the industry. These externalities occur when geographic concentration leads to the diffusion of knowledge and technology among firms. Distinctions are made to highlight the differences in the nature of externalities. Glaeser et al. (1992) named dynamic externalities differently in their studies. They referred to them as Marshall-Arrow-Romer (MAREOS) externalities if they have an intra-industrial nature and as Jacobs (JaEOS) externalities if they have an inter-industrial nature (Junius, 1997: 65).

2.2.3. Positive and Negative Externalities

The classification of positive-negative externalities originates from When the results of externalities that occur as a result of the activities of economic units are examined, emerges. Externalities that occur when there is an increase in the costs of another economic unit as a result of the activities of an economic unit are defined as negative externalities. However, externalities, which occur when these activities benefit another economic unit and the benefiting economic unit does not have to pay a cost for it, are called positive externalities (Pettinger, 2019).

In cases where positive externalities arise from the activities of economic units, the social benefit function resulting from them is higher than the private benefit function. In other words, marginal social benefit is higher than marginal private benefit. When positive externalities exist, the market price is lower than the optimum price level for producers, while it is above the optimum price for consumers (Güneş, 2003: 121). The reason for the occurrence of externalities is that no payment is made for the benefit that arises. In the case of negative externalities, however, the marginal private cost is less than the marginal social cost. An example traditionally given for the negative externalities that occur as a result of the activities of economic units is environmental pollution. The damages to the environment caused by the production activities of businesses are considered negative externalities. Businesses do not classify these damages as costs and do not pay for them. Therefore, the price of the goods and services produced is lower than the optimum price for the producer (Kargı and Yüksel, 2010: 187). The most basic classification for externalities is positive-negative externalities.

The term "negative externalities" is generally defined over the environment. Therefore, it can be defined as the effects of the activities of

an economic unit on the environment that cannot be regulated. Negative externalities refer to the detrimental effects on the environment, whereas positive externalities refer to the beneficial ones (Mankiw, 2012: 196). While negative externalities are related to cost imposition, positive externalities are related to benefit provision (Parkin, 2010: 374). In this case, the side effects of economic behavior determine the type of externalities. If these side effects are beneficial, then there is the positive externality, whereas harmful effects are named as the negative externality (Beckett-Camarata, 2005: 135). In this context, externalities can be either beneficial to other units or harmful to them (Perloff, 2012: 606).

In general, negative externalities are focused when discussing the externalities. However, externalities can also be positive (Rosen, 2005: 103). Positive externalities occur when economic actors' production or consumption activities positively affect other actors (Savaşan, 2016: 277). In this case, the occurrence of positive externalities means the existence of societal benefit along with private benefit (Kirmanolu, 2014: 159).

The most general classification of externalities, positive and negative externalities, is decisive for other classifications (Güneş, 2000: 25). Within this classification, the most prominent example of positive externalities is seen in educational services. Externalities arising from educational services can be summarized as an increase in productivity, political stability, sociocultural progress, increased desire for development, and a decrease in crime tendency (Şener, 1998: 70-71). In addition to these, personal care, personal hygiene, health services, vaccinations to prevent infectious diseases, and inventions can be considered within positive externalities (Ekelund and Tollison, 1991: 508). Negative externalities refer to other economic units suffering as a result of the activities of economic units. However, the inability of the economic units involved in the activity to pay for the damages they cause constitutes negative externalities (Koutsoyianis, 1987: 594). In negative externalities, the costs resulting from the activities of economic units are generally borne by society.

2.2.4. Production and Consumption Externalities

The common framework used to define externalities is when economic actors engage in activities that result in other actors benefiting or being harmed. Economic activities conducted for economic purposes may positively or negatively affect other economic actors. This situation gives rise to the concept of externalities. When considering the utility function of an economic actor, the economic activity of another actor, along with the goods and services used to derive utility, also affects the welfare of that actor (Edizdoğan, 1993: 26).

When classifying externalities within economic activities, it is possible to classify them as production and consumption externalities. Production

externalities occur when the production activities of one economic actor become an independent variable in the production function of another producer or in the consumption function of other actors (Bakırtaş, 2015: 3-5,8).

An example of production externalities is the coexistence of apple orchards and beekeeping activities in the same region. The economic activities of both factors affect each other. Similarly, an increase in the production capacity of an automobile manufacturer can lead to an increase in steel production. As a result, the increase in steel production will increase its supply and lead to a decrease in steel prices. Other automobile manufacturers will be able to obtain steel at lower prices. This will result in a decrease in production costs, leading to production externalities (Baumol, 1965: 369).

The effects resulting from the consumption activities of one economic actor being treated as an independent variable in the consumption function of another economic actor are referred to as consumption externalities (Edizdoğan, 1993: 26).

In consumption externalities, there are externalities that occur from consumers to producers or from consumers to consumers. An example of consumption externality is when flowers grown in someone's garden without any commercial purpose benefit another person engaged in commercial honey production. This falls within the scope of consumption externalities from consumers to producers (Özakman, 1995: 55-57).

2.2.5. Marginal and Inframarginal Externalities

Every additional change resulting from an economic actor's engagement in economic activity is called marginal externalities when there are changes in the benefit or cost functions of other economic actors. Within these externalities, changes occur in the benefits or costs of other economic actors. However, there may also be instances where there is no change in the benefit or cost functions of other actors as a result of additional consumption or production activities taking place within the same scope. Additionally, the change occurring in the functions of other actors may be negligible. In these two cases, the externalities that occur are referred to as inframarginal externalities (Güneş, 2000: 31).

Marginal externalities arising from externalities can be categorized as one-way and two-way marginal externalities (Özakman, 1995: 55-57; Güneş, 2000: 31-33):

- One-way marginal benefit is described as the situation where there is a benefit or cost to other actors as a result of an economic actor's activities, but the affected actor's activities do not affect the actor undertaking the activity.

- The situation where both parties have benefits or costs on each other is referred to as two-way marginal benefit.

2.2.6. Technological and Monetary Externalities

Monetary externalities are determined based on whether benefits or costs occur under market mechanism conditions. Monetary externalities were introduced by Jacob Viner. Monetary externalities can be explained as one economic activity influencing other actors through the market mechanism. Changes occurring within firms or industries can affect other firms or industries through the market mechanism. As a result, affected firms may obtain benefits or incur costs. Monetary externalities have significant effects in forming connections between industries. The situation where price changes increase external effects through the market mechanism defines monetary externalities. In addition, scale economies determine the nature of monetary externalities (Kargı and Yüksel, 2010: 189).

Monetary and Technological externalities are types of externalities that indicate whether they are related to the market mechanism. When one economic activity affects other actors through the market mechanism, it is referred to as Monetary Externalities. The reason for calling benefits or costs arising through the market mechanism Monetary Externalities is that they result from changes in supply and demand conditions in the market. The actors in this situation are firms and markets. Interactions in the markets lead to transitions in firms or markets, affecting them. As a result, various benefits or costs arise (Manisalı, 1971: 8).

Scitovsky (1971) argued in his study that scale economies are the determining factor in identifying the nature of externalities. Scitovsky defined a change in yield as an increase or decrease in the price of a good due to an increase in the quantity purchased. Consequently, other consumers who want to purchase the same goods can be positively or negatively affected by this situation. Externalities occurring within this scope are called Monetary Externalities (Scitovsky, 1971: 282-284).

As a result of Technological externalities, changes occur in the benefit or cost functions of economic actors, leading to a real benefit effect (Güneş, 2000: 34).

Technological externalities can be examined in two groups: changes in utility and costs in consumer functions independent of the market and benefits and costs that occur independently of time and in a dynamic structure. In addition, Meade (1952) classified technological externalities as unpaid production factors and the creation of a relevant atmosphere (Meade, 1952: 54-67).

The main distinguishing factor between the two classifications Meade (1952) made regarding technological externalities is as follows:

- The classification of unpaid production factors signifies the absence of constant returns to scale not only within a single industry but also across the entire society.
- On the other hand, in the classification of atmosphere creation, the absence of constant returns to scale is not only present within a single industry but also across the entire society.

2.2.6. Marshallian Externalities

Marshall argues that economic activities are not evenly distributed in spatial terms due to externalities. Benefits such as the provision of skilled labor, the spread of technical innovation and knowledge, and the growth of the market, which are created by external economies, accrue to the entire industry. One of the benefits provided by external economies is the reduction of firms' costs following technological developments. Regardless of whether firms are in the same industry or different industries, they have the opportunity to benefit from externalities in new product development, design, manufacturing, marketing, and promotion (Hart, 2009, as cited in Türko, 2017: 59).

In Marshallian external economies, the transfer and sharing of information play a crucial role. Information transfer occurs easily through interactions between people. When firms are geographically close to each other, information transfer is more extensive. According to Marshall, people's ideas materialize knowledge. Collaboration resulting from the competitive environment in the region naturally ensures the continuity of the whole. In addition, in his work "Principles of Economics," Marshall mentions that the social environment collaborates with economic environments (Hart, 2009, as cited in Türko, 2017: 59).

According to Marshallian external economies, each small firm in an industrial region benefits from external economies as they are interconnected with the environment. Firstly, firms benefit from access to specialized labor. The need for skilled labor in industrial regions increases, leading to the migration of the workforce to these regions. Moreover, local firms facilitate access to expensive and specialized equipment. Besides these external economies, due to regional proximity, external economies arise from decreases in logistics and communication costs (Hart, 2009, as cited in Türko, 2017: 59).

Understanding agglomeration economies, according to Marshall, requires recognizing the importance of external economies. In Marshall-type economies, resembling a snowball effect, agglomeration represents a

mechanism where a larger number of economic actors are involved in the process due to specialization and diversity (Combes et al., 2008; 42).

Becattini expressed external economies arising from regional effects and local concentration in terms of organizational economies, education economies, information and learning economies, concentration economies, education economies, and transaction economies. Organizational economies promote the division of labor in activities such as raw material supply, transportation, and marketing. Firms benefit from common compatibility for differentiated products. Economies arising from network activities are referred to as information and learning economies. Network activities imply cost reductions due to minor technological innovations. Moreover, stylistic innovations resulting from differentiation also signify low costs. Economies occurring in the market for intermediate inputs such as raw materials, semi-finished goods, and energy are named concentration economies. Organizations for training the workforce and fostering entrepreneurship represent education economies. Specialization and accumulation of human capital, along with the division of production into periods, also represent education economies. Economies arising from firms benefiting from banking credits and other facilities at low costs are referred to as transaction economies (Becattini, 2004, as cited in Türko, 2017: 65).

2.2.7. Knowledge Externalities

The speed of spreading ideas and knowledge is higher in regions where communication is prevalent. The density of communication is dependent on the geographical location of firms or economic units. Consequently, significant externalities occur as a result of firms being located close to major cities. As one moves away from urban centers, there is a decrease in the rate of externalities. The low levels of both communication and interaction opportunities in rural areas act as barriers to the formation of externalities. R. Lucas (1989) highlighted the difference between externalities in urban centers and rural areas. Lucas emphasized that urban centers serve as natural laboratories for analyzing the structures of externalities and their effects (Henderson et al., 1995: 1067-1090).

The formation of knowledge as a result of firm and industry activities occurs in two ways (Branstetter, 1998: 521-522):

- New knowledge emerges when firms develop a new product or improve an existing one. In this case, other firms can enter the market by imitating this product. These firms will engage in production activities using the new knowledge they obtain without paying a price for it.

- The technological knowledge used by the innovative firm to create a new product becomes a dynamic part of the knowledge pool available to

other firms. Other firms complete their new ventures by benefiting from this knowledge. Thus, these knowledge externalities enable industry growth and change.

Knowledge externalities are classified as dynamic externalities (Kıymalıoğlu and Ağaoğlu, 2006: 198). In this context, knowledge externalities can also be expressed as technological externalities. Innovations created by firms and industries benefit other firms or industries without being integrated into the market mechanism through the dissemination of knowledge. Consequently, they contribute to the formation of externalities and increase efficiency (Lucio et al., 2001: 243).

Firms are typically interconnected through network connections, leading to the diffusion of knowledge. Over time, interactions and a climate of trust develop, and as a result, the interactions between firms are reflected as knowledge externalities (Henderson, 1997: 450).

One way to express knowledge externalities is through theories of knowledge diffusion. De Bont (1996) described knowledge diffusion as the involuntary leakage or deliberate exchange of knowledge resulting from innovations or technical developments. Nieuwenhuijsen and Van Stel defined knowledge diffusion as the utilization of knowledge generated by firms' research and development activities by other firms without any payment. Audretsch described knowledge diffusion resulting from agglomerations as the key to innovation (Lukach and Plasman, 2002: 2; Norman and Pepall, 2002: 2).

Knowledge externalities, which have significant effects on economic development, have been classified in various ways. In the literature, there are three main classifications of knowledge externalities: Marshall-Arrow-Romer, Jacobs, and Porter externalities. However, there are also classifications based on periods in the categorization of knowledge externalities. In this context, knowledge externalities are classified into static and dynamic knowledge externalities based on the periods in which they are effective (Türkcan, 2013: 5).

3. Conclusion

Externalities represent a significant source of agglomeration. One of the factors playing an important role in bringing economic actors together is the existence of external economies. There are many different reasons why firms producing the same goods and services are located in close proximity to each other. Some of these reasons include the presence of intermediary institutions, the existence of a pool of qualified personnel, ease of access to technical facilities, ease of access to new information, and the ability to benefit from common infrastructure services. Agglomeration economies formed in

this way are generally referred to as external economies. These effects occur as a result of the increase in total output in industries in a region. However, another important point is that the formation of external economies occurs beyond the control of individual firms.

REFERENCES

Bakırtaş, İ. (2015). Dışsallıklar Sorununun İçselleştirilmesinde Düzenleyici Vergiler Ve Sübvansiyonların Etkinliği: Analitik Bir Yaklaşım. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi. 7*, 1-19.

Baumol, W. J. (1965). *Economic Theory and Operations Analysis* (2th Edition). USA: Prentice Hall.

Beckett-Camarata, J. (2005). Voting and Representative. *Handbook of Public Sector Economics*. Taylor&Francis. 109-139.

Berk, S. (2006). Çevresel Dışsallıkların İçselleştirilmesinde Kullanılan Regülasyon ve Hukuki Sorumluluk Sistemlerinin Değerlendirilmesi. *Çimento Müstahsilleri İşveren Sendikası Yayınları. 20*(5), 25-35.

Brakman, S., Garretsen, H., & Van Marrewijk, C. (2001). *An introduction to geographical economics: Trade, location and growth.* Cambridge university press.

Branstetter, L. G. (1998). Looking for International Knowledge Spillovers a Review of the Literature with Suggestions for New Approaches. *The Economics and Econometrics of Innovation. 521.*

Caballero, R. J., & Lyons, R. K. (1990). Internal versus external economies in European industry. *European Economic Review, 34*(4), 805-826.

Combes, P.P, Mayer, T., & Thisse, J.F. (2008). *Economic Geography. In Economic Geography*. UK: Princeton University Press.

Dinler, Z. (2008). *Bölgesel İktisat* (8th edition). Bursa: Ekin Kitabevi Yayınları.

Edizdoğan, N. (1993). *Kamu Maliyesi* (3th edition). Bursa: Ekin Kitabevi.

Ekelund, R. B. & Tollisun D. R. (1991). M*icroeconomics*. London: Harper Collins Publishers Inc.

Fujita, M. (1989). *Urban economic theory*. Cambridge Books.

Güneş, İ. (2000). *Dışsallıklar, Kamunun Düzenleyici Rolü: Enerji Sektöründe Bir Uygulama* (Unpublished doctoral thesis). Çukurova Üniversitesi Sosyal Bilimler Enstitüsü.

Güneş, İ. (2003). Dışsallıklar Teorisi ve Ağ Dışsallıkları. *II. Ulusal Bilgi, Ekonomi ve Yönetim Kongresi,* 117-130.

Henderson, V., Kuncoro, A., & Turner, M. (1995). Industrial development in cities. *Journal of political economy, 103*(5), 1067-1090.

Henderson, V. (1997). Externalities and Industrial Development. *Journal of Urban Economics. 42*, 450.

Junius, K. (1997). Economies of Scala: A Survey of the Empirical Literature. *Kiel Working Paper (813).*

Kargı, V. & Yüksel, C. (2010). Çevresel dışsallıklarda kamu ekonomisi çözümleri.

Maliye Dergisi. 159, 183-202.

Kıymalıoğlu, Ü. & Ayoğlu, D. (2006). Türk İmalat Sanayinde Yığılma Ekonomileri. *Doğuş Üniversitesi Dergisi. 7*(2), 198-209.

Kirmanolu, H. (2014). *Kamu Ekonomisi Analizi*. İstanbul: Beta Yayınları.

Koutsoyıannıs, A. (1987). *Modern Mikro İktisat*. Ankara: Teori Yayınları.

De Lucio, J. J., Herce, J. A., & Goicolea, A. (2002). The effects of externalities on productivity growth in Spanish industry. *Regional Science and Urban Economics, 32*(2), 241-258.

Lukach, R. & Plasmans, J. (2002) Measuring Knowledge Spillovers Using Patent Citations: Evidence from the Belgian Firm's Data. *Cesifo Working Paper. 754* (2).

Manisalı, E. (1971). *Dışsal Ekonomiler ve İktisadi Gelişme*. İstanbul: İstanbul Üniveristesi Yayını.

Mankiw, N. G. (2012). *Principles of Economics* (6th Edition). South-Western Cengage Learning.

Meade, J. E. (1952). External economies and diseconomies in a competitive situation. *The economic journal, 62*(245), 54-67.

Nakamura, R. (1985). Agglomeration economies in urban manufacturing industries: a case of Japanese cities. *Journal of Urban economics, 17*(1), 108-124.

Norman, G., & Pepall, L. (2004). Knowledge spillovers, mergers and public policy in economic clusters. *Review of Industrial Organization, 25*, 155-174.

O'Sullivan, M. (2003). The political economy of comparative corporate governance. *Review of International Political Economy, 10*(1), 23-72.

Özakman, F. O. (1995*). Çevre Ekonomisinin Mikroekonomik Analizi* (Unpublished master's thesis). İstanbul Üniversitesi Sosyal Bilimler Enstitüsü.

Parkin, M. (2010). *Microeconomics* (10th Edition). Pearson.

Perloff, J. M. (2012). *Microeconomics* (6th Edition). Pearson.

Pettinger, (2019). *http://www.economicshelp.org/micro-economic-essays/marketfailure/positive-externality/*. 07.06.2022.

Rosen, H. S. (1991). *Public Finance* (3th Edition). United States: IRWIN.

Savaşan, F. (2016). *Kamu Ekonomisi*. Bursa: Dora Yayınevi.

Seyidoğlu, H. (1999). *Ekonomik Terimler Ansiklopedik Sözlük* (Second Edition). İstanbul: Güzem Can Yayınları.

Seyidoğlu, H. (2006). *İktisadın Temelleri*. İstanbul: Güzem Can Yayınları.

Scitovsky, T. (1954). Two concepts of external economies. *Journal of political Economy, 62*(2), 143-151.

Scitovsky, T. (1971). *Welfare and Compatition*, USA: Richard D. Irwin, Inc.

Sönmez, S. (1987). *Kamu Kesimi Teorisi: Kamu Harcamalarında Etkinlik Arayışı*. Ankara: Teori Yayınları.

Stiglitz, J. E. & Stiglitz, J. E. (2000). E*conomics of the public sector* (3rd Edition). New York: W. W. Norton & Company.

Şener, O. (1998). *Kamu Ekonomisi* (6th Edition). İstanbul: Alkım Yayınevi.

Türkcan, N. & Kumral, N. (2013). Yüksek Teknolojili Endüstrilerde Bilgi Dışsallıkları: İzmir Örneği. *http://www.iibf.ege.edu.tr/economics/tartisma, 5*.

Türko, E. S. (2017). *Endüstriyel Bölgelerde Dışsal Ekonomiler ve İşbirliği: Türkiye Ayakkabı Endüstrisinde Bir Uygulama* (First Edition). İstanbul: Kriter Yayınevi.

Yücer, S. (2008). *Türkiye'nin imalat sanayinde sektörel ve bölgesel kümelenmelerinde dışsallık etkileri* (Unpublished master's thesis). Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü.

CHAPTER 3

USE OF ARTIFICIAL INTELLIGENCE IN INTERNAL MARKETING FROM A THEORETICAL PERSPECTIVE

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INTRODUCTION

Artificial intelligence has started to take place in almost many areas of life in light of rapidly advancing technological developments. This technology is integrated into every field, from education to commerce, science to art, and attracts the attention of scientists as a new field of research. Today's businesses are also turning to technologies such as web tools and artificial intelligence to strengthen their internal marketing strategies and especially to increase productivity.

Artificial intelligence has started to play an important role in the field of intrinsic marketing and offers opportunities to increase employee performance and satisfaction. Artificial intelligence in internal marketing contributes to productivity and motivation by making communication between employees effective and personalized. With AI-supported tools, customized materials and content are prepared according to the preferences of employees, and the interaction between teams is accelerated with the communication tools to be created, enabling collaboration and information flow.

For example, Amazon decided to hire an AI to help people with the recruitment process. However, the company terminated the project when it realized that the AI was sexist against women. In 2016, a risk assessment software used to find out which criminals were most likely to re-offend was racially discriminatory against people of color. In fact, artificial intelligence projects used in issues such as recruitment, credit evaluation and parole decisions have prejudices and problems (Kılıç Kırılmaz & Ateş, 2021). AI-supported data analyses and predictive analyses for the future provide managers with better information on workforce planning and performance management. However, it is appropriate to use it when it is ethically well examined and any problems that may occur after many pilot applications are minimized.

This study addresses the use of AI in intrinsic marketing, i.e., how AI can be used in intrinsic marketing and how it can benefit companies and employees. The study will also address the ethical and legal issues related to the use of AI in intrinsic marketing.

INTERNAL MARKETING CONCEPT

The concept of internal marketing, which was first defined in the 1980s, started to make a name for itself with the growth of the service industry in general. Internal marketing is defined as a management philosophy that provides internal products that meet the needs and wants of employees as internal customers. The main point of internal marketing practices is that it should be recognized as a market that will pave the way for the ultimate success of the business. It is thought that success can be achieved by meeting

the needs of internal customers and suppliers (Sağlam, 2021).

Essentially, the importance of organizational change and development to the implementation of marketing strategies is through the internal market perspective. Internal marketing is a concept that views employees not as employees but as partners in the organizational success of the business. It is thought that the main component of internal marketing programs is training, that it is only possible for employees to understand the organizational culture, products and promotional activities through training, and that employees who have become a part of the organizational culture through training can satisfy customers. Because training creates a deeper and clearer understanding within the organization, it is a basic capability that can respond to the challenges of the competitive world. Accordingly, internal marketing is defined as directing employees to teamwork in line with the mission and objectives of the organization in order to meet the needs and expectations of internal and external customers and taking them into consideration as both suppliers and customers (İnal, Çiçek & Akın, 2008).

In addition, internal marketing is a type of internal communication and motivation strategy that a company carries out for its employees. This strategy conveys the company's goals, values and culture to employees and increases their loyalty to the company. In addition, internal marketing efforts aim to increase the performance and productivity of the organization by encouraging employee motivation and cooperation. Internal marketing strengthens communication within the company and uses various strategies to increase employee engagement, satisfaction and commitment. This, in turn, strengthens the company's external image and increases its competitive advantage (Sağlam, 2021).

Apart from definitions, when we examine internal marketing, it can be said that it can be a marketing understanding that will enable an organization to develop marketing strategies for its employees, to adopt, own and support the company's goals, vision and mission, values, services (Erginöz, 2019).

In line with the concept of internal marketing, businesses need to manage their internal and external customers in line with the goals of the organization in order to gain superiority over their competitors and increase their performance in a period of increasing competition. The success of the organization is affected by the attitudes and behaviors exhibited by the employees. In particular, the communication of the employees within the organization with the customers, meeting customer demands and needs in a timely and proper manner, determines the success of the organization. For this reason, external customers should not be ignored in internal marketing; in fact, the focus of the employees within the company is on external customers. However, the importance of external customers for internal marketing cannot

be ignored. External customers are people outside the company who buy the company's products or services, and internal marketing strategies do not directly address external customers (Sağlam, 2021).

However, internal marketing efforts have indirect effects on external customers. The satisfaction, commitment and motivation of employees within the company affect the quality of services and products they offer to external customers. If employees have adopted and understood the culture and values of the company, they provide a more positive and consistent experience to external customers, which in turn leads to a positive increase in productivity in the company (İnal, Çiçek & Akın, 2008).

CONCEPT OF ARTIFICIAL INTELLIGENCE

Artificial intelligence is the general name of the technology of developing machines that can exhibit human-like behaviors and movements, created entirely with artificial tools, without the benefit of any living organism. When approached idealistically, artificial intelligence products that can perform activities such as feeling, predicting behaviors, and making decisions that are completely human-like are generally called robots (Yıldırım & Özdemirci, 2019).

However, artificial intelligence is a field of technology designed to simulate human-like thinking, learning and problem-solving abilities of computer systems. Artificial intelligence is categorized as software that can perform tasks given in computer-based software and systems, make analyses in the light of certain data, develop solutions to complex problems in a short time and make decisions. The concept of artificial intelligence, which has been frequently encountered recently, is generally used in positive sciences and has started to show wide effects in the marketing sector with the influence of Web 2.0, Industry 4.0 and Industry 5.0 (Çakır, 2024).

In particular, the fact that social media has reached large masses and has come to a position to shape the lives of individuals leads to an increase in the amount of data on the internet and the need for real-time interaction. The fact that individuals share many of their personal experiences on social media platforms brings artificial intelligence to an important position in terms of intrinsic marketing. Employees' experiences on social media have become an important issue for companies to analyze. In light of these practices, companies are turning to artificial intelligence systems to increase the efficiency of their existing practices and to develop new alternative strategies and methods. In particular, companies have a healthier predictive perspective thanks to artificial intelligence in developing technology. For example, the recommendation system on sales platforms, offering additional products to individuals from similar products purchased by different users, and Siri-like applications that fulfill the command on phones have been the aspects that

inspire companies (Kurtboğan, 2023).

In light of this information, the term artificial intelligence and its history are examined as an important topic. Although the term artificial intelligence was first coined in 1956 at an academic conference on the subject, the issue of understanding whether machines can actually think began long before that. A study published in 1945 proposed a system to augment humans' own knowledge and understanding. 5 years later, a scientist named Alan Turing wrote a paper on the ability of machines to simulate humans and do intelligent things, such as playing chess.

Although artificial intelligence has a long history, its development has important milestones. These important milestones are as follows (Binbir, 2021);

- **Beginnings and Basic Concepts (1950s-1960s):** The concept of artificial intelligence was popularized by Alan Turing in the 1950s with the Turing Test. During this period, basic concepts such as logical computation, language processing and machine learning were established. John McCarthy used the term artificial intelligence for the first time in 1956 and organized a conference on artificial intelligence.

- **Symbolic Artificial Intelligence (1970s-1980s):** In this period, symbolic artificial intelligence models such as expert systems came to the fore. Computers tried to make human-like decisions by performing logical operations on symbols. However, the lack of a sufficient amount of data caused problems in this regard and made it difficult for studies to progress.

- **Machine Learning and New Approaches (1990s-2000s):** This period saw the development of new approaches such as machine learning and data mining. Computers created algorithms to recognize and learn patterns by processing large amounts of data. These algorithms paved the way for encryption systems and inspired cryptocurrency activities.

- **Deep Learning and Big Data (2010s-present):** Deep learning has emerged as an important sub-branch of artificial intelligence. Deep neural networks and multilayer neural networks have been used to solve complex problems by processing large data sets. Success has been achieved in many areas, such as image recognition, natural language processing, game strategies, and the possibility of biological encryption in devices.

The rapid advances in this period have enabled the application of artificial intelligence to many fields. Today, artificial intelligence is used in health, automotive, finance, education, security and many other fields and continues to develop rapidly. Artificial intelligence significantly affects human life by enabling the development of smarter and innovative systems (Yücel & Adiloğlu, 2019).

The Importance of Artificial Intelligence in Internal Marketing

Today, people generally see artificial intelligence as a part or concept of robots. However, the development of social media and the continuous and rapid realization of communication are changing the thoughts on artificial intelligence (Yıldırım & Özdemirci, 2019).

It is stated that in the medium term, artificial intelligence will affect not only simple tasks but also more complex and knowledge-intensive industries such as consulting, financial services, and law, causing changes in these areas. In internal marketing, artificial intelligence plays an important role in increasing employee satisfaction, encouraging cooperation, increasing productivity, establishing a faster practical communication network and strengthening the company culture (Sağlam, 2021). These roles are listed below;

- **Personalized Content and Communication:** This is the most important part of the use of AI in the intrinsic marketing process. Artificial intelligence has the ability to provide customized content and communication to employees; for example, customized e-mails or content can be sent to employees according to their preferences and needs. By creating content in line with employees' preferences, skills and needs, it is possible to attract their attention and increase their motivation. Increased motivation positively affects company loyalty and productivity (Kılıç Kırılmaz & Ateş, 2021).

- **Increased Productivity:** Artificial intelligence optimizes internal workflows and increases productivity. In an artificial intelligence application where an effective communication network can be established, employees can easily create a work schedule. Daily, weekly or monthly plans and tasks that need to be repeated are automated, enabling employees to use their time more efficiently and thus ensure that work is not interrupted. In this case, it is possible for employees to use their time on more strategic tasks and focus better on the process.

- **Training and Development:** Artificial intelligence is crucial in identifying employees' training needs and creating personalized training programs. Learning algorithms analyze the strengths and weaknesses of employees and make suggestions for their development. Personal training programs are organized in accordance with these analyses, and in this way, training plans suitable for the needs of each employee can be prepared (Akça, 2023).

- **Performance Evaluation:** Artificial intelligence supports performance evaluation processes. It monitors and analyzes employee performance, making performance evaluations more objective and data-driven. Thanks to data analytics and predictive analysis, it is easier to evaluate

employee performance and identify areas for improvement. It is possible to generate additional data on training and development to support another area of importance (Ballı, Uğur & Korukoğlu, 2009).

- **Employee Experience, Communication and Feedback:** AI-enabled systems increase communication between employees and strengthen feedback processes. This process improves the experience within the company by analyzing employee complaints or feedback. It also offers suggestions to provide a better work-life experience for employees. For example, instant feedback and communication tools enable more effective collaboration between teams. In addition, fast and systematic communication saves time (Efe, 2022).

- **Innovation and Change Management:** Artificial intelligence encourages innovation within the company and supports change management processes. By identifying innovative ideas, it contributes to the management and implementation of these ideas. It ensures that new strategies are created and contribute to and update the organizational culture (Efe, 2021).

- **Team Efficiency and Collaboration:** Artificial intelligence is used to increase collaboration and improve team efficiency. Artificial intelligence technologies are also used in areas such as project management, workflow optimization or interaction analysis between team members (Sağlam, 2021).

Relationship between Intrinsic Marketing and Artificial Intelligence

Artificial intelligence and data analytics provide individualized learning for organizations to develop talent, in particular machine learning technology, effective course recommendations and effective learning mapping. In this process, relevant data is researched and compiled by matching employees' social groups, interests, development goals and level positions. In another example, smart technologies in the form of machine learning are being put into action based on available data across industries, providing feedback and helping to predict workplace hazards. In light of developments in technology and software, the intrinsic marketing process is also affected by these developments, which can be positive or negative (Kurtboğan, 2023).

In this sense, the changes that may occur in the basic principles of the internal marketing process include the following elements;

- **Communication** Effective communication is the most important element of success in many other sectors as well as in internal marketing. It is very important to establish a regular communication network with employees about the company's strategies, short and long-term goals, achievements and problems. Clear, open and regular communication makes it easier for employees to understand the company's mission, vision and culture.

- **Training and Development:** Training and development, one of the most important elements of human resources management in the recruitment process, is also an effective principle in the internal marketing process. The ever-changing technology and the information age make employee training an important issue for companies. Providing opportunities to increase the skills and knowledge of employees through training programs, seminars, or distance learning can ensure the continuity of development (Karaman, 2009).

- **Leadership and Exemplary Behavior:** An important factor in intrinsic marketing is that leaders clearly define the company's goals, provide guidance to employees and behave in accordance with company values. Leaders must exhibit an attitude that inspires and supports employees and reflects the company culture. In this sense, a good leader increases employee motivation and has positive effects on job satisfaction.

- **Motivation and Rewarding:** In order to increase employee motivation, a fair reward system, employee recognition or motivational work programs increase employee job satisfaction and commitment.

- **Employee Engagement and Feedback:** Valuing employees' ideas, encouraging their participation and receiving feedback is an important part of the internal marketing process. In this sense, employees are encouraged to contribute to the development and improvement of the company. Including employees in the process through detailed, clear, and understandable feedback increases the success of the company.

- **Company Culture and Values:** Company culture ensures that employees adopt the values and culture of the company. Accordingly, the company's mission, vision and values are introduced to employees, and these values are reflected in every moment of the marketing process. In addition, values and company culture are at the forefront of the daily functioning of the business (Genç, 2016).

These components form the basis of intrinsic marketing and increase the commitment, motivation and cooperation of employees within the company. Each component is necessary to better engage employees in the company's goals and increase the company's success. Establishing a good connection between these components and creating a systematic structure contributes to a more positive and successful internal marketing process (Yücel & Adiloğlu, 2019).

ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS IN BUSINESS

Artificial intelligence applications are considered as versatile technological systems that offer many opportunities for companies. Businesses use artificial intelligence applications in many parts of the sector, and the areas of use

generally include the following;

- **Customer Service and Experience:** Artificial intelligence is being used to improve customer service. AI-powered tools such as voice assistants, chatbots and automated response systems are there to answer customer questions and provide support. This process enhances the customer experience and increases customer satisfaction. Retail businesses are leveraging the benefits of AI to understand, predict and analyze consumer behavior and make improved decisions. For example, L'Occitane, an international retailer of body, face, fragrance and home products, uses artificial intelligence applications to understand where mobile site users have problems and how they react (Gülşen, 2019).

- **Marketing and Sales:** Artificial intelligence is used to strengthen marketing strategies. Developing more effective marketing and sales strategies in areas such as personalized recommendation systems, segmentation, analyzing customer behavior, and advertising optimization depends on the presence of artificial intelligence support systems. Personalized recommendation systems analyze the actions of each customer individually and provide individual recommendations for both the customer and the employee to guide them toward their goals. Examples of this are shopping and video sites such as Netflix, Amazon, and YouTube, and the page and friend recommendation sections of social media platforms. By integrating these artificial intelligence applications into their systems, companies can speed up the analysis processes of their employees, reduce the workload and increase job satisfaction and motivation.

- **Data Analysis and Predictive Analytics:** Artificial intelligence analyzes data stacks that employees can analyze in a very long time in a shorter time and determines predictive data for businesses. They create a pattern or neural network from the data and make predictions. They directly affect companies' decision-making processes by indicating the effect of different choices on the results (Budak & Gümüştaş, 2022).

- **Human Resources and Recruitment:** Artificial intelligence is frequently used for human resources management. In CV scanning, candidate evaluation and recruitment processes, parameters suitable for the company's culture, mission, vision and values are entered into artificial intelligence-supported systems to make faster and more objective decisions. A fair and systematic recruitment process not only saves the company a lot of costs but also positively affects the employee's loyalty to the company due to the experience they have during the recruitment process.

- **Business Processes and Automation:** Artificial intelligence is used to optimize and automate business processes. For example, structures such as industrial robots are used in production processes to work more efficiently

and error-free (Gür, Aydın & Yücel, 2019).

- **Risk Management and Security:** Artificial intelligence is also popular in risk analysis and security. Artificial intelligence systems are effective in areas such as fraud detection, network security and prevention of dangerous behaviors. Especially recently, the use of visual codes, QR codes, and dual verification systems in the "Robot Musun?" application on many shopping platforms has had an important place in the process of ensuring the security of individuals (Efe, 2021).

- **Logistics and Supply Chain Management: The** use of artificial intelligence occupies an important place in logistics and supply chain, where it is important to ensure continuous follow-up of company employees and to deliver the products produced to the customer without damage and at the specified time. Artificial intelligence is used especially in logistics processes such as routing optimization, inventory management and demand forecasting. This enables a more effective supply chain management to be structured. Artificial intelligence facilitates the instant follow-up of employees in a systemized and automated logistics network and positively affects motivation (Aylak, Oral & Yazıcı, 2020).

Artificial Intelligence in Human Resources Management

Human resource management is a company unit that manages processes such as the recruitment, training, performance, development and termination of employees. Artificial intelligence can be used in various ways in the field of human resources management, and these areas of use make human resources processes more efficient, objective and effective (Kurtboğan, 2023). These processes are listed as follows;

- **Recruitment Processes:** Artificial intelligence allows the evaluation of big data in recruitment much faster and more efficiently than traditional methods. In the recruitment process, a large number of applications need to be evaluated in order to find the right candidate or not to miss a specially talented candidate. With artificial intelligence tools, certain filters are applied, and evaluations are made quickly. Especially in emergency situations where time is limited, utilizing artificial intelligence is a very effective method. In addition, artificial intelligence enables more candidates to be reached by providing real-time and personalized communication. Artificial intelligence is also used in resume screening, candidate evaluation, and interview processes in recruitment. Natural language processing algorithms are used for resume analysis, candidates' skills and experience are evaluated, and by analyzing interviews with candidates, decisions can be made based on objective data to identify the best candidates.

- **Training and Development:** Artificial intelligence is highly effective in determining the training needs of employees and creating personalized training programs. For example, by evaluating the skills of employees, it creates special training and development programs for them.

- **Employee Satisfaction and Experience:** Artificial intelligence is used to measure employee satisfaction and improve their experience. Surveys, feedback and social media analyses are used to collect data on the emotional state and satisfaction of employees and improvements are made using these data. Thanks to artificial intelligence applications, people can quickly access their questions about their work and organizations with up-to-date data, which contributes to increased employee loyalty and reduced workforce turnover (Kılıç Kırılmaz & Ateş, 2021).

- **Talent Management:** Artificial intelligence is used to evaluate the skills and performance of employees. In performance management processes, AI-supported analytical tools monitor employee performance, provide feedback and identify areas for improvement (Karaman, 2009).

- **Turnover and Loyalty Analysis:** Artificial intelligence is highly effective in predicting employee turnover and improving workforce planning. In this way, businesses can create strategies for talent retention (Gür, Aydın & Yücel, 2019).

Artificial intelligence is very important in human resource management in terms of making data-driven decisions, automating processes and enabling human resource professionals to focus on more strategic and valuable tasks. However, caution should be exercised on issues such as ethics, privacy and bias, as AI applications also bring some sensitive issues. Especially in the use of artificial intelligence, data theft and security threats can create major problems (Efe, 2021).

The Role of Artificial Intelligence in Education and Development Processes

In training and development processes, artificial intelligence plays an important role in developing employees' skills, improving their learning experiences and making training processes more effective. Especially when the cost of personnel training is taken as a basis, the use of artificial intelligence applications in this field is very economical for companies (Gülşen, 2019).

Artificial intelligence evaluates the effectiveness of the training process by analyzing learning data. Factors such as employees' progress in the training process, success rates and the impact of training materials are analyzed, and these analyses enable the improvement of training content and methodology. In addition, AI-supported simulations, virtual training environments and learning tools are used to support employees in developing their practical

skills. For example, in areas such as medicine or the automobile industry, simulations mimic real-life situations, and companies can save huge costs by using simulation programs to practice. It is important to encourage employees to continuously learn and acquire new knowledge so that the knowledge learned is transformed into practical application and continuous development (İşler & Kılıç, 2021).

Artificial Intelligence Applications in Business Processes

Artificial intelligence applications in business processes include elements such as various technological solutions used to increase efficiency, reduce errors, reduce costs and optimize workflows (Cesur & Armutçu, 2023). Artificial intelligence applications commonly used in business processes include the following;

- **Automation:** Artificial intelligence saves time by automating repetitive and routine tasks. For example, artificial intelligence and machine learning algorithms are used in areas such as document classification, data entry, report generation, university cafeteria systems, or student affairs procedures (Cesur & Armutçu, 2023).

- **Predictive Analytics:** Artificial intelligence makes future-oriented predictions by analyzing large data sets. Artificial intelligence used in areas such as predictive analysis, demand forecasting, inventory optimization or sales forecasts helps businesses in their strategic planning.

- **Customer Relationship Management:** Artificial intelligence is effective in customer relationship management processes. It analyzes customer demands, draws patterns from customer behavior and offers personalized recommendations (Akça, 2023).

- **Risk Management:** Artificial intelligence is used in areas such as financial market analysis, fraud detection and risk management to help identify and mitigate risks (Efe, 2021).

- **Manufacturing and Industrial Processes:** Industrial robots and smart machines are combined with artificial intelligence and used in production processes. Artificial intelligence has an important role in processes such as the optimization of production lines, quality control and maintenance planning (Yıldız Tonga & Tonga, 2022).

EXAMPLES OF USING ARTIFICIAL INTELLIGENCE IN INTERNAL MARKETING

Artificial intelligence is frequently preferred in the developing sector structure with its data processing speed and accurate predictions. Automation systems have started to be included in marketing processes with structures such as segmentation, targeting, personalization, analyzing customer experiences,

identifying the potential of prospective customers and recommendation engines. Within the developing structures, espepersonalized experiences of internal customers and existing potential external customers play an important role in the efficiency of businesses (Budak & Gümüştaş, 2022). In this context, the use of artificial intelligence in internal marketing processes is examined below with an example.

Artificial Intelligence in Personalization and Customer Experiences

Artificial intelligence, or more precisely, machine learning, is all about making predictions. It communicates with data by analyzing the information available to determine something unknown. This is why it is called predictive marketing or precision marketing. Making accurate predictions is important and greatly improves marketing efforts. Data collection is mainly done through cookies on the website and marketing automation platforms. Through this database, artificial intelligence analyzes, predicts and creates a customer profile (Kılıç Kırılmaz & Ateş, 2021).

Thanks to the hyper-fast analysis of artificial intelligence, personalized analyses are made about many customers and employees, and thanks to the data obtained, a communication structure independent of other customers and employees is defined for each customer and employee. In this way, each customer and employee can access only the information necessary for them without being bombarded with e-mails or SMS (Budak & Gümüştaş, 2022).

The artificial intelligence that forms the highly personalized infrastructure of these e-mail systems is NLP or Automatic Language Processing. This system allows the marketer to create and automatically route e-mails using personalized data analysis. Intelligent systems are involved not only in the creation of content but also in sending frequencies. In order to tailor the content of the e-mails to the consumer's behavior, the most appropriate moment to open the e-mail is selected by analyzing the opening times and open rates of each customer. With AI, A/B testing e-mails has become redundant because the intelligent system analyzes the customer's behavior to engage and convert leads. It then creates various versions to create appropriate content and runs tests on a sample to find the appropriate e-mail (Dayan & Yilmaz, 2022).

Artificial Intelligence Use Cases in the Recruitment Process

Digitalization leads to an uncertainty between machine potential and human potential. Artificial intelligence transforms recruitment into a more effective and beneficial structure and benefits the brand of the recruiting organization. Depending on the developments, artificial intelligence has become a necessity for recruitment interview processes in recent years, and at least 76% of recruiting companies have started to use artificial intelligence in this process (Akduman, 2019).

The fact that artificial intelligence evaluates big data much more quickly and in a quality and unbiased manner compared to the old methods pushes companies to receive artificial intelligence support in these processes. Artificial intelligence stands out as an effective method that can be used especially in periods of urgent personnel needs when time is limited (Kılıç Kırılmaz & Ateş, 2021).

AI also enables reaching more candidates by providing an effective network of simultaneous and individualized communication. According to Midas IT, an organization specializing in AI data analysis, identifying qualified candidates to be interviewed through AI interviews increases the accuracy of the analysis by up to 82%. This is a very high and good level, considering that the overall average validity of personality/aptitude tests is 30-40% and the validity of unstructured interviews is as low as 10% (Akduman, 2019).

In the t of these developments, artificial intelligence integrations in the processes of candidate information, candidate engagement, re-engagement, post-offer acceptance, training processes, career opportunities and development, and employee-organization relations have started to intertwine, and chatbots have become the most preferred artificial intelligence method. Chatbots, which are highly developed in voice recognition and understanding, as well as detecting changes in a person's tone of voice, have become an indispensable element of companies for personalized analysis in interviews. Siri and Cortana stand out among the applications developed in this field. Chatbots that can speak like humans are actively used in routine jobs that require face-to-face communication when their message programs are surrounded by accurate and effective data (Kurtboğan, 2023).

Assessment Systems, an assessment and evaluation company, argues that by asking the right questions through interviews with chatbots, the candidate is freed from concerns such as "The *human resources specialist does not know my job, asked me irrelevant questions, did not understand me.*" For example, a well-established company such as Unilever has included chatbots in the process of facilitating recruitment and monitoring employee-company relations by using artificial intelligence-based methods. Thanks to the artificial intelligence called 'Una,' 70000 hours were saved from the time spent on two million application requests for interviews, training and evaluation in one year. In addition to recruitment, artificial intelligence interface programs were used for employee communication, career development, corporate culture and motivation, and employees were included in all processes.

Another example is L'oréal, which has been interviewing applicants through its chatbot Mya since 2018. "*What are you currently studying, and how long until you graduate?* Do you have any *additional questions about*

the company culture, the details of the department you are applying for or the interview?" In the beginning, Mya introduces itself as a chatbot to the candidate, and at the last stage of the interviews, it allows the candidate to meet with the company's expert employees. In interviews with 10000 people, the use of Mya enabled more effective communication with 92% of the candidates, and 100% of the candidates stated that they were satisfied with the process.

Microsoft also uses artificial intelligence tools for job applications, employee training and performance evaluations. Voice recognition technologies, analysis of changing voice tones in conversations, evaluation of gestures and facial expressions, extracting and analyzing large data structures with relearning systems and transferring these reports to the necessary units within the company. However, the program has recently been suspended due to the problems of discrimination between men and women, especially in recruitment processes and artificial intelligence applications that make racist decisions. Although errors are encountered due to the fact that it is a newly integrated system in our country and globally, companies such as Turkcell, Hilton hotels, HireVue company, etc. carry out processes such as recruitment, training, performance evaluation with artificial intelligence (Akduman, 2019).

ADVANTAGES AND DISADVANTAGES OF USING ARTIFICIAL INTELLIGENCE IN INTERNAL MARKETING

Like many applications, the use of artificial intelligence has its advantages and disadvantages. Artificial intelligence and data analysis provide personalized learning for companies to improve their capabilities. AI support is especially important in technology learning and tracking, quality course recommendations and effective learning schema creation. The data obtained by matching the social life, social groups, interests, and development goals of employees with those of other employees is compiled and analyzed (Gülşen, 2019).

At the same time, artificial intelligence prevents workplace hazards as a result of the data obtained from accidents that happen to employees in the workplace. Artificial intelligence neural networks are also used to assess and predict employee motivation and job satisfaction. Artificial intelligence-based techniques utilizing algorithms help solve scheduling problems of employees in the workplace. AI applications in employee turnover forecasting, risk mitigation, identifying employee needs, workplace decision-making and developing technical expertise are well received by employees. AI increases managerial awareness of safety issues in workplaces characterized by various levels of problems (Akça, 2023).

Artificial intelligence is being integrated into more and more companies as its benefits are observed in developing technology (Gülşen, 2019). These positive aspects are listed as follows;

- **Productivity and Automation:** Artificial intelligence increases efficiency in business processes by automating repetitive tasks. This allows people to focus on more strategic and creative tasks.

- **Data Analysis and Predictive Analytics:** Artificial intelligence extracts meaningful information by quickly analyzing large data sets. Thanks to predictive analytics, it is highly effective in predicting future trends or possible scenarios.

- **Fast Decision-Making:** Analyzing large amounts of data instantly accelerates complex decision-making processes. This enables businesses to make faster and more information-oriented decisions.

- **Error Correction and Security:** Artificial intelligence can detect errors in business processes and prevent foreseeable errors. It is also effective in identifying and responding to threats in the field of cyber security (Onay, 2020).

- **Cost and Resource Savings:** By automating manual work in businesses, costs are reduced, and resources are used more effectively.

- **Personalization and Recommendation Systems:** Artificial intelligence offers personalized recommendations by understanding the preferences and behaviors of users or customers. These recommendations help improve user experience in areas such as e-commerce, media and education (Cesur & Armutçu, 2023).

Organizations that start to adopt and use artificial intelligence technologies gain advantages such as reduced costs, successful demand forecasts, improvements in products and processes, and other benefits and developments. In the *"State of Artificial Intelligence in Entrepreneurship"* research conducted between April and May 2022, 79% of the respondents to the survey of 2,620 executives from 13 countries stated that they fully implemented three or more types of artificial intelligence.

Although artificial intelligence provides many benefits for both companies and employees, it also has disadvantages. In some studies, it is seen that artificial intelligence has negative attitudes, especially in companies that carry out their business with traditional methods. Among the dangers that will be experienced with the use of smart technologies in the workplace, it is emphasized that the role of employees in the company's goods and services activities will decrease and they will become passive, and due to the decrease in the workload of the employees, it will cause loss of workforce and atrophy in the fields of problem solving and literacy. In addition, the negative attitude of managers and staff towards automation and artificial intelligence technologies and the loss of trust are among these threats (Akça, 2023).

Many employees in companies fear that AI will threaten their jobs and that they will be dismissed, and it is thought that the adoption of AI will lead to increased employee stress, damage to organizational loyalty and a decrease in personal productivity in creating new projects. No matter how positively companies view artificial intelligence, the negativities experienced in some areas cause companies to adhere to their traditions (Özevin, 2023). The use of artificial intelligence in companies generally includes the following disadvantages;

- **High Cost:** The development, implementation and maintenance of AI technologies are often costly. Especially for small and medium-sized enterprises, these costs play an inhibiting role in using artificial intelligence (Yücel & Adiloğlu, 2019).

- **Biases and Unjust Decisions:** Artificial intelligence systems learn biases arising from the way data is collected and used and, therefore, may be biased in their decisions. Since this situation causes injustice and discrimination, it is highly likely that the internal culture of the company will deteriorate and employees' job satisfaction will decrease.

- **Ethical Issues:** Many ethical issues arise with the use of artificial intelligence. Especially in decision-making processes, the lack of transparency of responsibilities and decisions taken by the algorithm is a situation that needs to be solved.

- **Insufficient Data and Unsolvable Problems:** Artificial intelligence systems make misleading or erroneous decisions if they are trained with insufficient or inaccurate data or produce incomprehensible results. This situation causes great financial loss for companies.

- **Data Privacy and Security Concerns:** Since artificial intelligence is based on large amounts of data, there are risks of protection, privacy and misuse of this data (Abanoz & Acar, 2023).

- **Reduced Human Employment:** Artificial intelligence and automation reduce the need for human labor in certain jobs or replace some tasks with humans. This leads to job loss in certain business areas.

- **Reliance on Technology:** Over-reliance on artificial intelligence systems causes people to lose their own abilities or instincts. At the same time, over-reliance on artificial intelligence reduces the control of company analyses and leads to atrophy of employees' skills (Akça, 2023).

ETHICS AND CREDIBILITY ISSUES

Ethics basically refers to the judgment on the correctness of an action. Many ethical structures and phenomena have been put forward from the past to the present. For example, while one scientist argues that the moral

correctness of an action will be determined by the targeted results, another scientist has argued that the moral correctness of the action will be determined according to standards and laws with the concept of rule ethics.

In light of the risks and benefits that may be encountered in the use of artificial intelligence in intrinsic marketing, there are discussions, especially in the field of ethics (Özevin, 2023). When the studies on ethics and trustworthiness, which are open to research, are examined, they are generally the subject of research and discussed under four headings;

- **Automation and Decision Making:** Automation systems and decision-making processes handled with artificial intelligence systems eliminate human aspects. Decisions made by an automated and emotion-free structure may be objective, but the question of whether they are ethically correct is a source of ethical problems. In this context, research has started to be conducted on international regulations for the legal processes and legal evaluation of artificial intelligence. It is recommended to develop applications that pay attention to ethical values in a structure that will not violate human rights and will not create prejudice.

- **Data Privacy and Security:** The security vulnerabilities of cloud systems, where data is analyzed, and source data is stored, enable structures that will allow individuals and company data to be easily captured in today's technology in artificial intelligence applications. The accuracy, confidentiality, and holistic protection of employee information and companies' financial and personal data are of great importance. Today, the fact that many data such as e-invoices, e-declarations, e-ledgers, or resume documents are in an electronic environment requires good protection of this information. Companies are trying to get intensive support from cybersecurity companies to close this gap and minimize the risk.

- **Human Ethical Values:** Artificial intelligence applications have led to debates on whether ethical decision-making is personalized. It is a matter of curiosity how ethical decisions will be made by programs that do not have a completely humanistic mindset. The main reason for the problem is that human ethical values vary from person to person and from society to society. For this reason, it is thought that every program prepared will carry the ethical values of the people who prepare the program about ethical values. In order to minimize this problem, the system should be constantly updated, accurate and meaningful (Özevin, 2023).

- **Transparency and Accountability:** The complex data analysis and intertwined neural networks of artificial intelligence cause the transparency of the applications to be questioned. In addition, the lack of a personality or structure that companies will take as an interlocutor in AI-supported applications creates problems in terms of accountability for the decisions

taken. In order to minimize the problems experienced, the neural network of artificial intelligence should be mapped in a clear and simple way, and it should be ensured to have an auditable structure. This will also allow both users and the institutions that prepare the application to be held legally responsible (Dilek Öztürk, 2019).

Issues such as ethical standards, transparency, accountability and security are critical for the ethical and trustworthy use of AI. This enables both society and businesses to maximize the potential benefits of this technology. The need for human supervision or control of AI applications is crucial for the certainty and reliability of this technology because uncontrolled systems lead to serious problems. Incorrect and incomplete data processing leads to serious financial losses for the company in training and developing its own employees, which negatively affects the perspective of artificial intelligence used and reduces reliability.

In addition, the rapid development of artificial intelligence technology leads to the emergence of new risks and problems. In particular, ethical and security issues related to the widespread use of artificial intelligence in certain sectors create uncertainty. Data storage, reliability and cyber theft are known to be the biggest vulnerabilities of artificial intelligence, and getting support from cyber security companies in this regard will prevent significant problems.

In the past, the Whatsapp application's two-step verification system for the marketing of personal data to companies for advertising purposes in the two-step verification system, and the fact that it lost a large number of users and threw them back are examples of the disadvantages of artificial intelligence. However, depending on the studies conducted on artificial intelligence applications, new tests developed on the basis of the Ethical Dilemma Test, Professional Ethics 5 Principles Test or Multidimensional Ethical Perception Test, which have been used in previous studies, will be useful in reducing the risks to be encountered before creating programs to approach human ethical values, transparency and responsibility (Dilek Öztürk, 2019).

ARTIFICIAL INTELLIGENCE IN FUTURE INBOUND MARKETING

AI is certainly a powerful marketing tool. Simply put, AI helps businesses solve one of the most important problems in business today: securing consumers. In this sense, AI plays a key role in the success of any marketing campaign, from the planning stage to the customer loyalty stage. Organizations that are able to take full advantage of AI have a very good advantage over their competitors. Essentially, HutSpot, search engines, cortex, chatbot and artificial intelligence come together to sustain customer-employee relationships, e-commerce and digital marketing. Many artificial

intelligence tools provide the development of companies by progressing in a structure that enables both sides to win (Yıldırım & Özdemirci, 2019).

While not formally requiring mandatory certification, companies need to take steps to ensure that AI practitioners and employers follow clear guidelines to ensure that AI systems are correct and ethical. In this regard, a number of universities and companies, including Stanford, Coursera and IBM, have introduced AI certifications. The quality of the AI certificates that companies will use is important in terms of reliability, confidentiality and ethical rules, and companies are as sensitive as possible in this regard (Dilek Öztürk, 2019). Accordingly

- Roles should be introduced to AI very well, and standards specific to the vision, mission and culture of the organization should be introduced.
- Professional training on artificial intelligence to be used should be requested, and an additional unit should be established to develop and advance the work.
- A protocol should be established to formalize the analyses generated by artificial intelligence.
- Employees should be provided with basic AI training, even if they are not interacting with AI applications that have become part of routine work.

CONCLUSION

Interactions in an electronic-based environment are now evolving to be based on artificial intelligence. Thanks to artificial intelligence, hyper-personalized marketing offers organizations the opportunity to interact with customers in an advantageous way, deepen ties with them and improve their experiences (Akça, 2023). Artificial intelligence is constantly evolving, especially in the personalization of employee and customer data. The development of systems with artificial intelligence in a structure that takes into account employee and customer suggestions in the development process is beneficial for the algorithms to be created to be more efficient.

In internal marketing, the use of artificial intelligence significantly improves the experience of employees and provides many benefits in internal processes. These applications support the training and development of employees, strengthen communication, make performance evaluation objectives more efficient, and make business processes more efficient. In particular, artificial intelligence-supported internal marketing applications provide training and development opportunities tailored to the needs of each employee. At the same time, tools such as chatbots and virtual assistants help employees access information quickly and facilitate business processes.

However, in addition to these benefits, there are also some concerns. Issues such as data privacy and security, bias or injustice, people's concerns about losing their jobs, etc., hinder the successful use of artificial intelligence. In this context, when the use of artificial intelligence in the field of intrinsic marketing is handled with care, it plays an important role in business activities and carries a competitive advantage to very high levels.

REFERENCES

Abanoz, M. & Acar, E. (2023). Artificial intelligence and ontological insecurity: an evaluation on individual and social anxiety dynamics. *European University of Lefke Journal of Social Sciences,* 14 (1), 22-51.

Akça, C. (2023). Artificial intelligence applications in talent management. *Ahi Evran Akademi*, 4 (1), 49-63.

Akduman, G. (2019). Digital recruitment: Evaluating the impact of the digital world on human resources recruitment function with conceptual and application examples. *International Journal of Arts and Social Studies,* 2 (3), 24-44.

Aylak, B. I., Oral, O. & Yazici, K. (2021). The use of artificial intelligence and machine learning techniques in the logistics sector. *Al-Jazari Journal of Science and Engineering*, 8 (1), 74-93.

Ballı, S., Uğur, A., & Korukoğlu, S. (2009). A fuzzy expert system implementation for performance evaluation in human resource management. *Ege Akademik Bakış*, 9 (2), 837-849.

Binbir, S. (2021). A descriptive study on the use of artificial intelligence in marketing studies. *New Media Electronic Journal*, 5 (3), 314-328.

Budak, H. & Gümüştaş, E. (2022). A hybrid approach using user-based collaborative filtering and clustering for a personalized product recommendation system. *Istanbul Commerce University Journal of Social Sciences*, 21 (43), 253-268.

Cesur, M. & Armutçu, B. (2023). The effect of artificial intelligence on green product purchasing behavior. *Journal of Public Economy and Public Financial Management,* 3 (2), 39-54.

Çakır, N. S. (2024). Artificial intelligence integration with customer relationship platform. *MIS Encyclopedia*, 12 (1), 93-113.

Dayan, A. & Yilmaz, A. (2022). Machine Language Modeling with Natural Language Processing and Deep Learning Algorithms. *DÜMF MD,* 13 (3), 467-475.

Dilek Öztürk, G. (2019). *The ethical reality of artificial intelligence.* (Unpublished Master's Thesis) Ankara Yıldırım Beyazıt University, Ankara.

Efe, A. (2021). Artificial intelligence-oriented cyber risk and security management. *International Journal of Management Information Systems and Computer Science,* 5 (2), 144-165.

Efe, A. (2022). The potential effects of artificial intelligence algorithms on the auditing profession. *Journal of Management Information Systems*, 8 (2), 1-19.

Erginöz, Y. C. (2019). The *effect of businesses' internal marketing practices and employer brand activities on the formation of corporate image.* (Unpublished Master's Thesis) Istanbul University, Istanbul.

Genç, Ç. (2016). Employee awareness of corporate culture and values: an application example in a private educational institution. *Selcuk Communication*, 9 (2), 116-137.

Gülşen, İ. (2019). Artificial intelligence applications and benefits in businesses. *Journal of Consumer and Consumption Research,* 11 (2), 407-436.

Gür, Y. E., Aydın, C. & Yücel, A. (2019). The impact of developments in artificial intelligence on human resources management. *Fırat University IIBF International Journal of Economics and Administrative Sciences*, 3 (2), 137-158.

İnal, E., Çiçek, R. & Akın, M. (2008). Evaluation of institutional perceptions of public sector employees in the context of internal marketing approach: the case of niğde. *Mustafa Kemal University Journal of Institute of Social Sciences*, 5 (9), 162-181.

İşler, B. & Kılıç, M. (2021). The use and development of artificial intelligence in education. *New Media Electronic Journal,* 5 (1), 1-11.

Karaman, R. (2009). The importance of performance measurement in organizations and balanced scorecard as a modern performance measurement tool. *Selcuk University Journal of Social and Economic Research*, 8 (16), 411-427.

Kılıç Kırılmaz, S. & Ateş, Ç. (2021). The use of artificial intelligence in recruitment: a conceptual evaluation. *Journal of Business and Trade*, 2 (1), 37-48.

Kurtboğan, H. (2023). *Yenidünyada artificial intelligence metaphor and the effect of artificial intelligence on employee performance.* (Unpublished Master's Thesis) Karamanoğlu Mehmetbey University, Karaman.

Onay, A. (2020). The transformation of internal audit in the era of big data. *Journal of Accounting Science World,* 22 (1), 127-163.

Özevin, O. (2023). The effects of using artificial intelligence in accounting on professional ethics: chatbot application. *Journal of Finance and Social Research*, 8 (3), 535-549.

Sağlam, Ş. (2021). *An application for the effect of internal marketing practices on health workers in the digitalization process of hospitals.* (Unpublished Master's Thesis) Nevşehir Hacı Bektaş University, Nevşehir.

Yıldırım, B. F. & Özdemirci, F. (2019). Uncovering tacit knowledge in organizations through artificial intelligence-supported recommender systems. *Journal of Knowledge Management*, 2 (1), 34-43.

Yıldız Tonga, M. & Tonga, M. (2022). An overview of Industry 4.0: The future of the industry. *Gaziantep University İslahiye İİBF International E-Journal,* 6 (6), 40-60.

Yücel, G. & Adiloğlu, B. (2019). Digitalization-artificial intelligence and accounting expectations. *Journal of Accounting and Finance History Research*, 17, 47-60.

CHAPTER 4

ACCOUNTING AND DIGITALIZATION: THE CASE OF KARS

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INTRODUCTION

In today's business world, with the growth of enterprises, accounting transactions and financial management are becoming increasingly complex. Accounting is generally a tool for collecting, sorting, analyzing and reporting financial transactions to those who are interested in order to reveal the financial status of enterprises. All these steps are done one by one with the efforts of members of the profession; it is a time-consuming process. At this point, developments in digital technology offer innovations that accounting professionals can also benefit from. In this sense, it transforms accounting processes and systems.

Digital technology offers the potential to make enterprises' accounting processes more effective and efficient. It paves the way for systems that can perform the same transactions in a shorter time and in a more error-free manner by getting rid of traditional accounting practices where human labor is intensive. For example, artificial intelligence and automation can speed up accounting processes, minimize human errors, and thus encourage accountants to spend more time on riskier transactions. In addition to saving time, it also provides cost savings by doing the work of more than one individual through an application. On the other hand, with big data analyses, dealing with masses of accounting data is prevented, and with cloud computing and blockchain applications, data can be easily stored without being corrupted or deleted.

However, digitalization also brings new risks. Data security and privacy are important issues to consider in the digitalization process. In addition, technological changes may require businesses to invest in training their staff and adapting to new technologies. These situations may lead to increased costs.

In conclusion, the development and advancement of digital technologies bring about significant change and transformation in the field of accounting. Both businesses and accounting professionals have to digitalize their accounting processes, invest in new technologies, and, most importantly, make themselves qualified to adapt to this change and gain a competitive advantage.

In this study, the concept of digitalization is defined, and the reflections of the digitalization process on accounting are discussed. In the analysis study, it was found that demographic characteristics such as gender, age, experience and title of the professional members operating in the center of Kars province did not differentiate their perspectives on digital systems. As a result of the evaluations of the members of the profession, time-saving and increasing efficiency were the prominent results among the advantageous aspects of the digital system. In terms of disadvantages, especially the difficulty of finding

qualified personnel came to the fore. In general, it can be said that the members of the profession are not insensitive to the digital process and try to adapt to it.

1. DİGİTALİZATİON

Today, the basis of the interaction and communication process in societies is now highly dependent on technology and the technological tools it requires. The large scale of these developments leads to significant changes in social and cultural dynamics (Tuncer 2013: 3). Digitalization is defined as the process of transforming individual information flows into digital language. Digitalization is considered an infrastructure around which social life is especially gathered (Schumacher et al. 2016). Digitalization refers to the digitization of various information and content in parallel with the expansion of the internet network and technological advances (Özbey, 2022: 146).

Digitalization describes the process of rapid integration of technological developments into individual and social life. This development enables business processes to become faster, more efficient and more effective. The fact that businesses and professionals act in harmony with technology adds positive values such as customer satisfaction, competitive advantage and time-saving to business life. Digital innovations such as artificial intelligence and big data analysis help businesses and professionals make more accurate and faster strategic decisions. Various accounting and marketing strategies are also changing with digitalization. It brings many advantages, such as reaching wider masses, reducing costs, and better quality communication between people(https://www.isbank.com.tr/blog/dijitallesme-dijital-donusum-nedir, Access Date: 13.02.2024).

In the global world, a digital culture or society is mentioned with the penetration of digitalization into every field, both individual and social. Since digitalization affects the sociocultural structure by changing economic structures, production relations, processes, and occupational definitions, the effects of digitalization are especially in economic, social and cultural aspects (Schumacher et al., 2016).

Digitalization, which is also defined as digitizing data with the help of electronic tools, can also be perceived as working with richer information and less labor (Adiloğlu &Yücel, 2018).

The first thing that comes to mind when it comes to digitalization is that multiple technological devices work in connection with each other. Therefore, it is wrong to limit digitalization only to computers. The fact that individuals are in easy and frequent communication with each other in business life through the Internet provides significant speed to business activities and saves time (Yücel & Adiloğlu 2019: 54-55).

With digitalization, many new concepts and applications have been added to both daily life and business life. Some of these can be listed as follows:

Smart robots, robot technology, also called mechatronics, is widely used in the automotive industry and helps flexible production in different sectors; it basically consists of a combination of machinery and electronics. It can also be said that this new concept encourages industrial production (Davutoğlu et al., 2017: 554). It is predicted that smart robots will be used instead of humans in many professional activities in the near future.

Cloud computing system: This concept, in the simplest definition, is the storage of information or knowledge not in a physical computer environment but in the internet environment and its use by accessing it over the general network in case of need (Aksu 2017:83). The shrinking of computers down to hand size, mobile phones functioning like computers, and the internet being an integral part of daily life have necessitated the change and development of the information system. In order to adapt to this transformation, a "Cloud Computing System" has been developed, and the development process is still ongoing (Mert et al. 2022: 198).

With the development of digital technology systems, web-based programs based on cloud computing are used in the field of accounting instead of classical accounting programs. This situation, which allows financial data to be managed from any environment, helps the accounting information system to operate faster, more flexibly and accurately (Elitaş & Özdemir, 2014: 103). It also makes it easier to store accounting data in large piles.

Artificial intelligence: Artificial intelligence, one of the most talked about and applied new concepts today, is to ensure that human-specific behaviors are performed by the machine (Nabiyev, 2005). In other words, it is a system that improves the results obtained by performing various operations with the programs created and gives the ability to learn from errors (Büyükarıkan, 2021: 276). Artificial intelligence, which enables computers to think like humans, is an inclusive term that is considered together with concepts such as machine learning and deep learning.

It is known that artificial intelligence applications in accounting have a long history (Baldwin et al. 2007: 77). The roles of accountants are transformed into a different structure with artificial intelligence. While technical accounting information is used to deal with some difficult and new situations, human labor continues to be used in situations that require professional judgment. However, the role of accountants can be expanded by interpreting business data correctly and working in cooperation with other units (Serçemeli, 2018:379-380). Artificial intelligence, which is an integral part of the decision-making process, continues to be developed and adopted in both technical and administrative processes of modern business

and professions, especially accounting (Omoteso, 2012: 8490 - 8491). While applications such as artificial intelligence deal with monotonous tasks that need to be done, accounting professionals will be able to devote more time to tasks for which they are better suited (Marr, 2018).

Block Chain: Blockchain technology is a storage technology that can never be deleted by adding Decentralized Distributed Ledger Technology data to each other (Altunbaşak, 2018: 362). The information shared on the blockchain is stored in one place at the same time. This means that the stored information is public and accessible to everyone. Since many devices can access data at the same time, it is an environment with a high tendency to be attacked (Mert et al. 2022: 199).

The adaptation of blockchain technology to accounting has many positive effects on quality and technology process. Blockchain provides great convenience in stages such as collecting, sorting, correcting, correcting, using in the information system, preventing corruption of accounting data (Kwilinski, 2019: 4).

Big Data: This concept refers to the size and complexity of the data set (Atalay & Çelik, 2017: 163). In other words, data with a size far beyond the ability of known database management tools to collect, store, manage and analyze data is called "big data" (Mert et al. 2022: 199). With the use of big data technology in enterprises, it is possible to measure very large data stacks; it provides the formation of a structure that removes managerial decisions from individuality and rather bases them on evidence. This increases the transparency of management (McAfee & Brynjolfsson, 2012: 62-63).

When big data technology is integrated into the accounting system, financial products and services are digitized by transferring transactions to the electronic environment. The activities of collecting, storing and analysing big data become easier. On the other hand, inability to trust big data, inaccuracies in combining data in a logical and consistent manner, inability to detect erroneous and fraudulent events, and weak competitive conditions may prevent accounting professionals from using big data efficiently (Yılmaz, Bülbül & Atik, 2017: 84).

With the growth of businesses in volume, increasingly complex accounting transactions create large data stacks, and these stacks can be easily stored in cloud computing or blockchain systems. By utilizing artificial intelligence technology, the most complex accounting transactions can be easily performed. Therefore, both time and cost savings are achieved by using modern technologies instead of the traditional system. Digital technology developments manifest themselves in every field and affect professions from every sector. It is up to individuals to adapt to the new order by assimilating the advantages and disadvantages of this situation.

2. ACCOUNTING AND DİGİTALİZATİON PROCESS

Accounting is a system that explains the financial status of the enterprise to the relevant parties by revealing the acquisition of resources in enterprises, the way they are invested, and the increases or decreases that occur as a result of the activities (Erkan, Eltaş and Ceran, 2014: 1). As can be understood from its definition, accounting is seen as a profession where human labor is intensive.

Digital developments affect every professional environment, and accounting is perhaps the most important of these. With the use of technological developments in accounting, the competence and responsibility of the accounting profession increases in parallel. The adaptation of the professional member to the environment will help to obtain qualified, transparent, reliable information and contribute to the protection of the reputation of the profession (Kwilinski, 2019: 1).

The technological change experienced by the accounting profession is very rapid. So much so that many digital concepts and systems that were not in question ten years ago are now actively used in this profession, both in the world and in Turkey; digital developments continue to have an impact on many sectors. With the need brought about by globalization, the concept of a world company, not a country company, is beginning to emerge. This situation, of course, brings with it the need to present companies' financial data in a timely, reliable, and accurate manner. In order to achieve this, it is necessary to follow, adapt and assimilate the developments in the world. International companies in Turkey closely follow these developments and changes, using the common accounting language used in the world and updating it continuously (Mert et al. 2022: 200-201).

It is a known fact that bookkeeping in accounting was very important in the past. Over time, with technological developments, all accounting records and data have been moved to the computer environment. This situation forces accountants to learn new skills in parallel with information technology developments. When we look at the history of the accounting profession, it is easily seen that the profession that started with "clerking" has turned into a system where declarations are prepared electronically. In parallel with this, it can be said that new concepts such as ready declaration systems and new-generation cash registers have been included in professional life as a result of technological developments. In the process of e-transformation (electronic transformation), which started with e-declaration (electronic declaration) in accounting in 2005 in Turkey, the most authorized institution in terms of applications in the electronic environment is the "Revenue Administration." With the communiqués published by the said institution, electronic ledger and ready declaration applications have been developed (Eş and Atasoy, 2022: 257-258).

The accounting profession stands out as one of the professions that adapt quickly to technological innovations. For this reason, it is also suggested that the new definition of the accounting profession should be changed as "accounting data scientist" (Erturan and Ergin, 2018:162).

3. RESEARCH ON THE PERSPECTIVES OF ACCOUNTING PROFESSIONALS ON DİGİTALİZATİON

In this section, the purpose, importance, scope, main mass and sample, method, findings and interpretations related to the research are given.

3.1.Purpose of the Study

The main purpose of the research is to determine the effect of Digitalization on accounting professionals in the province of Kars. In line with this purpose, it is aimed to determine the demographic characteristics of the members of the profession, the importance they attach to digital systems, the non-professional or professional digital products they use, and the advantages and disadvantages of Digitalization in terms of accounting.

3.2. Scope of the Study

The scope of the research consists of accounting professionals operating in the center and districts of Kars province.

3.3. Main mass and sample of the research

The main mass of the research consists of 41 accounting professionals who are active in the province of Kars. Since this main mass is an accessible number, all of the members of the profession were reached and a questionnaire was applied to 39 people who voluntarily accepted to participate in the research.

In this case, 95.1% of the main mass (39/41) participated in the research.

3.4. Data collection tool and method of the research

In this study, the survey method, which is one of the primary data collection methods widely used in the field of social sciences, was used. The main data collection tool is the questionnaire form used in face-to-face interviews with accounting professionals.

While preparing the questionnaire form, Mert et al. (2022)'s study titled "A Research on CPAs in Istanbul Province in terms of the Development of Digitalization Process and its Effects on Accounting Practices" was used.

The questionnaire form used in the research consists of two parts. In the first part of the questionnaire, there are 10 questions about the demographic characteristics of the members of the profession and their use of digital products; in the second part, there are 18 statements evaluating the

advantages, disadvantages and effects of Digitalization on the accounting profession.

In the questionnaire form, a five-point Likert-type scale, which allows interval-level measurements, was used. Because it is known that the five-point Likert-type scale has a wide range of uses in the field of social sciences. In addition, this scale is mostly used to measure the tendencies and attitudes of people (Büyüköztürk, 2010: 4). Therefore, with this scale, the researcher can measure the extent to which the participants show tendency and attitudes towards the judgment statements in the questionnaire form. The degree of agreement of the answers given to the 18 statements in the questionnaire form: (1) "Strongly Disagree," (2) "Disagree," (3) "Undecided," (4) "Agree," (5) "Strongly Agree."

In the research, frequency analysis normality test was applied; since the data showed normal distribution, Anova analysis, t-test, correlation and regression analyses were used, and interpretations were made.

3.5. Validity and Reliability of the Study

The concept of validity in research refers to the degree to which the questionnaire, which is a measurement tool, can be answered appropriately, accurately and adequately (Padem et al., 2012: 63). In this research, many academicians who are experts in the field have expressed their positive opinions about the validity of the questionnaire form used as a measurement tool.

Another important feature of measurement tools is that the questions in the questionnaire form should be reliable. Reliability explains the consistency of the statements in the questionnaire with each other. In this respect, Cronbach's Alpha coefficient is used in the analyses. This number is a value between 0 and 1, and the reliability of the scale used; $0.00 \leq \alpha < 0.40$ means that the scale is not reliable, $0.40 \leq \alpha < 0.60$ means that the scale has low reliability, $0.60 \leq \alpha < 0.80$ means that the scale is highly reliable, and $0.80 \leq \alpha < 1.00$ means that the scale is highly reliable (Kalaycı, 2006: 403, 405).

In this context, in the reliability analysis conducted to measure the internal consistency of the survey data, Cronbach's Alpha coefficient was found to be 0.56. The fact that this coefficient is in the range of $0.40 \leq \alpha < 0.60$ indicates that the scale has low reliability. This is due to the small sample size.

3.6. Research Findings

This section includes the evaluations and interpretations of the data obtained.

Table 1. Findings Related to Demographic Characteristics of Participants

Demographic Information		N	%
Gender	Woman	22	56.4
	Male	17	43.6
Age	25 years and under	3	7.7
	26-30 years old	6	15.4
	31-35 years old	9	23.1
	36-40 years old	6	15.4
	41 years and over	15	38.5
Foreign Language Proficiency	Yes	15	38.5
	No.	24	61.5
Education Status	High School	1	2.6
	Higher School	2	5.1
	License	24	61.5
	Master's Degree	9	23.1
	PhD	3	7.7
Professional Title	SM	1	2.6
	SMMM	29	74.4
	CPA Trainee	9	23.1
Professional Experience	Five years and less	15	38.5
	6-10 years	5	12.8
	11-15 years	4	10.3
	16 to 20 years	6	15.4
	21 years and over	9	23.1

56.4% of the participants were female (22 people), and 43.6% were male (17 people), and their ages were generally represented by 41 and over (38.5%, 15 people). The least represented age group is 25 years and below, with 7.7% (3 people). In terms of knowing a foreign language, 38.5% (15 people) answered yes, while 61.5% (24 people) answered no. Education levels were mostly concentrated in bachelor's degrees (61.5%, 24 people), followed by master's degrees (23.1%, nine people) and doctorate (7.7%, three people). In terms of professional titles, the majority of the participants were CPA (Certified Public Accountant) with a rate of 74.4% (29 people), CPA trainees with a rate of 23.1% (9 people) and SM (Certified Public Accountant) with a rate of 2.6% (1 person). In terms of professional experience, 38.5% (15 people) have five years of experience or less, while 23.1% (9 people) have 21 years of experience or more.

This data draws attention to the fact that the majority of the participants are women and generally have higher education but are less competent in foreign language skills.

Table 2. Importance of Digital Systems in the Profession

	N	**%**
Very important	25	64.1
Important	14	35.9

The majority of the participants (64,1%, 25 people) stated that the digital system is "Very important" in their profession. The remaining 35.9% (14 people) consider it as "Important". This situation is seen as a necessary step to adapt to the digital technology environment that is increasingly used.

Table 3. Importance of Occupational Technological Training after Graduation

	N	**%**
Very important	29	74.4
Important	10	25.6

It reflects the views of the participants on the importance of technological training related to the profession after graduation; here, 74,4% (29 people) state that such training is "Very important," while 25,6% (10 people) state that it is "Important." Since the use of technology in the profession has become a necessity, this competence is expected after graduation.

Table 4. General Digital Products Used

	N	**%**
Mobile Vehicles	31	79.5
Software	27	69.2
Email	29	74.4
Video Communication	12	30.8
Social Media	15	38.5
Search Engines	27	69.2
Blog	5	12.8
Cloud Systems	22	56.4

Mobile devices are the most preferred technology by 79.5% (31 respondents), followed by email with 74.4% (29 respondents) and software and search engines with 69.2% (27 respondents). Video communication and social media are seen as less prioritized by 30.8% (12 people) and 38.5% (15 people), respectively, while cloud systems are considered important by 56.4% (22 people), indicating the importance of data access and storage. Blogging is the least popular tool, with 12.8% (5 people).

Table 5. Professional Digital Products Used

	N	%
Internet Tax Office	39	100
Ledger Declaration System	39	100
E Declaration	39	100
E-Invoice	37	94.9
E-Ledger	37	94.9
E-Notification	34	87.2
Interactive Tax Office	38	97.4
E Collection	17	43.6
Digital Withdrawal of Bank Data	25	64.1
Creation of balance sheet and income statement in digital environment	24	61.5

Among the professional digital products used, platforms such as "Internet Tax Office," "Ledger Declaration System," and "E-Declaration" are used by all participants (100%, 39 people), and these three tools appear as indispensable elements in professional practices. The usage rates of "E-Invoice" and "E-Ledger" are also quite high, with 94.9% (37 respondents) using both tools. The usage rate of "Interactive Tax Office" is similarly high at 97.4 percent (38 respondents), followed by "E-Notification" at a slightly lower rate of 87.2 percent (34 respondents). "E-Collection" is a relatively less used service with 43.6% (17 people), while "Digital Withdrawal of Bank Data" and "Creation of Balance Sheet and Income Statement in digital environment" are used at medium level with 64.1% (25 people) and 61.5% (24 people) respectively.

The data were analyzed by Kolmogorov-Smirnov and Shapiro-Wilk tests with the SPSS program, which tests whether the data are normally distributed. Since the significance value was greater than 0.05 (0. 200 > 0.05), the data were normally distributed.

Table 6. Normality test

FACTORS	FACTOR EXPRESSIONS	FACTOR LOADS	EXPLANATIVITY OF FACTOR (% Of Variance)	RELIABILITY VALUE (Cronbach Alpha)
Advantages of Digitalization in Accounting	MDA1	0.874	64,521	0,867
	MDA2	0.814		
	MDA3	0.811		
	MDA4	0.810		
	MDA5	0.730	KMO= 0,764 (p < 0 ,00)	
Digitalization in Accounting Disadvantages	MDD1	0.746	28,683	0,598
	MDD2	0.744		
	MDD3	0.701		
	MDD4	0.482	KMO=,483 (p < ,00)	

Approach to Situations Related to Digitalization	DIUY1	0.895	13,521	0,584
	DIUY2	0.814		
	DIUY3	0.678		
	DIUY4	0.675		
	DIUY5	0.614		
	DIUY6	0.530		
	DIUY7	0.798		
	DIUY8	0.794		
	DIUY9	0.902	KMO= 0,593 (p < 0,00)	

In the first stage of the analysis, KMO value was examined. This value is expected to be 0.50 and above. The KMO value is 0.833, which is considered to be a very good level in the first stage. The KMO values of the other scales are 0.483 and 0.593, respectively.

3.6.1. Testing Hypotheses

In this section, the hypotheses, testing and results are presented.

H_1: There is a significant relationship between the education level of accounting professionals and the factors.

Table 7. ANOVA Results According to the Educational Background of Accounting Professionals

Factors		N	Average	Std. Deviation	p
MDA	High School	1	2.25	0.12	0,702
	Higher School	2	3.50	1.06	
	License	24	3.45	0.75	
	Master's Degree	9	3.25	1.08	
	PhD	3	3.25	1	
MD	High School	1	2.50	0.18	0,649
	Higher School	2	2.75	1.06	
	License	24	3.20	0.82	
	Master's Degree	9	2.75	0.90	
	PhD	3	3.08	1.12	
DIUY	High School	1	2.75	0.28	0,149
	Higher School	2	2.77	0.31	
	License	24	3.32	0.46	
	Master's Degree	9	2.86	0.68	
	PhD	3	3.07	0.32	

According to the analysis, at the significance level α = 0,05, P = 0,702; 0,649; 0,149>0,050,447 >0,05, there is no statistically significant relationship between the education level of the professional members and the factors consisting of their statements about the digitalization process of accounting.

The H_1 hypothesis is rejected. When the table is analyzed, there is no significant difference in all three scales according to the education level of the accounting profession members. This shows that the education level of the professional members does not affect their perspectives on the advantages and disadvantages of Digitalization in accounting and the factors related to the digitalization process.

H_2: There is a significant relationship between the age of accounting professionals and the factors.

Table 8. ANOVA Results According to Age of Accounting Professionals

Factors		N	Average	Std. Deviation	p
MDA	25 years and under	3	3.25	0.50	**0.012**
	26-30 years old	6	4.12	0.30	
	31-35 years old	9	3.77	0.73	
	36-40 years old	6	3.20	1.00	
	41 years and over	15	2.90	0.77	
MD	25 years and under	3	3.08	0.38	0.683
	26-30 years old	6	3.04	1.17	
	31-35 years old	9	2.80	0.86	
	36-40 years old	6	3.25	0.63	
	41 years and over	15	3.11	0.91	
DIUY	25 years and under	3	3.22	0.48	0.897
	26-30 years old	6	2.94	0.46	
	31-35 years old	9	3.35	0.43	
	36-40 years old	6	3.18	0.38	
	41 years and over	15	3.10	0.68	

According to the analysis, at $\alpha = 0.05$ significance level, P = 0.683; 0897>0.05, there is no statistically significant relationship between the age of the professional members and the factors consisting of the statements related to the digitalization process of accounting for two factors. The hypothesis H_2 is rejected. Accordingly, there is no significant relationship between the disadvantages of digitalization in accounting and approaches to digitalization and the ages of professional members. However, there is a significant relationship between the advantages of Digitalization in accounting factor (P =0,012<0,05) and the age of the professional members. These differences were determined by the TUKEY test that there is a difference between "26-30 years old and over 41 years old". The difference can be explained by the fact that younger ages are more prone to technology.

H_3: There is a significant relationship between the gender of accounting professionals and the factors.

Table.9. t-Test Results According to the Gender of Accounting Professionals

Factors		N	Average	Std. Deviation	p
MDA	Woman	22	3.18	0.83	0.125
	Male	17	3.60	0.82	
MD	Woman	22	2.98	0.90	0.609
	Male	17	3.13	0.81	
DIUY	Woman	22	3.16	0.59	0.924
	Male	17	3.15	0.47	

According to the analysis, at α = 0,05 significance level, P = 0,125; 0,609; 0,924>0,05, there is no statistically significant relationship between the gender of the professional members and the factors consisting of the statements related to the digitalization process of accounting. The H_3 hypothesis is rejected. Accordingly, no significant difference was found in all three scales according to the gender of the accounting profession members. This shows that the gender of the professional members does not affect their perspectives on the advantages and disadvantages of Digitalization in accounting and the factors related to the digitalization process.

H_4: There is a significant relationship between the foreign language skills of accounting professionals and the factors.

Table.10. t-Test Results According to Foreign Language Professionals' Knowledge of Foreign Languages

Factors		N	Average	Std. Deviation	p
MDA	Yes	15	3.55	0.83	0.288
	No.	24	3.25	0.85	
MD	Yes	15	2.98	1.02	0.720
	No.	24	3.09	0.74	
DIUY	Yes	15	3.09	0.50	0.558
	No.	24	3.19	0.56	

According to the analysis, at the significance level α = 0,05, P = 0,288; 0,720; 0,558>0,05, there is no statistically significant relationship between the foreign language skills of the professional members and the factors consisting of the statements related to the digitalization process of accounting. The H_4 hypothesis is rejected. This shows that the foreign language proficiency of the professional members does not affect their perspectives on the advantages, disadvantages and factors related to the digitalization process in accounting.

Table 11. ANOVA Results According to Professional Titles of Accounting Professionals

Factors		N	Average	Std. Deviation	p
MDA	SM	1	2.75	0.10	0.691
	SMMM	29	3.34	0.15	
	CPA Trainee	9	3.50	0.32	
MDD	SM	1	0.13	0.15	0.873
	SMMM	29	0.83	0.83	
	CPA Trainee	9	1.00	1.00	
DIUY	SM	1	0.18	0.23	0.675
	SMMM	29	0.47	0.47	
	CPA Trainee	9	0.75	0.75	

H_5: There is a significant relationship between the professional titles of accounting professionals and the factors.

According to the analysis, at $\alpha = 0.05$ significance level, P = 0.691; 0.873; 0.675>0.05, there is no statistically significant relationship between the professional titles of the professional members and the factors consisting of the statements related to the digitalization process of accounting. The hypothesis H_5 is rejected. This shows that the professional titles of the professional members do not affect their perspectives on the advantages and disadvantages of Digitalization in accounting and the factors related to the digitalization process.

Table 12. ANOVA Results According to Professional Experience of Accounting Professionals

Factors		N	Average	Std. Deviation	p
MDA	Five years and less	15	3.71	0.761	**0.023**
	6-10 years	5	3.95	0.670	
	11-15 years	4	3.06	0.74	
	16 to 20 years	6	2.70	0.79	
	21 years and over	9	3.02	0.78	
MD	Five years and less	15	3.13	0.82	0.791
	6-10 years	5	2.70	1.08	
	11-15 years	4	2.81	0.23	
	16 to 20 years	6	3.00	0.88	
	21 years and over	9	3.25	1.01	
DIUY	Five years and less	15	3.14	0.41	0.298
	6-10 years	5	3.24	0.54	
	11-15 years	4	3.25	0.55	
	16 to 20 years	6	2.75	0.74	
	21 years and over	9	3.37	0.53	

H_6: There is a significant relationship between the professional experience of accounting professionals and the factors.

According to the analysis, α = 0,05 significance level, P = 0,791; 0,298 > 0,05, there is no statistically significant relationship between the professional experience of the professional members and the factors consisting of the statements related to the digitalization process of accounting for two factors. The hypothesis H_6 is rejected.

Accordingly, there is no significant relationship between the disadvantages of digitalization in accounting and approaches to digitalization and the professional experience of professional members. However, there is a significant relationship between the advantages of digitalization in accounting factor (P =0,023<0,05) and the professional experience of the professional members. These differences were determined by the TUKEY test that there is a difference between "26-30 years old and over 41 years old". This difference is due to the differences between "between 6-10 years and 16-20 years", "between 6-10 years and 21 years and above", "between 11-15 years and 16-20 years", "between 11-15 years and 21 years and above". This situation explains that professional experience affects the digitalization process in accounting and differentiates the perspectives.

Table 13. Factor Correlation Analysis Results

Factors/Variables	1	2	3
1-MDA	1		
2-MDD	0.064	1	
3-DIUY	0.179	0.475**	1

** 0,01 significance level

According to the results of the correlation analysis shown in the table, there is a very weak positive correlation between MDA and MDD with 0.064, while there is a slightly stronger but still low-level positive correlation (0.179) between MDA and DLL. On the other hand, the correlation between MDD and SWOT was 0.475, indicating a moderate positive and statistically significant relationship. This indicates that the MDD and SWOT variables are more closely related to each other, and this relationship is an important finding that should be taken into consideration in the research.

Table 14. Regression Analysis Between MDA and MDD

	B	Std. Error	Beta	t	p
Fixed	3.171	0,514		6,166	0,00
MD	0.064	0,162	0,064	0,392	0,697
MDA: Dependent variable R= ,064 R^2 = ,004 F= ,154 p= ,697 Durbin-Watson: 1,918					

The results of the regression analysis show that the power of MDA to explain MDD is a very low relationship. The regression coefficient (B) of MDD on MDA was calculated as 0.064, and this value was found to be statistically insignificant (p = 0.697). The standard error (0.162) was high compared to the magnitude of the coefficient, indicating that the accuracy of the estimation was low. The beta coefficient is also low at 0.064, indicating that the standardized effect of MDD on MDA is weak. The value of R-squared (0.004) indicates that MDD explains only 0.4 percent of the Variance in MDA, which is very low. The Durbin-Watson statistic of 1.918 indicates that there is no autocorrelation, i.e., the error terms are independent of each other. Overall, this regression model is not effective in explaining the relationship between MDA and MDD.

Table 15. Regression Analysis Between MDD and SADD

	B	Std. Error	Beta	t	p
Fixed	0,666	0,737		0,903	0,372
DIUY	0,755	0,230	0,475	3,281	0,002
MDD Dependent variable R= 0.475 R^2 = 0.225 F= 10.768 p= 0.002 Durbin-Watson: 1.942					

The results of the regression analyses show that the variable of WFCL has a statistically significant and moderate positive effect on MDD. The regression coefficient (B) of the WFCS was calculated as 0.755, and this effect was statistically significant (p = 0.002), indicating that the model is reliable. Beta value. 0.475, which indicates that the standardized effect of WFCL on MDD is moderate. The R-squared value of the model is 0.225, which means that EWB can explain about 22.5% of the Variance in MDD. The F statistic is 10.768 (p = 0.002), indicating that the model is statistically significant overall. The Durbin-Watson statistic of 1.942 indicates that there is no autocorrelation between the errors, i.e., the error terms are independent of each other.

In general, the effect of WFCL on MDD is both statistically significant and of practical importance.

Table 16. Professionals' Level of Agreement on the Advantages of Digitalization in Accounting

Evaluations	Strongly Disagree		Disagree		Undecided		I agree		Strongly Agree	
Advantages	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Saving Time	1	2.6	4	10.3	-	-	11	28.2	23	59.0
Reducing the Number of Erroneous Transactions	1	2.6	5	12.8	2	5.1	12	30.8	19	48.7
Increasing Efficiency	-	-	5	12.8	-	-	11	28.2	23	59.0
Ensuring Customer Satisfaction	2	5.1	4	10.3	3	7.7	11	28.2	19	48.7
Increasing Communication	3	7.7	2	5.1	3	7.7	13	33.3	18	46.2

Table 16 shows that accounting professionals mostly agree with all the advantages of digitalization in accounting. It is seen that they agree that digital technology is especially advantageous in terms of saving time and increasing efficiency.

Digitalization helps accounting processes in enterprises to be more efficient, fast and flexible. In this process, since accounting transactions will be automated, data recording and classification gain speed and more work is completed in a shorter time. With flexibility, data can easily adapt to changing conditions and remain up-to-date. Automated processes will help to provide accurate information by eliminating possible human errors. All these help to reduce labor costs, save time, increase efficiency in general and ultimately establish healthy communication with the customer. This situation is reflected back as customer satisfaction.

Table 17. Professionals' Level of Agreement on the Advantages of Digitalization in Accounting

Evaluations	Strongly Disagree		Disagree		Undecided		I agree		Strongly Agree	
Advantages	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Difficulty in Finding Trained Personnel	3	7.7	9	23.1	8	20.5	13	33.3	6	15.4
Possibility of Workforce Reduction	3	7.7	12	30.8	8	20.5	12	30.8	4	10.3
Reducing Physical Socialisation	8	20.5	8	20.5	5	12.8	11	28.2	7	17.9
Exposure to Unconfirmed Information	10	25.6	9	23.1	5	12.8	10	25.6	5	12.8

It is seen in Table 17 that accounting professionals mostly agree with all disadvantages of Digitalization in accounting. It is seen that they agree that digital technology will lead to the difficulty in finding qualified personnel and the possibility of a decrease in qualified labour force in parallel with this.

As the digitalization process requires more technical skills and knowledge in accounting transactions, the difficulty of finding qualified personnel arises. Training and development programs are needed to adapt to digital technologies, which increases costs. In addition, since accounting professionals can handle every transaction online, an asocial environment is created. In addition, there is difficulty in finding the right one among internet-based information and exposure to information pollution.

Conclusion

Technological applications that change and develop day by day affect professional activities in every sense. Digital innovations included in daily life in the digital age also affect and transform both individuals and professions.

Digitalization affects the field of accounting in many different ways. These effects have positive aspects as well as negative ones. In this context, the main purpose of this study is to determine the effects of digitalization on accounting professionals in Kars province. In line with this purpose, it aims to determine the demographic characteristics of the members of the profession, the importance given to digital systems, the non-professional or professional digital products they use, and the advantages and disadvantages of digitalization in terms of accounting. According to the findings, the majority of the members of the profession are female, undergraduate graduates and middle-aged. Most of them do not have foreign language competencies. There are CPAs and CPA trainees in the province, and there is no CPA. The findings show that digital systems are very important for the profession, and technological training after graduation is absolutely necessary. While carrying out their professional activities, the participants mostly used mobile phones, email, and search engines. All of the participants used the Internet tax office, book declaration system, e-declaration, e-invoice, and e-book. The demographic characteristics of the participants, such as gender, age, experience and title, do not differentiate their perspectives on digital systems. As a result of the analyses, time-saving and increasing efficiency were the most prominent results among the advantageous aspects of the digital system. In terms of disadvantages, especially the difficulty of finding qualified personnel came to the fore. In general, it is seen that the members of the profession are not insensitive to the digital process and try to adapt to it.

For future studies, as digital processes are embedded in professional activities, it can be suggested that similar studies should be conducted at certain intervals to check progress and compliance and that members of the profession should evaluate the process.

REFERENCES

Adiloğlu, B.& Yücel, G. (2018) "Is Digitalization a Threat or an Opportunity for the Accounting Profession?", XXth Turkish Accounting Congress, TÜRMOB, 5-6 October 2018, Istanbul

Aksu, İ. (2017). Window Opening from Information Technology to Accounting: Cloud Accounting. Journal of Individual and Society, Volume: 7, Issue: 13, 79-102

Altunbaşak, T.A. (2018). Taxation with Blockchain Technology. Journal of Finance, 174, 360-371.

Baldwin, A.A., Brown, C.E. & Trinkle, B.S. (2007). Opportunities for Artificial Intelligence Development in the Accounting Domain: The Case for Auditing. Intelligent Systems in Accounting, Finance & Management: International Journal, 14 (3), 77-86

Büyükarıkan, U. (2021). Examining the effects of technological developments on the accounting profession. *Yüzüncü Yıl University Journal of Institute of Social Sciences*, (52), 269-288.

Büyüköztürk, Ş. (2010). Data Analysis Handbook for Social Sciences. Ankara: Pegem Akademi Publishing House.

Davutoğlu, N. A., Akgül B. & Yıldız E., (2017). Ensuring Change Effectively by Creating Awareness with the Concept of Industry 4.0 in Business Management. Journal of Academic Social Research, 5(52), 544-567

Elitaş, C. & Özdemir, S. (2014). Cloud Computing and Its Use in Accounting. Journal of Accounting Science World, 6 (2), 93-108

Erkan, M., Eltaş, C. & Ceran, Y. (2014). End of Period Accounting Transactions. Bursa: Ekin Basım Yayın Dağıtım.

Erturan, E. İ. & Ergin, E. (2018). Digitalization in Accounting Profession: Industry 4.0 Effect. Academic Social Research Journal (Asos Journal), Year: 6, Issue: 72, 153-165

Eş, A., & Atasoy, A. (2022). The effect of digitalization on accounting professionals: The case of Ankara province. Journal of Accounting and Tax Applications. 15 (2), 247-279.

Kalaycı, Ş. (2006). *SPSS Applied Multivariate Statistical Techniques.* Ankara: Asil Publishing.

Kwilinski, A. (2019). Implementation of Blockchain Technology in Accounting Sphere. Academy of Accounting and Financial Studies Journal, 23 (2), 1-6.

Marr, B. (2018). The Digital Transformation Of Accounting And Finance - Artificial Intelligence, Robots And Chatbots. https://www.forbes.com/sites/bernardmarr/2018/06/01/the-digitaltransformation-ofaccounting-and-finance-artificial-intelligence-robots-and chatbots/#1dda9c464ad8.

McAfee, A. & Brynjolfsson, E. (2012). Big Data: The Management Revolution. Harvard Business Review, 90 (10), 60-68.

Mert, H, Güner, M. & Duyar, G. (2022). "A research on CPAs in Istanbul in terms of the development of the digitalization process and its effects on accounting practices" Journal of Accounting and Auditing Review (Year: 2022, Issue: 66, Page: 195-218

Nabiyev, V.V. (2005). Artificial Intelligence; Problems-Methods-Algorithm. Ankara:Seçkin Publishing.

Omoteso, K. (2012). The application of artificial intelligence in auditing: Looking back to the future. Expert Systems with Applications, 39(9), 8490-8495.

Özbey, İ. B. (2022). Digitalization, social media and risk society. *Imgelem*, *6*(10), 141-158.

Padem, H., Göksu, A. and Konaklı, Z. (2012). *Research Methods (SPSS Applied).* Sarajevo: IBU Publications

Schumacher, A., Shin, W. & Erol, S. (2016). Automation, Digitization and Digitalization and Their Implications for Manufacturing Processes, Innovation and Sustainability Scientific Conference, Bucharest, Romania.

Serçemeli, M. (2018). Artificial Intelligence in the Digital Transformation of Accounting and Auditing Professions. *Electronic Turkish Studies*, *13*(30).

Tuncer, A. S. (2013). Social Media, F. Zeynep Özata (Ed.), Development of Social Media (2-26), Eskişehir: Anadolu University.

Yılmaz, B., Bülbül, S. & Atik, M. (2017). The Impact of Big Data on Accounting and Investigation of Its Contributions to Accounting. Land War College Science Journal, 27 (1), 79-112

Yücel, G., & Adiloğlu, B. (2019). Digitalization-artificial intelligence and accounting expectations. *Journal of Accounting and Finance History Research*, (17), 47-60.

CHAPTER 5

THE EU, TURKEY, AND HISTORICAL PERSPECTIVES ON THE ISRAEL-PALESTINE CONFLICT

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1. Introduction

This article aims to uncover the intricacies of the EU's foreign policy regarding the Israeli-Palestinian conflict by exploring its historical positioning within the broader international context of the Middle East Peace Process (MEPP). The analysis centers on the empirical findings of the inherent dilemma between democratization and stabilization throughout the Middle East, with particular attention on the international efforts for the settlement of the Israeli-Palestinian conflict. To this end, the multifaceted relations between international actors, including the US, EU, and UN as well as the local parties, Israel and Palestine, and the regional actors, specifically Turkey, have been subject to an in-depth examination. Given the unipolar nature of the international order in the aftermath of the Cold War, the involvement and decisive position of the US in the peacemaking efforts regarding the Israeli-Palestinian conflict is taken for granted. However, due to the EU's role as an emerging soft power with a significant economic contribution to the Palestinians' social and humanitarian situation and Turkey as an emerging regional power with prospects of managing a mediatory role, this study aims to explore the EU's initiatives for the settlement of the Israeli-Palestinian conflict in line with the historical developments between 1980 and 2009.

Given its fragmented image in foreign policy making, the EU has not been able to present itself as the leading and credible actor in the political scene of the Middle East. The former colonial rule of the European member states in the region, the proven oil and natural gas resources in the region and the cultural-religious heritage of the European identity-building process rendered the Middle East the utmost important region for European foreign policy. This is the main reason behind the weak but long-standing European efforts for peacemaking in the Middle East.

The gradual European integration combined with the changing international dynamics, i.e. the end of the Cold War followed by the dissolution of the Soviet Union, has been underlying reasons for enhanced EU foreign policy toward the Middle East. The sway of other international actors in the region prompted the urgent projection of a harmonized Middle East policy on the agenda of the European member states and Brussels-based European institutions.

The EU foreign policy toward the Middle East, fundamentally covered under the MEPP had undergone a forceful process in the sense of acquiring acceptance in the international arena. Thus, understanding the factors contributing to impasses in forming a unified European stance over the past two decades since the 1980 Venice declaration is crucial.

Behr (2008: 93) highlights the different historical interests and diverging national cultures of security amongst the EU member states as the main

reasons for the EU's lack of common political vision for the Middle East. Additionally, reconciling Islam and democracy in the region posed a challenge in establishing a unified EU position. Nevertheless, as European integration has progressed and bilateral relations with Middle Eastern states have strengthened, a common European approach has emerged, advocating for greater democratic space, including the involvement of moderate Islamist parties.

Migdalovitz (2003) reasons the EU's active engagement in Middle Eastern politics within the framework of shifting global power dynamics, particularly following the collapse of the Soviet Union and its withdrawal from the Middle East. Baroudi (2007) highlights that especially after the 2003 Iraq war, the need for an alternative leadership to counterbalance the ongoing US dominance in the region became evident.

Despite the broader turmoil in the Middle East, the Arab-Israeli conflict remains a focal point for EU authorities (Soetendorp, 2002). Stability, to be achieved through a peace settlement, is seen as vital for two primary reasons. Firstly, ensuring a stable and secure neighborhood with access to the region's vast oil and natural gas resources is crucial for Europe's energy security (Smith & Webber, 2008: 85). Secondly, while no longer colonial powers, EU member states still wield political, economic, and cultural influence in the region, necessitating consideration of their interests. Furthermore, Europe's evolving demographic structure, particularly the growing Muslim population in EU countries, heightened sensitivity towards the Arab-Israeli conflict and prompted a reaction within European societies (Archick, 2005: 2-3). Immigration concerns and the desire for a peaceful, stable region have been key drivers behind the EU's involvement in conflict resolution efforts in the Middle East. Nevertheless, Archick (2005: 4) criticizes the EU for implementing soft power or acting in line with low politics due to its civil modes of international discourse.

Historically, the EU's bilateral relations with the Middle Eastern states started with the 1974 Euro-Arab Dialog in the wake of the 1973 OPEC-induced oil shock. As an immediate step from Europe, Euro-Arab Dialog was carried out in the framework of further consultations and exchange of views between parties but did not have an explicit diplomatic discourse. It is important in the sense that, the founding 15 member states of the EU first defined the set of mind on the stability of the Middle East. Thus, the reliable flow of oil to Europe and the West necessitated first of all a sustainable peace settlement to the Arab-Israeli conflict, which was to be realized by the recognition of Palestinians and the establishment of a viable Palestinian state.

According to the European Union Committee (2007), the Venice Declaration of 1980 is regarded as the first official joint European policy

addressing the Arab-Israeli conflict. While being a European initiative, the Venice Declaration is adopted by regional actors, Israel and Palestine, and by international actors, the European Community and the United States. The content of the Venice Declaration asserted official recognition and adoption of the two-state solution to the Arab-Israeli conflict. Article 4 and Article 7 of the Declaration define conditions for a peace settlement, including the right to existence and security of Israel and the recognition of the legitimate rights of Palestinian people, as well as their right to self-determination (Akehurst, 2008).

Despite being a significant step for conflict resolution, the Venice Declaration could not succeed in leading its participants and addressees to the level of implementation. The fact that the EU had not completed its integration, especially in terms of the common foreign and security policy, triggered the US and Israeli non-compliance with the conditions adopted (Youngs, 2006: 227-228).

Soetendorp (2002: 284) puts forth that the 1991 Madrid Peace Conference revealed that the US policymakers did not favor the EU involvement in the Arab-Israeli conflict resolution talks. The conference was hosted by the Spanish government, an EU member state, co-sponsored by the US and the USSR and invited parties to the conflict, Israel and Palestine, as well as Arab countries including Syria, Lebanon, and Jordan. Soetendorp (2002: 286) further elaborates that the divergence of the US policy in the Middle East led the EU to be sidelined, while the USSR, right before its collapse, secured a chair in the Conference, which proceeded under the US leadership.

Though not taken as an official participant in the 1993 Oslo Process under the auspices of Norway, the EU has been a tactful promoter of the Palestinian domestic stabilization process in the aftermath of the Oslo Accords (European Union Committee, 2007: 10-11). The US and Russia represented the international community by undersigning the documents agreed on the nature of future relations for the peace negotiations between the conflicting parties. The main target of the Oslo Accords was to provide a convenient time and atmosphere for the realization of the UN Security Council Resolution 242, which asserts the Israeli withdrawal from territories occupied in the 1967 Middle East War, the establishment of a viable Palestinian state with capital East Jerusalem and final resolution to the Palestinian refugee problem by Israel. The UN was the international actor drafting the legal framework of the resolution of the Arab-Israeli conflict. Accordingly, the legal framework set out by the UN for conflict resolution has been the primary guide of the European authorities acting for the promotion of peace and stability in the Middle East (Akehurst, 2008: 242-245).

As regards the peace initiatives with European ownership, the 1995

Barcelona Process addressed multiple fields of policy in the Middle East and North Africa (MENA) and targeted a common area of peace, stability, and shared prosperity (Gavin, 2005). The Barcelona Process was formalized by three main pillars focusing on politics and security, economic partnership with the neighboring states in the South Mediterranean and Middle East, and lastly socio-cultural development.

The fact that the EU did not yet have an integrated approach in the foreign policy, and the common EU policy was dominated by the individual member states' bilateral relations with target states in the territories resulted in the failure of the process, which was publicly acknowledged on the 10th anniversary of the Barcelona Process (Gavin, 2005). Furthermore, Smith and Webber (2008: 87) assessed the Barcelona Process as having a vague rhetoric on projection and realization, thus being bound to fail in the long term.

The declaration of "global war against terrorism" in 2002 by President Bush following the 9/11 attacks appealed to all other international actors standing for the promotion of security and countering terrorism via the promotion of democracy. The EU endorsed the US-led war on terrorism. This, in turn, necessitated the US to recognize the EU as a political power on equal footing for the eradication of terror on a global scale, especially in the Middle East Peace. The call of US President George W. Bush had already implied the imminence of an alliance by international actors.

The commitment of the international community to peace-building and promotion of stability in the Middle East was invigorated by the establishment of the Quartet in 2002. The Quartet partners were the United Nations, the United States, the European Union and Russia represented by the UN Secretary-General, US Secretary of State, EU High Representative for the Common Foreign and Security Policy, and the Russian Foreign Minister (European Union Committee, 2007: 33). The EU representation within the framework of the Quartet for the MEPP was assumed by the EU Foreign Minister of Presidency on European Council and by the European Commissioner for External Relations on behalf of the European Commission. Furthermore, the EU designated a Special Representative for the MEPP, who would act in close cooperation with the US Special Envoy for the Middle East.

The Quartet for the Middle East Peace, formed with the US initiative in 2002, declared a Road Map in early 2003 outlining the processes for a peace settlement to the Israeli-Palestine conflict and the formation of Palestinian statehood. In line with this objective, the Road Map constituted a rather committed approach towards the conflict resolution.

The clearly defined phases and actions were to achieve the two-state solution by the projected date of 2005 (European Union Committee, 2007: 11). The EU being one of the Quartet partners supported a formula that endorsed

that "the security of the state of Israel can be ensured by a viable Palestinian State" (Archick, 2005: 12).

2. The Dynamics of the Middle East Peace Process

The 2002 Middle East Conference held in Sharm-el Sheikh and hosted by the US brought out a convention by the international leaders, the US, the EU, the UN, and Russia, on one commonly agreed target concerning the Arab-Israeli conflict. The previously acknowledged common interests of the US and EU, i.e. combating terrorism, halting the proliferation of weapons of mass destruction (WMD), ensuring the reliable flow of oil, and curtailing extremism in the Middle East found a common line of expression within the Quartet structure, which was coupled with the Road Map declared in April 2003 following its finalization at the end of 2002.

In addition to the US and EU initiatives for peace in the Middle East, the accelerated unrest in the territories raised regional awareness for countering the current turmoil. In parallel to this inclination, the Arab Peace Initiative (European Union Committee, 2007: 24) was launched in 2002 under the auspices of Saudi Arabia and expressed interest in collaborating with the acquainting authorities, referring to the Quartet partners and Israel, for a final peace settlement to the conflict. These steps constituted a solid background for the US and EU search for contacts in order to communicate with the Palestinian factions and the Palestinian Authority. Cooperating with Arab counterparts was seen as a way to enable reaching a compromise and having leverage on Hamas for its compliance with the Three Quartet principles, which can be outlined as:

"The conditions, which both conflict parties including their internal factions have to comply with. Thus, non-violence, recognition of Israel's right to exist, acceptance of previous agreements and obligations, including Road Map" (European Union Committee, 2007: 19-20).

Though they were addressed to both Palestine and Israel, it was perceived as an imposition on Palestine. The reason for this was the non-recognition policy of the newly elected Palestinian government, Hamas.

According to Migdalovitz, the US has traditionally been regarded as the main peace broker in the Middle East due to its presence during and after the 1991 Gulf War (2003: 1-2). The European support for the two-state solution has initially been overlooked by the US and Israeli authorities. The international attitude of the most relevant parties to the conflict, thus Israel, the US, and the Arab States endowed the EU with a marginal political role (Migdalovitz, 2003: 284).

As regards the international conjuncture, the EU's membership in the Quartet for the Middle East Peace is a proven success of enhanced European

integration that the European diplomacy fostered change in the US opinion for a two-state solution as a final settlement of the conflict. This esteem, however, did not dilute the implicit but proven US leadership in the Quartet. In fact, with the new set of mind on for the conflict resolution, the US and the EU do not diverge on their core attitudes towards the Middle East (Archick, 2005: 13). The new form of transatlantic relations concerning the Middle East was named complementary rather than competing in nature.

The inclusion of the EU to the Quartet escalated its image in the international arena as political actor on Arab-Israeli conflict besides its technical and financial assistance both to Palestine and Israel on the bilateral level. According to Everts (2005:47) however, the enhanced reciprocity and credibility in the Middle East did not confer sufficient clout and leverage on the EU enforcing its policies or recommendations unconditionally. This would be possible to overcome through a firm cooperation with a regional actor, i.e. Turkey. Yet, this cooperation would not override the primary peace brokerage by the US within the Quartet structure. Soetendorp (2002: 293) highlights that this implicit perception was put into words by British Foreign Minister Lord Carrington as:

> *"…none of us is laboring under the illusion that Europe is capable of producing a settlement on its own. Full US involvement is vital to the chance of peace. Cooperation, not competition, is uppermost in our mind".*

A model of the US-EU cooperation was operational during the Israeli withdrawal from the Occupied Gaza Strip in 2005 August (Archick, 2005: 14). The US Special Envoy designated to oversee the Israeli withdrawal from the Occupied Gaza Strip in 2005 August was in charge of brokering the deal between Israel and Palestine on security controls for Gaza border crossings. EU performed undeniably successfully concerning its bilateral relations with Palestine and Israel. However, on the multilateral level, speaking of an effective EU addressing both conflict parties was not the case. The pragmatic approach of the US along with the firm US support to Israelis, which was in sharp contrast with "the unacceptability of European brokerage to Israelis" (Soetendorp, 2002: 284-285) did not provide room for the EU to affirm its position on the multilateral level. Furthermore, the EU was a loyal and credible donor to Palestinians but without any prospects for speaking to Israelis with the same tone as a peace broker in 2005.

Smith and Webber (2008: 86-87) argue that the lines of communication within and outside of the Quartet structure were inevitably split into two main blocks of three actors, namely the EU-Israel-Palestinian Authority and the US-Israel-Palestinian Authority. Despite the complementary form of partnership in the Quartet, there was no triple including the US, EU, and one

of the conflict parties. Furthermore, the international actors did not talk to parties within the same triple in a concerted way. This was primarily led by the American tendency to handle conflict independently.

The European policy on the institution and state building in Palestine, implemented tactfully, resulted in the Hamas victory in Gaza in the 2006 Palestinian national elections, which were carried out democratically under European supervision. This once again brought the distinction to the notice of the EU that the democratization process in the Middle East could anytime lead to instability, which ultimately brings about the domination of security concerns (Behr, 2008: 80). Since Hamas was listed among the records of terrorist organizations in the US, the EU Member States and Israel, the talks with Palestinian authorities immediately after the elections got hold by the Quartet. The international community first cut off relations with Palestinian authorities, which included Hamas, and then boycotted entire Palestine throughout 2007. The way of handling the new political power in Palestine by the Quartet caused instability given the increasing poverty and crime rates.

The Arab Peace Initiative took over the responsibility of brokering an agreement between the hostile Palestinian factions. As a result, under the Mecca Agreement organized and hosted by Saudi Arabia, Hamas and the PA agreed to form a coalition. The National Unity Government (NUG), the name of the agreed coalition, was to act commonly on both geographically separated Palestinian territories, Gaza and West Bank. However, Hamas refused to comply with three Quartet conditions (non-violence, recognition of Israel's right to exist, and acceptance of previous agreements and obligations, including the Road Map). In that case, three main lines of action were suggested by the EU authorities as a way of engagement with the NUG. Accordingly, the first option was selective engagement with the NUG; or assuming that the three Quartet principles were met, lastly selective engagement with ministers who committed to three principles, or continuation of international Boycott, that led the way to further poverty in Palestinian territories (European Union Committee, 2007: 21)

After the European international boycott of Palestine, European Commissioner for External Relations Benita Ferrero-Waldner met one of the moderate NUG ministers in April 2007 to discuss the prospects of further humanitarian aid to the Palestinian people (European Union Committee, 2007: 23), which would firmly be monitored to ensure its essential goal. In that sense, there was a visible even-handed approach of the EU among other Quartet members. This approach endowed the EU with a highly appreciated dual role between the US and Arab states, though it lacked the complete credibility to facilitate communication on regional means.

The internal dynamics of the Quartet were a reflection of the transatlantic relations, the intensive domestic policy and change of the US presidency occupied the agenda of US politics, which left less room for concentration on foreign politics. Throughout 2008 the Quartet did not progress much due to a lack of guidance. Moreover, as the US and the EU brokerage ended in December 2008, the frictions accelerated the offensives of Israel to Gaza.

The catastrophic results of the Gaza War of 2008 were not only about the toll number but also of the high number of civilian deaths and Israeli bombings on the UN hospitals claiming Hamas making use of the UN buildings to hide and prepare for further attacks. The condemnations of the international community followed either by judging the Israelis or by Hamas's violent approach. Yet, the situation on the ground was rather serious when the destruction of the humanitarian conditions and financial investment were taken into account. In return, besides the Gazan population suffering from the disastrous results of the War, the international actors, Quartet, Arab League, and Turkey, faced with sudden vanish of their investments. This automatically generated a common sense of the urgent and primary need for a unified Palestinian position for peace.

The second quarter of 2009 witnessed US President Barack Obama's peace journey after he assumed office. The new government's program was perceived as promising, predominantly by European officials, in terms of solving the ever-lasting conflict in the Middle East. The US Envoy designated for the Middle East Peace, George Mitchell, was renowned for his contributions to the conflict resolution in North Ireland as well as the preparation of a report and recommendations before the Palestinian *Second Intifada* in 2000. The Europeans welcomed his designation and the prospects for future cooperation to bring an urgent solution to the situation on the ground after the last Israeli offense of three weeks between the last week of 2008 and the first half of January 2009.

Having obtained US support for the even-handed approach, Obama's Presidency was celebrated as the best time to cooperate productively for a peace settlement by the EU. John Gatt-Rutter, the Principal Administrator of the Middle East Task Force at the European Council, described this atmosphere as the best time ever to cooperate with the US, since the US was thought to be no longer the unconditional supporter of Israel, which was the biggest obstacle preventing the EU from progressing in the MEPP.

To sum up, the Quartet members are officially on the same footing. Yet, considering the actual situation, equal influence was not the case. The US, given its long-lasting and forceful involvement in the Middle East, led the way in the MEPP. The EU, merely because of its gradual and recently integrated common foreign and security policy, emerged as a rather unified balancing power to the US in the region, thus in the Quartet.

The persisting difference in the interests and understanding of security among EU member states impeded the EU's efficiency while leading to belated implementation of European policy within the Quartet structure (Berzi, 2009). This rendered the EU to a secondary role in maintaining the relations on multilateral level. In relation to other Quartet partners, the EU advocated the UN Security Council resolutions (European Union Committee, 2007: 36-37) for the Israeli-Palestinian conflict and acted in parallel with the UN in terms of financial and humanitarian assistance. As for the dynamics of relations with Russia, the dissolution of Soviet Union created a power vacuum in the Middle East and this balance was expected to be instituted by the EU.

The involvement of the EU was welcomed by the Arab states in the region, which regarded it as a substitute for the USSR power in counterbalancing the US until 1989 (European Union Committee, 2007: 32).

3. The EU-Israel Relations in the Middle East Peace Process

The official membership of the EU to the Quartet strengthened its credibility and acceptability by the Israelis. By then, EU-Israeli relations suffered from the lack of communication and the Israeli mistrust of Europe. Regarding the peace brokerage for the Israel-Palestine conflict, the sole EU involvement has never been the case (Soetendorp, 2002: 285).

The only possible way for European contribution could be accepted was by placing the EU secondary to the US meditation within the peace process (European Union Committee, 2007: 14). This requires an analysis of the variants of EU-Israeli relations concerning the MEPP until the formation of the Quartet.

The European position on two-state solution for the Arab-Israeli conflict, first adopted and declared by the EU at Venice Declaration in 1980, constituted the reason for the cooled relations between EU and Israel from the beginning. The already existing "Israeli mistrust of Europe" as termed by O'Donnell (2008: 30) was strengthened with the EU's support for a two-state solution. This at the same time led to Israeli perceptions on the EU's being insensitive to Israel's security concerns. The economic and diplomatic US support, assumed as stable and trustworthy by Israel, stood out as the main factor making Israel feel more comfortable and secure. Given the enhanced US-Israeli relations, Israel did not feel it necessary for other international actors to be involved in the MEPP.

The following decade witnessed an increased EU financial and development assistance to Palestinians, principally supported by the European Commission and European Investment Bank. Also the humanitarian support to Palestinians led Israel to develop its arguments for the presence of an Arab bias in the EU (O'Donnell, 2008). The bilateral disagreements between EU and

Israel under the framework of the Euro-Mediterranean Partnership, initiated under the framework of 1995 Barcelona Process, further exacerbated the EU-Israeli relations in the second half of 1990s (Dror & Pardo, 2006: 21).

The 2002 Quartet membership of the EU therefore, symbolized a turning point when the EU-Israeli relations for two decades were to be taken into account. The warming of the relations with the EU's inclusion to the Quartet was not based on the EU's changing opinion on the formula for peace settlement. On the contrary, the EU membership in the Quartet proved that the two-state solution, emphasized as the only formula for the settlement of peace, was adopted by other international actors, primarily by the US and Israel.

The Palestinian Authority, representing Palestinians under the Israeli occupation, submitted ultimate agreement and promised to commit the three principles for peace outlined under the Road Map of the Quartet. In line with the Road Map, apart from the bilateral recognition of the parties, Israel was expected to act in accordance with the international law, i.e. withdrawing from Palestinian territories, holding the settlement activity, and taking responsibility in the Palestinian refugee issue, as outlined in the UN Security Council Resolutions 242 (1967), 338 (1973), 1397 (2002), 1515 (2003), 1850 (2008), 1860 (2009), the Madrid principles, and the Council notes the importance of the 2002 Arab Peace Initiative (UN Security Council. President, 2009).

The shift in the US policy in 2004 implicitly supported Israel's reluctance to fulfill the conditions set under the Road Map. The implicit recognition of Israeli claims on parts of the West Bank seized in the 1967 Middle East War and to limit the Palestinians' right of return to Israel moreover, prepared the ground for Israeli opposition to the two-state solution.

On the other hand, the enduring EU support for the two-state solution and belief in a strong and viable Palestinian state to ensure Israel's security again led to a deadlock not only on transatlantic but also on the EU-Israeli relations (Archick, 2005: 15-16).

Europe's support for a strong and viable Palestinian state has been the main reason for EU's both financial and political assistance in the institution building and democratization efforts in Palestine. To this end, EU assumed its supervisory mission and took over the facilitation and monitoring of the 2005 democratic elections in Gaza. The result was, however, not the 'expected' (Behr, 2008: 82) one as Hamas, listed as a terrorist organization by the EU, the US and Israel, came out with an election victory.

The election of Hamas and their non-compliance with three Quartet principles was the most significant impact on Israeli reluctance to re-engaging

in direct negotiations with, thus recognition of, Palestinians. Though both Israel and the EU refuse to recognize or to talk with Hamas directly, the European criticism of Israeli tactics towards the entire Palestinian population built the core reason for EU-Israel frictions (Dror & Pardo, 2006: 36). The EU's approach stresses the recognition and dialog with the Palestinians and this was found impossible to implement by the Israeli authorities. Thus, the EU's image in Israel was not more than an institution full of inconsistencies.

Another initiative that contributed to this image was an open letter on July 2007 from Foreign Ministers of EU Mediterranean Member States to Tony Blair, which declared the failure of the Road Map (The Guardian, 2007). The EU's official line, set in agreement with the international community, was therefore given the image of a rather confused and incredible one, according to Israel (O'Donnell, 2008: 30). Meanwhile, the expansion of the Israeli settlements reached the inlands of the West Bank, which was not supportive to convince Palestinians factions for non-violent actions. The EU Boycott of Palestine was welcomed by Israel, which felt its security interests were taken into account. As a matter of impartial peace mediator, adopted as a fundamental value, the EU did not neglect to remind Israel that the continuous settlements were illegal and were to be drawn back (O'Donnell, 2008). This was done publicly once again at the Annapolis Conference in 2007 upon the deteriorated humanitarian situation in Palestine after the international boycott and the Israeli withholding of Palestinian customs revenues. Given the continuous attitude toward the non-recognition of the three Quartet principles and further violence by Hamas, representing Palestinians in Gaza, the EU and the Israeli opinions started to converge in 2008.

The rather warmed relations between the EU and Israel gave rise to Israeli demand for international peacekeeping on the Gaza border, where the EU member states referred together with the US as well. This at the same time highlighted that Israel supports the EU and the US forces training Palestinian police and security officials (European Union Committee, 2007: 45-46). The end of the ceasefire and the restart of the Hamas attacks from the Gaza Strip in the last months of 2008 led to large-scale Israeli offense on Gaza for three weeks. The already deteriorated humanitarian situation as well as the entire infrastructure in Gaza was ruined during three weeks of offences.

The EU was divided upon judging Israeli action in Gaza. One of the criticisms towards Israel was directed on Israel's 'heavy handed' and 'non-proportionate' (Archick, 2005: 12; Dror and Pardo, 2006: 35-41) attacks, especially targeting civilian killings, as had been the case during the Lebanon War (European Union Committee, 2007: 30). In line with this, Israel's bombing of the UN buildings in Gaza undermined Israel's security reasoning in the eyes of the international community. As it was best expressed by the EU High Representative Javier Solana, "the EU anticipates the security concerns of

Israel but these concerns cannot be used as a justification to un-proportionate violence and killing of civilians while countering terrorist actions of Hamas" (The Guardian, 2008). Having adopted a common position on the Israel-Palestine conflict regarding external relations, the EU member states were considered more sympathetic to Palestinians despite its advocacy on Israel's security concerns. The relations with Israel were therefore characterized by fluctuations due to the EU's changing image depending on the attitude toward Palestinians. There has been a set of agreements concluded in order to intensify political, economic, and technologic-scientific relations between the EU and Israel. The former agreements, the EU-Israel Association Agreement, Agreements on Technologic and Scientific Cooperation (Harpaz, 2008), Euro-Mediterranean Partnership, and Israel's inclusion to the ENP, was exploited as a basis to persuade Israel to assume a higher commitment to the MEPP.

The EU had plenty of well-defined mechanisms set under the Common Foreign and Security Policy, which promised to guarantee Israel's security when abided faithfully by Israel. Thus, if the EU could convince Israel to resume the peace talks with Palestine after 2008 offenses in Gaza, it would be a great opportunity to reengage parties and tame Hamas, which would bear the prospects of a unified, thus less violent Palestine (O'Donnell, 2008: 17-19).

The Israeli elections just after the Gaza offences in 2008 December took advantage of intensified nationalist and religious tendencies among Israeli society. Due to the increasing popular support of right-wing and extreme religious political parties in the 2009 elections in Israel (Yiftachel, 2009) Israel turned less sensitive, indeed even more confident with announcing violating the UN international law. This was evidenced in the self-assertive attitude of Israel against the European and other international criticisms (Kaptanoğlu, 2009) about the high civilian toll and war crimes during the Gaza operations.

4. The EU-Palestinian Relations in the Middle East Peace Process

The Venice Declaration in 1980 was a unique step to recognize the need of involving PLO, today's PA, in the peace process when it was considered as a terrorist organization by the US and Israel.

Following the 1991 Oslo Accords and the formation of a Palestinian interim government under the name of the Palestinian Authority (PA), the EU increased its support to the Palestinians in a rather formal and visible way. In the early 1990s, the EU was the biggest donor to the PA (European Union Committee, 2007:38). The European belief in the necessity of a strong Palestinian state was instrumental in the EU's political and financial support for the Palestinian nation and institution-building process.

Starting with its membership to the Quartet in 2002, the EU's support to Palestinians was executed on a twofold basis, which can be categorized

as financial assistance and political support. They had been carried out in parallel with each other until Hamas came to power with a high majority in Gaza after the 2006 democratic elections that were supported and monitored by the EU.

The amount of European financial aid together with the World Bank and the UN Agencies between 2002 and 2005 was estimated at around $300 billion per year (Archick, 2005:12). This aid was a relief for PA to overcome the liquidity problems caused by Israel's decision on withholding customs revenues and taxes collected on behalf of the PA (European Union Committee, 200:16; Soetendorp, 2002:288). The EU tool for developing and reviving the Palestinian economy covered trade concessions and investments, technical and development expertise, subsidized loans for running costs in addition to direct budgetary assistance to the PA, which amounted to €10 million per month. The main reason underlying this financial support by the EU was the essential idea of preventing the collapse of the Palestinian administration, which constituted a legacy to the Palestinian state (Soetendorp, 2008: 288). Serving to this end, the financial assistance took the form of reconstructing the Palestinian infrastructure as well as political support to the PA. Despite the enduring financial support to the PA, the EU officials acknowledged the risk of resources being taken by untargeted bodies. Yet, the EU, pressuring the PA to reform its financial system and the consolidation of the West Bank in comparison with the Gaza Strip especially since 2006, was assured by sound reform in PA's financial management system.

The political and diplomatic assistance, on the other hand, took the form of institution building for providing a background to a Palestinian state respecting the values of good governance, rule of law, and democracy. As one of the EU missions for the provision of security to Palestinian territories, EUPOL COPPS ensures the sustainable and effective functioning of the Palestinian Civil Police, which were advised and mentored under the Police Development Programme (Soetendorp, 2008: 288). EUBAM, on the other hand, acted based on Agreed Arrangement on Movement and Access concluded between Israel and the Palestinian Authority on 15 November 2005. Though the EU played a third-party role in EUBAM, its mission is entrusted with monitoring, mentoring, verifying, and evaluating the performance of the PA border control, security, and customs officials. For confidence building and implementation of agreements between parties, these two missions are referred to within the context of the EU strategy for political engagement and practical support to Palestine concerning the MEPP.

The EU was appreciated for its assistance in the capacity building, infrastructural, and human resources development of Palestinians. As argued by Roy Ginsberg, it became certain that Palestinians depend on the EU for its economic lifeline and diplomatic support as Israelis rely on the US authorities

for diplomatic support, military cooperation and economic aid. The Statement of the Palestinian General Delegate to the UK, Professor Manuel Hassassian, underscored that the occupation had played a detrimental role and Palestinians cannot undermine the fact that the Israelis had not been very helpful, cooperative, or happy to see the involvement of the Europeans in building capacity for the Palestinians. The intention of the Israelis was still not to have an independent Palestinian state (European Union Committee, 2007: 47).

Nevertheless, it was asserted by Palestinian officials that the practical side of these missions had to be coupled with proactive political engagement in parallel to the Israeli side (Archick, 2005: 14). Thus, the EU was expected to get involved more while showcasing its presence to other parties within the peace process.

Another field of the EU's active political engagement in Palestine under the MEPP was proven throughout the Palestinian nation and institution building, initiated by promoting democratic elections. In this line of thought, the 2006 elections in Palestine were highly supported by the EU, in terms of ensuring transparency. However, Hamas' holding of the election victory despite its being listed as a terrorist organization made primarily the EU and also the international community to reconsider their financial support they committed since the advent of the Quartet.

The EU's position in generating an all inclusive model of political participation in Palestine was at odds with Hamas' presence in Gaza (O'Donnell, 2008: 8), which secured a strong popular support. Concerning the peace efforts, the 2006 elections did not bring about constructive results as the geographically separated Palestinian territories were politically distanced from each other as well. The rather moderate tone of Fatah, ruling in West Bank and chaired by the PA President Mahmud Abbas, was never been adopted by Hamas which strongly advocates the non-recognition of Israel and violence until a peace settlement was reached. Saudi Arabia, as one of the leading countries in the Arab Quartet, made an initiative for coalition between two parties and hosted the formation of the NUG by Mecca Agreement in 2007. Yet, especially after the severe dispute when Fatah was violently expelled from Gaza, Hamas remained as the single power in Gaza.

The boycott of the international community since Hamas' election in Gaza led to increasing poverty and deteriorated humanitarian situation while gradually fed radicalization and gave rise to increasing crime rates. The subtle and low key role attributed to the EU in the Middle East acquired its meaning when its performance in Gaza was taken into account. The financial assistance of the EU unfortunately did not help to improve the political situation as the EU does not recognize Hamas.

The selective engagement strategy followed by European Commissioner for External Relations Benita Ferrero-Waldner with moderate Palestinian ministers (European Union Committee, 2007: 21) did not deliver the expected results as Hamas was divided into many factions, which are in conflict with each other. Regarding the other Palestinian territory, West Bank, Mahmud Abbas barely represents Palestinian population there. This did not strengthen his stance for resuming negotiations for a peace settlement.

The imminence of the worsening of the conditions for peace in the Israel-Palestine conflict in 2007 was not a misleading perception by scholars working in the field of Middle East Peace. Despite the PA's commitment to the Quartet principles, which were approved during the Annapolis Process in 2007, the fragmented nature of the Palestinian politics continuously undermined proposed reforms and economic incentives for development. The pending European attitude for convincing Hamas to accept the Quartet principles in exchange of resuming direct financial and diplomatic assistance failed due to the fragmented feature of European position. Yet, it is a fact that no matter how intense the EU support for state building in the PA was; the efforts was not likely to pay off as long as Hamas was not included in the process. Coming across this view, the first weeks of 2009 witnessed Israeli offensive to Gaza following small scale continuous strife and Hamas rocket attacks to the south Israel in the last week of 2008. The already deteriorated humanitarian situation in Gaza ended up in catastrophic results, which did not lead any party in the conflict to ceasefire.

What the EU could do after the last offensive to stabilize the region was first promoting its firm position in solving the local stalemate in the Palestinian side, reported an official in the Palestinian Delegation to the EU, Belgium and Luxembourg in 2009. The EU, as the second approved broker to the peace settlement, was to consider any possible prospect to bring together Palestinian factions Hamas and Fatah, and promote the unity in the Palestinian administration. Secondly, after ensuring the strong Palestinian stance ready for peace negotiations, it was regarded less complicated to demand Israel to comply with the international law and UN Security Council resolutions on Israel-Palestine conflict. The Israel's meticulous demand on security, which was perceived by Palestinian official position as an Israeli pretext to prevent the foundation of a Palestinian state by the Arab states and the Palestinians, would be already having met (Palestinian Delegation to the EU, 2009). Furthermore, the European Union Committee affirmed that it could be easier to bring solutions to Palestinian refugee issue, illegal Israeli settlements and security barrier of Israel, which is built into the Palestinian territories in the West Bank rather than on the 1967 border lines (2007: 12).

That Palestinians, furthermore, did not feel the strong advocacy of the EU on their behalf towards Israel (Palestinian Delegation to the EU, 2009). The

EU support was approved either by the high level Palestinian officials or only received by the local population unilaterally. Furthermore, the Palestinians in Gaza was reported to feel that the international boycotts after the 2006 elections were a punishment for their democratic choice. So, again democracy was subject to be in dilemma with security in the Middle East. The inclusion of Hamas was democratic but not secure at all. The selective engagement did not deliver enough and was not fully democratic either.

5. Examining the Prospects of EU-Turkey Cooperation for the Settlement of the Israeli-Palestinian Conflict

The dynamics of the EU cooperation with Turkey for meeting the ends of exalting and sustaining its credibility and effectiveness for a peace settlement in the Israeli-Palestinian conflict fall within the scope of this section. The international atmosphere, calling for the EU to include Turkey in the peace process as a 'regional actor' in parallel with current Turkish activism in the Middle East, sets up the basis of this project.

There was no specific agreement concluded between Turkey and the EU for cooperation in the settlement of the Israel-Palestine conflict. As a common line of policy, the prospects for Turkey's support to the EU were reserved on the condition of being a full member of the Union. For that reason, the understanding of the EU-Turkey relations came to be reduced to Turkey's ongoing membership negotiations, thereby revolving relevant projections into a vicious circle. However, the EU's involvement in the Quartet came across with the initial steps of current Turkish foreign policy, shaped by the idea of making use of its historical and cultural potential as well as new political and economic constellations in the Middle East (Kalın, 2008).

The early 21st century witnessed an international political scene where Turkey acquired an enhanced image by its robust democracy, well-functioning market economy, secular state, and Muslim population with a high majority. This image earned Turkey credits both from the EU, in the way of being a good model of democracy for the Middle Eastern states, and from the Middle Eastern countries. The supportive attitude of the newly elected conservative democratic government led by the AK Party to the Muslim way of life in the public sphere was the primary incentive for the Middle Eastern countries to perceive Turkey as the preeminent leader of the Muslim world from 2002 on (Salem, 2009). The mutual sympathy between Middle Eastern states and the newly elected AK Party accelerated bilateral exchanges, which finally paved the way for Turkey to claim to be an energy hub in the near future in addition to being a regional power. This line of events bared an immediate outcome: the relinquishment of popular ambitions for joining the EU, which gained strength by the realization of Turkey's unique position of being in possession of diversity within a population with the Muslim majority, which was a quality

to exalt Turkey to a role of leadership among Middle Eastern countries. Hence, Turkey's financial expectations from the EU membership, thus the strong will to join the EU partly faded for two reasons.

First, due to the long-lasting disappointment with the accession negotiations, the popular support for an alliance with the European Union experienced a drastic fall. Despite remarkable and enormous changes in the Turkish constitution for acceding to the *aquis communautaire*, still being in a position to knock on the EU's door for membership was perceived as humiliation by high majority of the Turkish population.

Secondly, being an autonomous power in good relations with the Eastern neighborhood was thought to be maintained much quicker than being an extrinsic member of the EU. Furthermore, simultaneous with the AK Party rule, a considerable shift emerged in Turkish foreign policy. While enduring the accession ambitions at the level of official discourse, Turkey's intensified relations with the Middle Eastern countries signaled the prospects of resuming its soft power followed by a rapid inclusion into the political and economic dynamics of the Middle East.

The tangible outcome of these steps was evidenced by Turkey signing a high number of energy deals with Iran, Iraq, and Qatar. Economic partnership agreements along with the improved relations with Syria and the exchange of information and support on Iraq's political future, economic partnership agreements proved the eastward shift of the Turkish foreign policy making under the AK Party rule from 2002 to 2009.

Concerning the MEPP, the Turkish initiative to revitalize the Palestinian economy by launching an Industrial zone in Gaza was welcomed by the World Bank and the EU (Çağlar & Kaptanoğlu, n.d.). However, these common projects were not mentioned within the EU policies for MEPP. On this point, the EU foreign policy failed to communicate relevant actors in the peace process. The communication carried out on a bilateral level apparently did not meet the requirements of the peace process. Among the witnesses interviewed during this research, it is observed that Turkey was not regarded as a direct correspondent for the peace process (EU, 2009). This mindset led the European officials to project Turkey's prospects for action in the Middle East after its accession to the EU. Resented by exclusion from its territory and combined with the keen participation to MEPP, the feeling of belongingness due to the socio-cultural orientation of AK Party, the Turkish officials and society were willing to be a regional actor for assuming action rather than being designated to it in line with the preferences of a party, which regarded Turkey only as an external partner (Çağlar & Kaptanoğlu, n.d.). The best example of the realization of this line of thought was witnessed during the Davos exchange between Turkish Prime Minister Recep Tayyip Erdoğan and

Israeli Prime Minister Shimon Peres in early 2009 when Erdoğan walked off the stage after expressing his disappointment on Gaza offensive of Israel (Benhold, 2009).

To sum up, given its economic and diplomatic support to the MEPP, the dignity of the EU could not be disputed. Likewise, the growing mediatory role of Turkey among Israel, Syria, Lebanon, and the Palestinians due to its relations with the militant group Hamas was not to be overlooked by the EU. Because the soft power necessary for the reconciliation of the parties involved in the Israeli-Palestinian conflict could not be replaced solely by economic strength.

6. **Conclusion**

Given its fragmented image in foreign policy making, the EU struggled to assert itself as a leading and credible actor in the political landscape of the Middle East. The colonial history of European member states, coupled with the region's significant oil and natural gas resources, as well as its cultural-religious ties to European identity formation highlighted the Middle East's importance in European foreign policy. Consequently, the EU maintained a relatively weak yet enduring involvement in peace-making efforts in the region.

The process of European integration, alongside shifting international dynamics such as the end of the Cold War and the dissolution of the Soviet Union spurred a more assertive EU foreign policy towards the Middle East. Increased influence from other international actors in the region compelled European member states and supranational institutions in Brussels to prioritize a cohesive Middle East policy.

To this end, the EU's main line of policy for the settlement of the Israeli-Palestinian conflict was based on the principle that Israel's long-term security would only be assured with a strong Palestinian state. The European foreign policy tool, in particular the European Neighbourhood Policy, could be utilized in combination with the European Parliament's Israeli Action Plan for MEPP. The intensified relations and an incentive of future accession to the EU single market without being an EU member could motivate Israel to open borders for trade with Gaza and allow free movement in the West Bank, which would revive the Palestinian economy, help to reduce poverty and crime rates, lessen fundamentalism and contribute to the Israeli security in the long run.

Had the EU desired to enhance its credibility and clout to have an esteem in policy making, it needed to show its proactive approach to the US and Israel while adopting an all-inclusive approach, ready to cooperate with other actors, including Turkey, to accelerate the conditions for settlement of the internal conflict in Palestine. The transformation of Hamas could have been one of

the EU projects that resulted with success at engaging Fatah, then a terrorist organization, starting from Venice Declaration in 1980 on. For this, however, it was essential for the EU to pursue its strategy without offending the US and Israel. Finally and most importantly, Turkey, as an emerging regional actor and gradually developing more sympathetic towards the Middle East could be engaged to play a constructive role in the region, which would have exalted the image of the EU throughout the Middle East.

REFERENCES

Akehurst, M. (2008). The Arab-Israeli Conflict and International Law. In V. Kattan, *The Palestine Quation in International Law* (pp. 19-40). British Institute of International and Comparative Law.

Archick, K. (2005, March 9). *CRS Report for Congress: European Views and POlicies Toward the Middle East.* Retrieved from Congressional Research Service: https://sgp.fas.org/crs/mideast/RL31956.pdf

Baroudi, S. E. (2007). Arab Intellectuals and the Bush Administration's Campaign for Democracy: The Case of the Greater Middle East Initiative. *Middle East Journal*, 390-418.

Behr, T. (2008). Enduring Differences? France, Germany and Europe's Middle East Dilemma. *Journal of European Integration*, 79-96.

Benhold, K. (2009, January 29). *Leaders of Turkey and Israel Clash at Davos Panel.* Retrieved from The New York Times: https://www.nytimes.com/2009/01/30/world/europe/30clash.html

Berzi, T. (2009, January 29). *European Reactions to Israel's Gaza Operation.* Retrieved from Jerusalem Center for Public Affairs: https://jcpa.org/article/european-reactions-to-israel%E2%80%99s-gaza-operation/

Çağlar, E., & Kaptanoğlu, N. (n.d.). *Industry for Peace Initiative.* Retrieved from TEPAV: https://www.tepav.org.tr/eng/admin/dosyabul/upload/IndustryforPeaceInitiative.pdf

Dror, Y., & Pardo, S. (2006). Approaches and Principles for an Israeli Grand Strategy towards the Europen Union. *European Foreign Affairs Review*, 17-44.

EU, M. E. (2009, 06 20). Middle East Peace Process. (S. Sarıca, Interviewer)

European Union Committee. (2007, July 24). *26th Report of the Session 2006-07.* Retrieved from The EU and the Middle East Peace Process: https://publications.parliament.uk/pa/ld200607/ldselect/ldeucom/132/132i.pdf

Everts, S. (2005). An Asset but not a Model: Turkey, the EU and the wider Middle East. In K. Barysch, S. Everts, & H. Grabbe, *Why Europe should embrace Turkey* (pp. 47-69). Center for European Reform. Retrieved from https://www.ab.gov.tr/files/ardb/evt/1_avrupa_birligi/1_6_raporlar/1_3_diger/tr_embrace_europe.pdf

Gavin, B. (2005). The Euro-Mediterranean Partnership: An Experiment in North-South-South Integration. *Intereconomics*, 353-360.

Harpaz, M. D. (2008). Israel's Trade Relations with the European Union: The Case for Diversification. *Mediterranean Politics*, 391-417.

Kalın, İ. (2008). Turkey and the Middle East: Ideology or Geo-Politics? *Private View*.

Kaptanoğlu, N. (2009). *The Results of the Israeli Elections: Peace Supporters are Losing Power in Knesset.* Istanbul: Economic Policy Research Foundation of Turkey (TEPAV).

Migdalovitz, C. (2003). *The Middle East Peace Talks.* Congressional Research Service.

O'Donnell, C. (2008, April). *The EU, Israel and Hamas.* Retrieved from Centre for European Reform: https://www.cer.eu/sites/default/files/publications/attachments/pdf/2011/wp_820-1475.pdf

Palestinian Delegation to the EU, B. a. (2009, October 1). Relations with Israel in view of the Middle East Peace Process. (S. Sarıca, Interviewer)

Salem, P. (2009, October 29). *Could this be Turkey's Century in the Middle East?* Retrieved from Malcolm H. Carr Carnegie Middle East Center: https://carnegie-mec.org/2009/10/29/could-this-be-turkey-s-century-in-middle-east-pub-24067

Smith, M. E., & Webber, M. (2008). Political Dialogue and Security in the European Neighborhood: The Virtues and Limits of New Partnership Perspectives. *European Foreign Affairs Review*, 73-95.

Soetendorp, B. (2002). The EU's Involvement in the Israeli-Palestinian Peace Process: The Building of a Visible International Identity. *European Foreign Affairs Review*, 283-295.

The Guardian. (2007, July 11). *Open Letter The road map has failed* . Retrieved from The Guardian: https://www.theguardian.com/commentisfree/2007/jul/11/theroadmaphasfailed

The Guardian. (2008, December 28). *Reaction in Quotes: Gaza Bombing.* Retrieved from The Guardian: http://news.bbc.co.uk/2/hi/middle_east/7801444.stm

UN Security Council. President. (2009, May 11). *Statement / by the President of the Security Council.* Retrieved from United National Digital Library: https://digitallibrary.un.org/record/654231?ln=en&v=pdf

Yiftachel, O. (2009). Voting for Apartheid: The 2009 Israeli Elections. *Journal of Palestine Studies*, 72-85.

Youngs, R. (2006). *Europe and the Middle East.* London: Lynne Rienner Publishers.

CHAPTER 6

FINTECH

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1. INTRODUCTION

1.1 What is Fintech?

Fintech, or financial technology, is a term that refers to the use of technology in the provision of financial services. Fintech also refers to technologies in the financial services sector that introduce new business models, applications, processes, or products, and can have a significant impact on financial markets, financial institutions, and the provision of financial services. This is what we call innovation (ECB, 2018).

This covers a variety of applications, including mobile banking, blockchain technology, digital currencies, peer-to-peer lending, robo-advisors, and digital currencies (Ernst & Young, 2019). Fintech seeks to leverage technological advancements to enhance and streamline the financial process while also making it more cost-effective, easy, and effective.

Fintech plays a crucial role in making financial services more accessible to a wider range of people. Mobile banking and digital payment solutions provide basic financial tools to people in unbanked areas, fostering financial inclusion and empowerment (Raskin, & Yermack, 2016). Blockchain and cryptocurrencies are disrupting traditional banking models by facilitating decentralized and secure transactions, reducing dependence on conventional banking systems.

Robo-advisors exemplify the incorporation of artificial intelligence (AI) into financial services. Algorithms and machine learning are employed by automated investment platforms to monitor your account, assess market movements, and provide customized investment advice. Thus, artificial intelligence facilitates investors in improving decision-making skills as well as information relating to personal finance to its users.

Fintech peer-to-peer platforms combine both borrowers and lenders, thereby eliminating conventional middlemen transactions, minimizing the cost of operations, and improving the effectiveness and speed of financial processes. It also promotes innovation and entrepreneurship by using peer-to-peer crowdfunding and financing platforms platforms which give companies access to capital from a series of investors.

Fintech has many benefits, but it also brings new issues and regulatory considerations. Legislators and business leaders ought to carefully examine data privacy, cyber security, and potential financial exclusion issues. Regulations must change to keep up with technology in order to protect consumers, preserve the financial system, and responsibly promote innovation.

Fintech is a dynamic force that is reshaping the financial sector and opening up new avenues for efficiency, creativity, and inclusivity. As the

fintech industry develops, continued research and regulatory flexibility will be essential to determining the direction of the sector and its impact on the global financial system.

1.2 Brief History of Fintechs

There are more than 120 fintech markets, covering a wide range of services such as digital payments, alternative finance, wealth management, and blockchain. Fintech innovations are appearing in many financial areas such as retail banking, insurance, wholesale payments, equity finance, investment management, lending, etc. promoting the development of access to financial services and the transformation of traditional products/services (Luo et al., 2022; Murinde et al., 2022) compete with them (An & Rau, 2021; Panos Wilson, 2020). Therefore, developments in financial technology have a significant impact on the financial performance of the bank and the industry.

Indeed, financial technology (fintech), which combines technology and finance, has become a new form of finance in the new century. The Financial Stability Board (FSB) defines financial technology as business models, technology applications, and operational processes, and refers to new products (FSB, 2017). The FSB believes that financial technology does not increase the availability of financial resources or the asymmetry of transaction information, thereby improving resource allocation and keeping costs low and efficient (FSB, 2016).

Moreover, financial technology companies have grown rapidly in recent years, contributing significantly to global economic growth and preventing the deterioration of economic conditions in countries. It is important to examine the positive impact of COVID-19 on the fintech industry. Previous studies by Ashraf (2020) and Goodell (2020) have shown that COVID-19 has a strong impact on financial markets. The coronavirus disease (COVID-19) has caused unprecedented market disruption, and investors are currently struggling.

The opportunities offered by financial innovation have fostered the development of the financial industry in developing countries (Napier, 2014; Ndako, 2010). Financial innovation acts as a catalyst for economic transformation by increasing the efficiency of financial intermediaries (Johnson & Kwak, 2012) and diversifying financial services (Merton, 1992; Silve and Plekhanov, 2014). This will accelerate sustainable economic growth. This promotes technological progress (Valverde et al., 2007) and the efficient allocation of financial resources through new production methods.

1.3 The Importance of Fintech

Experts and researchers have identified several key reasons why fintech is considered important to modern finance. Here are some insights into the importance of fintech:

- **Financial Inclusion:** Fintech is crucial for advancing financial inclusion by enabling impoverished people to access financial services. Electronic wallets, payments via mobile devices, and networks of peers provide financial alternatives beyond what a conventional financial system offers.

- **Efficiency and Cost Reduction:** Fintech innovations use various risk mitigation tools and cybersecurity procedures to safeguard financial transactions and data (Gomber et al., 2017). Blockchain technology is highly acclaimed for its capacity to enhance security and diminish fraud in financial operations.

- **Competition and Innovation:** Fintech creates new business tactics and fosters innovation in the financial industry. In order to meet client expectations and improve competitiveness, both large financial institutions and startups are attempting to adapt and develop innovative solutions (Yermack, 2017). This has created a dynamic financial landscape.

- **Better Customer Experience:** Fintech has made the customer experience better by offering personalized services, quicker transaction processing, and user-friendly interfaces. Convenience and customer satisfaction are the main goals of technological solutions like robot cashiers and online banking (Demirgüç-Kunt et al., 2015).

- **Data Analytics and Personalization:** Fintech utilizes big data analytics to acquire insights into consumer behavior and requirements. Financial institutions can provide customized products and services to supply specific and pertinent offerings to consumers (Lee and Shin, 2018).

- **Risk Management and Security:** To protect financial transactions and data, fintech technologies integrate a range of risk control tools and cybersecurity protocols (Gomber et al., 2017). Blockchain technology is well recognized for its ability to improve security and reduce fraudulent activity in financial transactions.

This overview shows why fintech is a transformative force in the financial industry, impacting everything from access to efficiency, innovation, and customer experience. The references provided insight into the academic research and literature on this topic.

2. Types of Fintech Companies

Fintech companies operate in many sectors, offering innovative solutions that use technology to improve or transform traditional financial services. Here is a brief summary of the different fintech companies, including their structure, products, services and industry:

- **Chime and Revolut Company** is a digital banking institution founded in the 2010s that specializes in online banking services, to provide customers with convenient financial services without physical branches.

- **PayPal and Square Cash** is an Online payment and money Transfer Company founded in the late 1990s and 2000s that focuses on online payment solutions that make it easy for users to make digital transactions and transfer money via mobile wallets.

- **LendingClub and Prosper** peer-to-peer (p2p) lending platform founded in the mid-2000s connecting borrowers directly with the individual lenders changing lending models downward and promoting financial inclusion.

- **Wealthfront and Betterment** represent robo-advisors founded in the 2010s that use algorithms to automate investment management and provide users with low, algorithm-based returns on investing and financial management.

- **Coinbase and Ripple** are Cryptocurrency and Blockchain Companies that were founded in the early 2010s and operate in the financial and blockchain space. They facilitate Cryptocurrency trading and offer blockchain-based solutions for financial transactions.

- **Lemonade and Oscar Health** Insurtech companies that emerged in the 2010s, use, technology to innovate and improve all aspects of the insurance industry, focusing on customer-centric and simple processes.

- **Onfido and ComplyAdvantage** are Regtech (Regulatory Technology) Companies that were founded in the 2010s and specialize in Regtech. They offer technology solutions that help companies accelerate compliance and streamline regulatory processes.

- **Kickstarter and Indiegogo** are Crowdfunding Platforms founded in the late 2000s that allow individuals and companies to raise money from a large group of people for creative, startup, or charitable projects.

- **Rocket Mortgage and Zillow** are digital mortgage and real estate companies that have been active since the 2010s. They use technology to simplify the mortgage and real estate process and offer digital solutions for home buyers and sellers.

- **Mint and YNAB** Personal finance and budgeting apps developed in the late 2000s, offer personal finance and banking applications that provide users with tools for budgeting, tracking payments, and general financial management.

This illustrates the diversity and evolution of fintech companies in different industries and demonstrates their contribution to the transformation of the financial industry.

3. The Services or Products Offered by Fintechs

Fintech businesses provide a range of products that address many areas of financial services. Here is a list of popular fintech products, along with a short overview.

- **Digital Banking Services:** Digital banks provide online financial services to clients by facilitating users to gain access to their accounts via mobile app, and web interface without necessarily visiting a bank in person thereby effectuating operations such as account management, money transfers as well as financial instruments management.
- **Robo-Advisory Services:** Robo-advisors provide clients with personal investment information, and financial control services and adjust/or program according to their financial goals by utilizing algorithms.
- **Online Payment and Money Transfer:** financial technology establishments provide both wire and electronic fund payment solutions to their users via online platforms and mobile wallets in order to carry out digital operations, send/receive money, and also manage their finances.
- **Services related to Blockchain and Cryptocurrency:** The fintech company offers blockchain solutions, financial services, and cryptocurrency trading platforms such as Bitcoin. By using blockchain technology, people may buy, sell, and safely keep digital currencies, ensuring secure and transparent financial transactions.
- **Regtech Compliance Solutions:** Regtech companies offer identity confirmation services, perform bank secrecy acts (anti-money laundering-AML), and supervise legislative advancements. Hence, provides legal technology solutions that help businesses comply with financial regulations.
- **Insurtech Solutions** offers online insurance coverage, personal insurance possibilities as well as AI-powered declaration processing. In the process of utilizing technology, insurtech trades are transforming and enhancing many facets of insurance companies.
- **Crowdfunding Platforms:** Through crowdfunding platforms, individuals and organizations can raise money for a range of projects from large audiences. Initiatives may call for inventiveness, generosity, and creative thinking.
- **Apps for Personal Financial Management and Budgeting** give users the possibility to check their spending capacity to achieve financial

goals. Apps related to money and personal finance also offer tools for tracking costs, creating budgets, and managing funds.

- **Digital Mortgage Solutions** helps users in using digital resources, house buying process, presenting mortgage applications, and follow their progress. By automating and digitizing Fintech firms, the process of applying for and getting home loans approved is simplified.
- **Neobanks:** Neobanks are financial institutions that don't have any physical branch locations and only conduct business online. They emphasize giving customers a modern and easy financial experience by offering credit cards, checking and savings accounts, and other services.

The information shows a diversity of products and services offered by fintech businesses, each having unique characteristics and offerings that fit into predetermined categories.

4. Conclusion

Fintech is increasing the digitization of the financial sector by improving enterprises' access to financial services and providing effective, affordable solutions. The emergence of digital banking, online lending, payment gateways, and robo-advisory services has revolutionized the way in which businesses manage their assets and finances.

Fintech is a very important player in the modernized business world due to its capacity to improve efficiency, create financial solutions, and navigate change. Fintech's wide range of services and products makes it essential for satisfying a diversity of corporate needs.

Finally, by giving small and medium-sized businesses (SMEs) access to contemporary financial instruments, fintech seeks to promote financial inclusion while increasing business efficiency and profitability. Organizations benefit from continuous innovation in the fintech sector, which is growing and encourages global competition and economic progress.

REFERENCES

Arner, D. W., Barberis, J. N., & Buckley, R. P. (2016). The Evolution of FinTech: A New Post-Crisis Paradigm? Georgetown Journal of International Law, 47(4), 1271-1319.

Bank for International Settlements (BIS). (2021). Central bank digital currencies: foundational principles and core features. Retrieved from https://www.bis.org/publ/othp33.htm

Chan, C., Wang, H., Kong, Y., & Lin, J. W. (2021). An analysis of COVID-19 impacts on S&P 500 and Fintech index. International Journal of Financial Engineering, 8(02), 2141003.

Citation: EY. (2019). Global Fintech Adoption Index 2019. Retrieved from https://www.ey.com/en_gl/financial-services/global-fintech-adoption-index

Citation: Klaff, J., & Mayer, S. (2016). Competition among the many: The rise of fintech and widespread entry. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2862578

Demirgüç-Kunt, A., Klapper, L., Singer, D., & Van Oudheusden, P. (2015). The Global Findex Database 2014: Measuring Financial Inclusion around the World. World Bank Policy Research Working Paper, No. 7255.

European Central Bank. (2018). Fintech and the financial services landscape: An overview. ECB Occasional Paper No. 210.

EY Global FinTech Adoption Index 2019 - Ernst & Young LLP.

Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital Finance and FinTech: Current Research and Future Research Directions. Journal of Business Economics, 87(5), 537–580.

Klaff, J., & Mayer, S. (2016). Competition among the many: The rise of fintech and widespread entry. Columbia Business School Research Paper No. 16-69.

Lee, C. C., Li, X., Yu, C. H., & Zhao, J. (2021). Does fintech innovation improve bank efficiency? Evidence from China's banking industry. International Review of Economics & Finance, 74, 468-483.

Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. Business Horizons, 61(1), 35–46.

Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction. Princeton University Press.

Nguyen, Q. K. (2022). The effect of FinTech development on financial stability in an emerging market: The role of market discipline. Research in Globalization, 5, 100105.

Raskin, M., & Yermack, D. (2016). Digital Currencies, Decentralized Ledgers, and the Future of Central Banking. NBER Working Paper No. 22238

Statista. (2021). Robo-advisors - statistics & facts. Retrieved from https://www.statista.com/topics/5119/robo-advisors/

World Bank. (2018). Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. Retrieved from https://globalfindex.worldbank.org/

Yermack, D. (2017). Corporate Governance and Blockchains. Review of Finance, 21(1), 7–31.

CHAPTER 7

EMPIRICAL DETERMINANTS OF MANUFACTURING DIRECT FOREIGN INVESTMENT IN DEVELOPING COUNTRIES

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1. Introduction

By facilitating the transfer of money, technology, and knowledge across international boundaries, Foreign Direct Investment (FDI) plays a crucial role in propelling developing nations' economic development (Li & Tanna, 2019). In an effort to decipher the complex web of variables impacting investment decisions, this article dives into the empirical elements that determine FDI in developing nations' industrial sectors.

Multinational firms are reevaluating their investment plans due to the attractiveness of unexplored markets, inexpensive labor, and possible large returns. Given this context, it is critical for politicians, economists, and entrepreneurs to comprehend the actual factors that contribute to this. Given the complexity of these factors, it is necessary to investigate them from several angles, which calls for a thorough investigation of the many factors that influence the investing environment (Dinh et al., 2019).

This essay intends to add to the continuing conversation by expanding and synthesising what is currently known about manufacturing FDI in developing nations, drawing on prior research. The review progresses, revealing that the factors impacting FDI are complex and interrelated. Because of this complexity, an empirical method is required to decipher the myriad of factors affecting foreign investment (Sarkodie & Strezov, 2019).

The investment climate is greatly influenced by macroeconomic issues. We look at inflation, GDP growth, and currency rates to see how these affect foreign direct investment (FDI) in manufacturing. When evaluating the possible returns on investments, these economic indicators are crucial since they show how a country's economy is doing overall (Peres et al., 2018). This article seeks to provide a better understanding of the economic context in which choices about manufacturing FDI are made by analyzing these macroeconomic factors.

The emphasis moves to trade policy and investment incentives as the investigation into the empirical factors advances. When it comes to luring international investors, governments really shine when they craft regulations that provide an ideal setting for doing business (Essandoh et al., 2020).

Important factors impacting foreign direct investment decisions include technology preparedness and infrastructure development. A country's appeal as a location for foreign industrial investments increases when its infrastructure and technological capabilities are strong. At the same time, the regulatory and political climate has a significant impact on the investment landscape. When considering investing abroad, international investors prioritize a stable environment, strong rule of law, and an advantageous business climate.

2. Literature Review on Foreign Direct Investment (FDI)

Li and Tanna (2019) provided new evidence on the impact of foreign direct investment (FDI) on productivity in developing countries. Dinh et al. (2019) explored the short-run and long-run effects of FDI on economic growth in developing countries. Sarkodie and Strezov (2019) investigated the effects of FDI, economic development, and energy consumption on greenhouse gas emissions in developing countries. Peres, Ameer, and Xu (2018) studied the influence of institutional quality on FDI inflows in both developed and developing countries. Essandoh, Islam, and Kakinaka (2020) examined the link between international trade, FDI, and CO2 emissions in both developed and developing nations. Mamingi and Martin (2018) focused on the relationship between FDI and growth in developing countries, specifically in the countries of the Organisation of Eastern Caribbean States.

Aust, Morais, and Pinto (2020) investigated how FDI contributes to Sustainable Development Goals in African countries. Asongu, Akpan, and Isihak (2018) explored the determinants of FDI in fast-growing economies, examining evidence from the BRICS and MINT countries. Bermejo Carbonell and Werner (2018) employed a new empirical approach to analyze whether FDI generates economic growth, focusing on Spain. Sabir, Rafique, and Abbas (2019) studied the relationship between institutions and FDI in both developed and developing countries. Paul and Feliciano-Cestero (2021) provided an overview and research agenda for five decades of research on FDI by multinational enterprises (MNEs). Solarin and Al-Mulali (2018) investigated the influence of FDI on indicators of environmental degradation.

3. Macroeconomic Factors Impacting FDI

The investment environment is shaped by a complex interaction of macroeconomic factors, which in turn determine the attraction of foreign direct investment (FDI) in emerging nations. In order to successfully traverse the ever-changing global economic landscape, policymakers and investors must have a thorough understanding of the influence of these elements(Mamingi & Martin, 2018). We explore the many facets of macroeconomic impacts on manufacturing FDI in emerging economies in this section.

The rate of growth of a country's Gross Domestic Product (GDP) is one of the main macroeconomic variables that affect FDI. A country's health and appeal to international investors are strongly correlated with its rate of economic expansion. Strong and consistent GDP growth is an indicator of a thriving economy, which in turn opens doors to investment possibilities with the potential for greater profits. Countries with rapid economic growth attract investors, particularly those in the industrial sector, since it suggests a large and growing consumer market (Aust et al., 2020).

Foreign direct investment (FDI) decisions are heavily influenced by exchange rates. One factor that determines a country's investment attractiveness is the value of its currency in comparison to its trade partners. This, in turn, affects manufacturing costs. A falling currency may attract investors looking for cost benefits, while an advantageous exchange rate might make exports more competitive. Understanding how currency values impact the decision-making process for overseas industrial investments requires an analysis of the dynamics of exchange rates (Asongu et al., 2018).

A stable and predictable investment climate is affected by inflation, another macroeconomic factor. Overly high inflation reduces a currency's buying power and throws cost structures of companies into disarray. Unpredictable inflation rates terrify investors, especially those in the manufacturing sector, since they can mess with production schedules and cut into profit margins. Foreign manufacturers frequently view developing nations with relatively steady inflation rates as more appealing because they offer a favorable environment for long-term investments.

The government's monetary policy and fiscal policies are also threads in the macroeconomic fabric that affect FDI. Maintaining price stability in the economy is a goal of well-balanced fiscal policy. Similar to how wise monetary policies affect the cost of capital and investment climate generally, they control the money supply and interest rates. In order to reduce the dangers of inflation and currency volatility, investors choose to put their money into nations whose fiscal and monetary policies are well-balanced (Bermejo Carbonell & Werner, 2018).

When thinking about foreign direct investment (FDI) in manufacturing, a country's total infrastructure is another important macroeconomic factor. Things like transportation networks, energy supplies, and telecommunications are a part of this, in addition to the more conventional economic indicators. Transportation of products and services is made easier and manufacturing is made more efficient with a well-developed infrastructure. Because better infrastructure means lower operational costs and easier logistics, countries with strong infrastructure tend to attract more foreign investment.

4. **Trade Policies and Investment Incentives**

Trade rules and investment incentives are important factors that might entice or discourage multinational businesses from engaging in foreign direct investment (FDI) in manufacturing. If a developing nation wants to use foreign direct investment (FDI) to boost its economy, it would likely craft trade rules and incentives in a way that attracts FDI. Developing countries' industrial FDI trajectories have been significantly influenced by these rules and incentives, which we will examine in this section (Sabir et al., 2019).

The establishment of norms and laws controlling the cross-border movement of products and services is a key function of trade policy. If a developing nation wants to join the ranks of the world's leading manufacturers, it will likely adopt trade policies that attract investment from rich nations and make international commerce easier.

Trade policies, which include tariff and non-tariff obstacles, affect a country's attractiveness to foreign direct investment (FDI) in manufacturing. Reduced manufacturing costs for foreign investors can be achieved by lowering tariffs on imported raw materials and intermediate goods, which makes the destination more attractive. A less complicated and more efficient business climate is also the result of efforts to lower non-tariff barriers, such as those pertaining to customs and regulations (Paul & Feliciano-Cestero, 2021).

In order to entice foreign direct investment (FDI) in manufacturing, many developing nations have embraced trade liberalization policies that remove barriers to imports and exports. Foreign investors looking for new chances and markets may be enticed to these countries by their open markets, which show their dedication to creating a competitive and dynamic economic environment.

When it comes to trade policies that affect foreign direct investment, bilateral and multilateral trade agreements are equally important. Countries that are members of regional trade blocs or international accords usually have better trade conditions, which makes it more appealing for investors from other countries to invest there since they can access more markets (Solarin & Al-Mulali, 2018).

Investment incentives stand out as effective instruments in the toolbox of developing nation governments seeking to entice prospective foreign investors. The goal of these incentives is to make the destination more appealing to investors while reducing the risks connected with investing in a new market (Li & Tanna, 2019).

To entice foreign direct investment (FDI) in manufacturing, governments often offer tax breaks, such as lower corporation tax rates or tax vacations. In addition to making the host nation more competitive, these incentives help foreign investors get a better return on their investment.

Additional strategies used to attract foreign manufacturers include financial incentives such as grants, subsidies, and low-interest loans. Investors might feel less financial strain and the venture becomes more financially feasible when these benefits cancel out early capital expenses (Sarkodie & Strezov, 2019).

Many developing nations have set up Special Economic Zones (SEZs) to attract investment in certain regions. A special economic zone (SEZ) is a

regulated and advantageous location for foreign direct investment (FDI) in manufacturing because of the infrastructure and logistical assistance it offers, as well as the business-friendly regulatory climate.

The conclusion is that developing nations' strategies to attract manufacturing FDI revolve around trade policy and investment incentives. A free and competitive market is the goal, and providing real advantages to attract foreign investors is the other. These policies and incentives have been fine-tuned to strike this balance. For governments seeking economic progress through foreign investment, it is crucial to comprehend the interdependent nature of these policy instruments and manufacturing FDI, especially in light of the dynamic nature of the global economy (Essandoh et al., 2020).

5. **Infrastructure Development and Technological Readiness**

Developing nations' investment landscapes are being shaped by infrastructural development and technology preparedness, which are crucial factors in the arena of foreign direct investment (FDI), especially in manufacturing. All of these things work together to affect how well manufacturing processes work and how ready a country is to accept and benefit from technological progress. The importance of infrastructure and technical preparedness in luring foreign direct investment (FDI) in manufacturing is discussed in detail in this section (Aust et al., 2020).

For emerging nations to attract foreign investment in manufacturing, they must have strong infrastructure, which is essential to economic growth. The transportation networks, energy supply, telecommunications, and logistical capabilities that make up a country's infrastructure are all important factors in determining the country's appeal to foreign direct investment.

Raw resources, intermediary commodities, and completed items must all be able to flow freely and efficiently inside a system. Logistics-heavy industrial sectors that depend on just-in-time production methods benefit greatly from well-developed transportation infrastructure, which includes highways, ports, and airports (Bermejo Carbonell & Werner, 2018).

An additional essential component of infrastructure development is a dependable and reasonably priced energy source. In order to keep their production running smoothly, manufacturers look for locations with a reliable power supply. This is particularly true for energy-intensive businesses. In order to attract foreign direct investment (FDI) in manufacturing, governments should invest in modern and sustainable energy infrastructure. This would alleviate worries about operating costs and production continuity (Paul & Feliciano-Cestero, 2021).

Foreign direct investment (FDI) in manufacturing is growing more and more dependent on telecommunications infrastructure, especially in the

Industrial Revolution. 4.0. The productivity and competitiveness of industrial processes are greatly affected by advanced communication networks, which allow for the interchange of data in real-time, enable automation, and improve connection.

In order to attract foreign direct investment (FDI), governments typically concentrate resources in certain locations, known as Special Economic Zones (SEZs), which are generally associated with infrastructural development. Foreign firms are often enticed by SEZs because of the improved infrastructure, regulatory incentives, and simplified administrative processes that are offered (Dinh et al., 2019).

A country is considered technologically prepared when it can easily incorporate and benefit from cutting-edge technology across a range of industries. Foreign direct investment (FDI) in manufacturing is impacted by technical preparedness. FDI is seeking conditions that promote innovation, automation, and digitalization.

To be technologically ready, one must have access to skilled workers. The ability to operate and manage new industrial technology is a skill that developing nations may cultivate via investing in vocational training programs and education. Foreign investors looking to set up technologically advanced factories consider this trained staff as a significant advantage (Peres et al., 2018).

To be technologically ready, a country needs government programs that encourage R&D. Countries that prioritize innovation tend to attract foreign direct investment (FDI) because it creates a setting where companies may work with local institutions and reap the benefits of a growth mindset.

Another important part of being technologically ready is the regulatory framework. The adoption and use of new technology are made easier under a regulatory climate that is both open and encouraging. Governments that work with industry leaders to craft regulations that promote technology adoption show they are serious about creating a setting that welcomes foreign direct investment (FDI) in manufacturing (Mamingi & Martin, 2018).

6. **Political and Regulatory Environment**

Foreign direct investment (FDI) conditions, especially in the manufacturing sector, are highly sensitive to a country's political and regulatory climate. For emerging nations to attract investments from multinational firms, political institution stability, rule of law, and regulatory framework all play crucial roles(Asongu et al., 2018).

Attracting foreign direct investment (FDI) in manufacturing requires a stable political climate, since investors choose countries with stable

governments that they can trust to keep their promises. Investors from other countries are more likely to commit to the long haul when they know there won't be any sudden policy shifts, expropriation, or societal turmoil. Foreign direct investment (FDI) in manufacturing is more likely to occur in countries with a track record of peaceful leadership changes and stable policy frameworks.

Not only do national governments guarantee political stability, but so do municipal administrations. Foreign direct investment (FDI) in manufacturing is encouraged when national and subnational legislation and policies are consistent. When evaluating the potential and risk of an investment, investors frequently do thorough analyses of the political climate, taking into account the stability of the entire governance system (Sabir et al., 2019).

An investment-friendly environment must include the rule of law. Legal systems that are both open and efficient guarantee the enforceability of contracts, the protection of property rights, and the fair and impartial resolution of disputes. The rule of law gives a foundation of legal certainty and protects against arbitrary acts, which is why foreign investors are more likely to invest in manufacturing in nations with it.

Protecting intellectual property is an important function of a strong legal system, which is especially important for manufacturing sectors that depend significantly on technical advancements. Countries that place a premium on and strictly implement intellectual property rules foster an atmosphere where international investors can freely exchange proprietary technology and engage in R&D without fear of retaliation (Solarin & Al-Mulali, 2018).

Foreign direct investment (FDI) in manufacturing is heavily impacted by the regulatory environment, which comprises several rules and regulations that control how businesses operate. Foreign investors are relieved of administrative constraints and operational complications due to clear and simplified regulatory processes. To encourage and facilitate manufacturing FDI, governments should work with stakeholders to draft policies that are beneficial to businesses and to reduce bureaucratic red tape.

Factors including environmental restrictions, licensing processes, and ease of doing business are generally considered by investors when evaluating regulatory frameworks. The establishment and operation of manufacturing facilities are made easier and more predictable in countries that prioritise efficient and business-friendly regulatory systems, which in turn attract manufacturing FDI (Li & Tanna, 2019).

Manufacturing FDI is vulnerable to political risk, which includes occurrences like policy shifts, geopolitical conflicts, and government turnover. Foreign investors can find some peace of mind while doing business in some

nations thanks to investment guarantees, political risk insurance, or bilateral investment treaties. These tools make a country more appealing to foreign direct investment (FDI) in manufacturing by creating a safer investment climate.

7. Challenges and Barriers to FDI

Although developing nations stand to benefit greatly from foreign direct investment (FDI), there are a number of obstacles that can slow down the process, particularly in the manufacturing industry. If policymakers and investors want to foster an atmosphere that is favorable to sustained FDI, they must first understand and then overcome these challenges. Here we look at the many obstacles and difficulties that developing countries encounter, and how they might affect the dynamics of foreign direct investment (FDI) in manufacturing (Sarkodie & Strezov, 2019).

Economic and political unpredictability is a major obstacle for foreign direct investment (FDI) in the industrial sector. High inflation, fluctuating currency rates, and budget deficits are all examples of economic uncertainties that could discourage investment from outside. Investors may be hesitant to make long-term commitments in countries that experience political instability, such as those with frequent government transitions, policy reversals, or geopolitical conflicts.

While strong infrastructure is a key factor in luring foreign direct investment (FDI), its lack or inadequate state can operate as a formidable obstacle. Haggling industrial operations and increasing production costs can be caused by insufficient transportation networks, inconsistent energy supply, and inadequate telecommunications. Lacking adequate infrastructure, developing nations may find it difficult to attract foreign direct investment (FDI) from countries that provide better incentives in this area (Essandoh et al., 2020).

Significant hurdles to manufacturing FDI might be bureaucratic procedures and excessive red tape. Investing projects can run over budget, take longer than expected, and leave investors feeling uneasy due to the lengthy and complicated processes involved in acquiring licenses, permits, and approvals. To reduce these obstacles and increase a country's attractiveness to FDI, administrative processes can be streamlined and the ease of doing business can be improved.

One typical problem with industrial FDI is inadequate or unclear legal and regulatory frameworks. Concerns regarding the enforcement of contracts, intellectual property, and property rights might arise when rules are ambiguous or contradictory, which in turn creates uncertainty for investors. Developing nations that want to entice foreign direct investment (FDI) should work on making their laws and regulations more open, equitable, and investor-

friendly (Aust et al., 2020).

There are labor market issues, but a competent and reasonably priced workforce might be an advantage for foreign direct investment. Concerns that can cause investors to lose faith include labor conflicts, strikes, or insufficient protections for workers. Furthermore, investing in high-tech manufacturing may be difficult for nations that do not have enough trained individuals in certain fields. To create an environment where investments may thrive, it is essential to strike a balance between the demands of workers and those of businesses.

Foreign investors face a substantial risk from fluctuations in currency exchange rates. When investors have to convert their earnings back into their native currencies, it may be a real pain if the local currency suddenly appreciates or depreciates. Countries that are able to maintain relatively stable currencies may be better able to entice foreign direct investment (FDI) in manufacturing, and investors must take steps to mitigate currency risk (Bermejo Carbonell & Werner, 2018).

The role of social and environmental issues in attracting or discouraging foreign direct investment (FDI) in manufacturing is growing. Countries that fail to fulfill acceptable environmental criteria may encounter pushback from investors that prioritize sustainable operations. A country's image as a desirable location for foreign direct investment (FDI) can be influenced by social factors including labor rights, community involvement, and corporate social responsibility.

8. **Conclusion**

In an effort to better understand the complex web of variables that shape the investment environment, this study has set out to empirically determine what criteria attract foreign direct investment (FDI) in manufacturing to developing nations. Multinational businesses' decisions to invest in the manufacturing sector of emerging economies are influenced by a variety of factors, including macroeconomic conditions and regulatory regimes. Several important takeaways emerge as we wrap up our investigation, highlighting the complex interaction of factors that determine a location's attractiveness for industrial FDI.

Policymakers, economists, and investors must all have a comprehensive grasp of the empirical factors. Investors from other countries take a wide range of variables into account when making investment decisions, including the state of the economy, trade policy, infrastructural development, political stability, and regulatory frameworks. In order to attract industrial FDI, it is important to understand the interconnectedness of these factors.

Attracting international investments while protecting national interests is a fine balancing act that developing nations must master. Finding the right balance in crafting regulations that encourage investment while simultaneously protecting workers' rights, the environment, and society is no easy feat. Establishing a long-term, win-win partnership between host countries and international investors requires finding this sweet spot.

Changes in consumer tastes, geopolitical dynamics, and technology capabilities all contribute to a dynamic and unpredictable global economic environment. In order to attract foreign direct investment (FDI) in manufacturing, developing nations need to be flexible and quick to respond to new circumstances. To stay competitive and attract investments in a world where change happens so quickly, governments need to be able to adapt their policies and plans to new trends.

Developing nations would do well to take note of the difficulties and roadblocks to manufacturing FDI. It takes a dedication to constant development to tackle problems like bureaucratic red tape, poor infrastructure, and legal ambiguity. In order to foster an atmosphere that inspires trust among investors, policymakers must persistently endeavor to improve infrastructure, simplify procedures, and fortify legal frameworks.

As we look to attract foreign direct investment (FDI) in manufacturing, international cooperation and the sharing of information become more important. Working together with global organizations, studying successful case studies, and exchanging best practices can help developing nations improve their capacities. Opportunity discovery and strategy formulation in line with global trends are both facilitated by discussion with investors and other nations.

In conclusion, this study shows that developing nations may attract industrial FDI by committing to collaboration, constant development, and adaptability. As countries attempt to make sense of the intricate global economic situation, the knowledge gained from this investigation will serve as a bedrock for well-informed decision-making.

Foreign direct investment (FDI) in manufacturing is a potent tool for achieving long-term economic growth. It helps host nations develop and change not only financially, but also via bringing technology, knowledge, and job possibilities. Developing nations may improve their standing in the global manufacturing FDI arena by taking on opportunities, overcoming obstacles, and cultivating a culture that prioritizes stability, innovation, and cooperation. Unlocking the transformational potential of foreign investments may generate economic success and sustainable development. However, this path isn't without its barriers. With strategic planning and a dedication to continual improvement, governments can overcome these obstacles.

REFERENCE

Asongu, S., Akpan, U. S., & Isihak, S. R. (2018). Determinants of foreign direct investment in fast-growing economies: evidence from the BRICS and MINT countries. *Financial Innovation*, *4*(1), 1-17.

Aust, V., Morais, A. I., & Pinto, I. (2020). How does foreign direct investment contribute to Sustainable Development Goals? Evidence from African countries. *Journal of Cleaner Production*, *245*, 118823.

Bermejo Carbonell, J., & Werner, R. A. (2018). Does foreign direct investment generate economic growth? A new empirical approach applied to Spain. *Economic geography*, *94*(4), 425-456.

Dinh, T. T. H., Vo, D. H., The Vo, A., & Nguyen, T. C. (2019). Foreign direct investment and economic growth in the short run and long run: Empirical evidence from developing countries. *Journal of Risk and Financial Management*, *12*(4), 176.

Essandoh, O. K., Islam, M., & Kakinaka, M. (2020). Linking international trade and foreign direct investment to CO2 emissions: any differences between developed and developing countries?. *Science of the Total Environment*, *712*, 136437.

Li, C., & Tanna, S. (2019). The impact of foreign direct investment on productivity: New evidence for developing countries. *Economic Modelling*, *80*, 453-466.

Mamingi, N., & Martin, K. (2018). Foreign direct investment and growth in developing countries: Evidence from the countries of the Organisation of Eastern Caribbean States. *CEPAL Review*.

Paul, J., & Feliciano-Cestero, M. M. (2021). Five decades of research on foreign direct investment by MNEs: An overview and research agenda. *Journal of business research*, *124*, 800-812.

Peres, M., Ameer, W., & Xu, H. (2018). The impact of institutional quality on foreign direct investment inflows: evidence for developed and developing countries. *Economic research-Ekonomska istraživanja*, *31*(1), 626-644.

Sabir, S., Rafique, A., & Abbas, K. (2019). Institutions and FDI: evidence from developed and developing countries. *Financial Innovation*, *5*(1), 1-20.

Sarkodie, S. A., & Strezov, V. (2019). Effect of foreign direct investments, economic development and energy consumption on greenhouse gas emissions in developing countries. *Science of the Total Environment*, *646*, 862-871.

Solarin, S. A., & Al-Mulali, U. (2018). Influence of foreign direct investment on indicators of environmental degradation. *Environmental Science and Pollution Research*, *25*, 24845-24859.

CHAPTER 8

DECISION MAKING IN CNC VERTICAL MACHINING CENTER: AN INTAGRATED APPROACH WITH AHP AND COPRAS METHODS

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1.INTRODUCTION

The primary aim of manufacturing companies that compete under current economic conditions is to produce goods and services by efficiently using their resources. The survival of companies depends on the decisions made by those in charge. Selecting a computerized numerical control (CNC) vertical machining center is one of the most important investment decisions for the company, and the type of CNC machine tool largely depends on the speed, quality and cost of production.

A machining center is a computer-controlled tool that allows different operations to be performed on different surfaces of a workpiece and in different directions. Machining centers allow different workpieces to be processed on the same machine within a shorter period of time and in the desired dimensions and tolerances. Machining centers, thanks to their linear and angular movements within different axes and the capability to automatically change cutting tools, enable many operations that had been performed on different machines to be performed on a single machine (İç and Yurdakul, 2008:86).

Studies on MCDM methods used to help select machining center machines are as follows: Oeltjenbruns et al. (1995), Lin and Yang (1996), Yurdakul (2004), and Çimren et al. (2004; 2007) used AHP method to select a machining center. Ayağ (2007) used a simulation technique in addition to AHP to resolve a machine-selection problem. Dağdeviren (2008) used the AHP PROMETHEE methods; Karim and Karmaker (2016) used the AHP and TOPSIS methods. Arslan et al. (2004) used a multi-criteria weighted average, Agdaie et al. (2013) used SWARA and COPRAS-G methods, Çakır and Akar (2017) used the SWARA and TOPSIS methods, and Ayağ and Özdemir (2006) and Duran and Agulio (2008) used fuzzy AHP to make a machine selection. In addition, Kaya et al. (2007) and Yurdakul and İç (2009) used fuzzy TOPSIS, Önüt et al. (2008) used fuzzy AHP–fuzzy TOPSIS, Tuzkaya et al. (2010) used fuzzy ANP and fuzzy PROMETHEE, Ayağ and Özdemir (2011) used FANP and Vatansever and Kazançoğlu (2014) used fuzzy AHP method by MOORA.

The present study was conducted to determine the most suitable CNC machining center using specific criteria of the company that operates within the energy sector and makes machine parts combined with welding. AHP and COPRAS methods, which are multi-criteria decision-making methods, were considered together to achieve this goal.

This manuscript comprises five parts. The first introduces the study and aim, the second introduces the AHP method and the steps followed for the method, the third explains the COPRAS method and the steps followed, the fourth provides the application, and the fifth provides the results and recommendations.

2. AHP METHOD

AHP was developed by Thomas L. Saaty in the 1970s and is a multi-criteria decision-making method which is a structured technique for organizing and analyzing complex decisions by breaking them down into a hierarchical structure of criteria, sub-criteria, and alternatives of expressing the components and variables of a complex, unstructured situation in a hierarchical order. (Saaty, 2005:5). AHP provides a systematic and structured approach to decision-making, allowing decision-makers to incorporate both quantitative and qualitative factors. It helps in handling complex decision problems with multiple criteria and alternatives, providing a more rational and consistent decision-making process.

In many cases, it is difficult for the decision maker to determine the best alternative because the criteria may conflict with each other, and most of the decision-making methods include only quantitative criteria; however, in real life, the decision-making process is significantly affected by not only quantitative but also qualitative criteria. Here, the AHP is a method by which the use of both quantitative and qualitative decision-making criteria in the evaluation and selection of options are allowed. The AHP is used in resolving decision-making problems encountered in many fields because it has a structure similar to real life and considers both qualitative and quantitative criteria.

The steps to be followed while resolving problems using the AHP method can be summarized as follows:

Step 1: Define the decision problem and identify the goal.

Step 2: Address the problem expressed as a hierarchical structure consisting of specific criteria, sub-criteria if any, and alternatives. The simplest method by which a decision problem is structured is to use a three-level hierarchical structure (Fig. 1). The purpose is at the top of this hierarchical structure, and the criteria used are given at the lower level. According to the structure of the problem, sub-criteria can be added and alternatives can be added to the lower part of the structure.

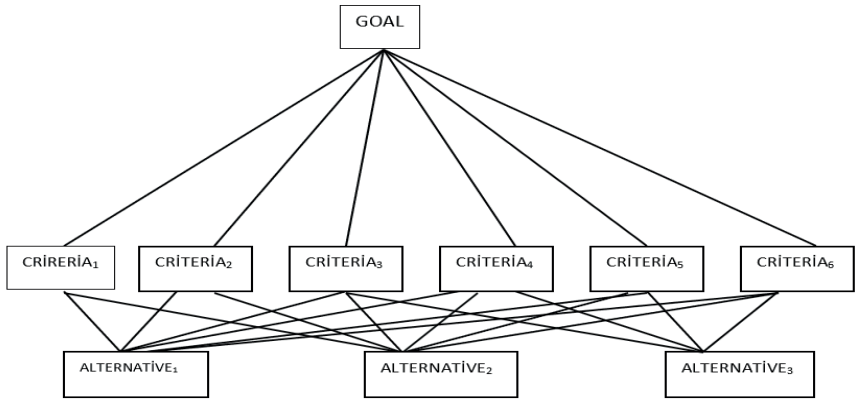

Figure 1. A Simple Three-Stage Hierarchical Model

Reference: Saaty,Thomas (1994). Fundamentals of Decision Making and Priority Theory, RWS Publications, Pittsburgh, p:94.

Step 3: Determine the priority of the elements at the hierarchical level through pairwise comparisons among elements at each level using a series of question–answer processes.

Decision makers use the scale from 1 to 9 suggested by Saaty (2008:86) when making pairwise comparisons. This comparison scale is given below (Saaty, 2008:86).

Table 1. Scale Used To Determine Pairwise Comparisons

Relative İmportance	Definition	Explanation
1	Equal importance	Two activities contribute equally to objective
3	Weak importance	Experience and judgment slightly favour one activity over another
5	Strong importance	Experience and judgment strongly favour one activity over another
7	Demostrated importance	One activity is strongly favoured and demonstrated in practice
9	Extreme importance	The evidence favouring one activity over another is of highest possible order of affirmation
2,4,6,8	İntermediate values	When compromise is needed between two adjacent judgments

Step 4: Check the consistency of the pairwise comparison matrices and calculate a consistency index using Eq. (1).

$$CI = \frac{\lambda_{\max} - n}{n-1} \tag{1}$$

To calculate the consistency ratio (CR), the random index (RI) value corresponding to the number of decision alternatives is determined. RI values are shown in Table 2 (Saaty, 1998:21). The CR is then calculated using Eq. (2).

$$\mathrm{CR} = \frac{CI}{RI} \tag{2}$$

For the calculated consistency levels to have a CR < 0.10, the levels of each element of the pairwise comparison matrix are considered to be significant. If CR > 0.10, the decision maker is inconsistent in his or her judgments and it is necessary to review the comparisons and improve the judgments.

Table 2. Random Index Values

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0,00	0,00	0,58	0,90	1,12	1,24	1,32	1,41	1,45	1,49	1,51	1,48	1,56	1,57	1,59

Step 5: Combine and synthesize the calculated priority vectors. Sum each row in the pairwise comparison matrix and divide each sum by the sum of all rows (i.e., normalize) to obtain the priority vectors to be combined in the synthesis stage.

Step 6: Combine the priority values obtained as a result of pairwise comparisons to prioritize the alternatives. Multiply and combine the priority values of the evaluated criteria and the priority values of the alternatives. Select the alternative with the highest value from the results.

3. COPRAS METHOD

In 1996, Zavadskas and Kaklauskas defined the mathematic infrastructure and they introduced the COPRAS method, which is applied to rank and evaluate alternatives in terms of priority and utility of the criteria. Specific values are used to maximize the high utility criteria and minimize low utility criteria (Aksoy et al., 2015:11). The superiority of COPRAS over other multi-criteria decision-making methods is that it rates the alternatives by degree of utility and indicates as a percentage how good or bad each alternative is when compared with the others.

The steps in COPRAS are listed below (Zavadskas et al., 2008:241–247). The variables in the model are shown as follows:

A_i = i alternatives I = 1,2,…m
K_j = j evaluation criteria j = 1,2,…n
W_j = weight of the j evaluation criteria j = 1,2,…n
X_{ij} = the value of i alternative in terms of j evaluation criteria

Step 1: Construct the decision matrix as seen in Eq. (3).

$$D = \begin{matrix} A_1 \\ A_2 \\ A_3 \\ . \\ . \\ A_m \end{matrix} \begin{bmatrix} x_{11} & x_{12} & x_{13} & . & x_{1n} \\ x_{21} & x_{22} & x_{23} & . & x_{2n} \\ x_{31} & x_{32} & x_{33} & . & x_{3n} \\ . & . & . & . & . \\ . & . & . & . & . \\ x_{m1} & x_{m2} & x_{m3} & . & x_{mn} \end{bmatrix}$$

Step 2: Transform the decision matrix into a normalized decision matrix using Eq. (4).

$$x_{ij}^{*} = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}} \qquad \forall j = 1,2,\dots,n$$

Step 3: Construct a weighted normalized decision matrix using Eq. (5).

$$D' = d_{ij} = x_{ij}^{*}.w_j$$

Step 4: Determine the criteria with high and low utility using Eqs. (6) and (7). For high-utility criteria is shown as $Si+$, and for low-utility criteria is shown as $Si-$.

$$S_{i+} = \sum_{j=1}^{k} d_{ij} \qquad j=1,2,\dots,k \qquad \text{high-utility criteria}$$

$$S_{i-} = \sum_{j=k+1}^{n} d_{ij} \qquad j=k+1,\ k+2,\ \dots,\ n \qquad \text{low-utility criteria}$$

Step 5: Calculate the relative priority value, symbolized as Qi for each alternative, using Eq. (8).

$$Q_i = S_{i+} + \frac{\sum_{i=1}^{m} S_{i-}}{S_{i-}.\sum_{i=1}^{m} \frac{1}{S_{i-}}}$$

Step 6: Use Eq. (9) to find the highest relative priority value.

$$Q_{max} = \quad \text{Max} \quad \{Q_i\} \quad \forall i = 1,2,\dots,m$$

Step 7: Use Eq. (10) to calculate the performance index symbolized as Pi for each alternative and rank the alternatives from largest to smallest.

$$P_i = \frac{Q_i}{Q_{max}} . 100\%$$

4. APPLICATION

The present study was conducted using a manufacturing company in Bursa Province, Turkey, that produces the combustion chamber of turbines. First, the AHP and COPRAS methods were applied for the selection of CNC machining centers. Second, eight criteria were determined for the selection of the proposals by interviewing the production manager and chief of the company. These criteria are given in Table 3.

Table 3. Criteria For Proposal Selection

Criteria
TX: Travel distance on X axis
TY: Travel distance on Y axis
TZ: Travel distance on Z axis
SX: Speed of X axis
SY: Speed of Y axis
SZ: Speed of Z axis
SD: Spindle speed
C: Cost

After the criteria were determined, the decision makers were asked to divide them into pairs and compare them. The decision matrix formed is provided in Table 4.

Table 4. Decision Matrix From Pairwise Comparisons Of Criteria

	TX	TY	TZ	SX	SY	SZ	SD	C
TX	1	1	0,5	3	1	1	0,5	3
TY	1	1	1	1	2	1	1	1
TZ	2	1	1	1	1	2	2	1
SX	0,33	1	1	1	2	0,5	1	0,5
SY	1	0,5	1	0,5	1	1	1	1
SZ	1	1	0,5	2	1	1	1	1
SD	2	1	0,5	1	1	1	1	1
C	0,33	1	1	2	1	1	1	1

Because the CR of the decision matrix = 0.08 (that is, <0.1), the resulting decision matrix was consistent. After checking the consistency using the AHP method, the decision matrix was normalized. It is provided in Table 5.

Table 5. Normalized Decision Matrix

	TX	TY	TZ	SX	SY	SZ	SD	C
TX	0,12	0,13	0,08	0,26	0,10	0,12	0,06	0,32
TY	0,12	0,13	0,15	0,09	0,20	0,12	0,12	0,11
TZ	0,23	0,13	0,15	0,09	0,10	0,24	0,24	0,11
SX	0,04	0,13	0,15	0,09	0,20	0,06	0,12	0,05
SY	0,12	0,07	0,15	0,04	0,10	0,12	0,12	0,11
SZ	0,12	0,13	0,08	0,17	0,10	0,12	0,12	0,11
SD	0,23	0,13	0,08	0,09	0,10	0,12	0,12	0,11
C	0,04	0,13	0,15	0,17	0,10	0,12	0,12	0,11

After the normalized decision matrix was obtained, the weights of the criteria were obtained in Table 6.

Table 6. Criteria Weights Obtained Using The AHP Method

Criteria	Weights
TX: Travel distance on X axis	0,15
TY: Travel distance on Y axis	0,13
TZ: Travel distance on Z axis	0,16
SX: Speed of X axis	0,11
SY: Speed of Y axis	0,10
SZ: Speed of Z axis	0,12
SD: Spindle speed	0,12
C: Cost	0,12

According to the decision makers interviewed for this study, the criterion with the highest weight was Z-axis travel distance, followed by X-axis movement distance and Y-axis travel distance, respectively. Z-axis speed, spindle speed, and cost criteria had equivalent priority, followed by X axis speed and Y axis speed.

After calculating the weights of the criteria for selection of the CNC machine using the AHP method, the alternative rankings were determined using the COPRAS method. Five vertical machining center proposals were provided to the company.

In the COPRAS method, high-utility criteria refer to that in which higher values indicate better status in achieving a goal. In the present study, X axis travel distance, Y axis travel distance, Z axis travel distance, X axis velocity, Y axis velocity, and Z axis velocity were the criteria with higher degrees of utility. Hence, the high values of these criteria had a positive effect on the selection of alternatives. In addition, the criteria would positively affect the selection of alternatives when their values were low among the criteria with low degrees of utility. In the present study, spindle speed and cost criteria were also among these with low degrees of utility.

The data on the evaluation criteria of the determined vertical machining center alternatives were obtained from the company used in the present study. These values formed the decision matrix seen in Table 7.

Table 7. Decision Matrix

	Criteria							
Alternatives	**TX**	**TY**	**TZ**	**SX**	**SY**	**SZ**	**SD**	**C**
MODEL I	610	430	570	40	40	40	10000	557620
MODEL II	850	550	550	30	12	12	8000	366750
MODEL III	600	510	510	36	36	30	8000	352080
MODEL IV	700	400	330	48	48	48	10000	301570
MODEL V	700	400	330	48	48	48	10000	438130
TOTAL	3460	2290	2290	202	184	178	46000	2016150

Then, the normalized decision matrix was calculated and it is given below.

Table 8. Normalized Decision Matrix

	Criteria							
Alternatives	**TX**	**TY**	**TZ**	**SX**	**SY**	**SZ**	**SD**	**C**
MODEL I	0,1763006	0,187773	0,248908	0,19802	0,217391	0,224719	0,217391	0,276577
MODEL II	0,2456647	0,240175	0,240175	0,148515	0,065217	0,067416	0,173913	0,181906
MODEL III	0,1734104	0,222707	0,222707	0,178218	0,195652	0,168539	0,173913	0,17463
MODEL IV	0,2023121	0,174672	0,144105	0,237624	0,26087	0,269663	0,217391	0,149577
MODEL V	0,2023121	0,174672	0,144105	0,237624	0,26087	0,269663	0,217391	0,21731
TOTAL	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

The weighted normalized decision matrix seen in Table 9 was then created using each criterion weight obtained using the AHP method.

Table 9. Weighted Normalized Decision Matrix

	Criteria							
Alternatives	**TX**	**TY**	**TZ**	**SX**	**SY**	**SZ**	**SD**	**C**
MODEL I	0,0264451	0,02441	0,039825	0,021782	0,021739	0,026966	0,026087	0,033189
MODEL II	0,0368497	0,031223	0,038428	0,016337	0,006522	0,00809	0,02087	0,021829
MODEL III	0,0260116	0,028952	0,035633	0,019604	0,019565	0,020225	0,02087	0,020956
MODEL IV	0,0303468	0,022707	0,023057	0,026139	0,026087	0,03236	0,026087	0,017949
MODEL V	0,0303468	0,022707	0,023057	0,026139	0,026087	0,03236	0,026087	0,026077

After the matrix was created, Si^{+} values for useful criteria and Si^{-} values for useless criteria given in Table 10 were calculated.

Table10. Si^+ And Si^- Values For Each Alternative

Alternatives	Si^+	Si^-
MODEL I	0,1611685	0,059276
MODEL II	0,1374486	0,042698
MODEL III	0,1499906	0,041825
MODEL IV	0,1606961	0,044036
MODEL V	0,1606961	0,052164

The priority value, Q_i, was calculated for each alternative given in Table 11.

Table 11. Q_i Value For Each Alternative

Alternatives	Qi
MODEL I	0,199337
MODEL II	0,190436
MODEL III	0,204084
MODEL IV	0,212074
MODEL V	0,204068

The best alternative was that with performance index (P_i) equal to 100. According to the order given in Table 12, this alternative was vertical machining center model four, with 100% performance index value; the worst alternative was vertical machining center model two, with a performance index value of 89.797%.

Table12. P_i For Each Alternative And Order Of Preference Of Alternatives

Order of Preference	Alternatives	P_i
1	**MODEL IV**	100,000
2	**MODEL III**	96,233
3	**MODEL V**	96,225
4	**MODEL I**	93,994
5	**MODEL II**	89,797

5. CONCLUSION

Investing in CNC machining center is an important decision to make in production enterprises. To make the investment decision suitable for the needs of the company, the criteria affecting this choice should be well known. For the purpose of evaluating and analyzing all the criteria that affect the decisions, using a scientific method is more beneficial than making an intuitive and experiential decision. In the present study, the problem of selecting proposals for the machines that were presented to company management was handled using an approach based on combining AHP and COPRAS methods. First, the criteria weights were determined using the AHP method, and then the five vertical machining center model alternatives were ranked using the COPRAS method. The ranking was as follows: model four > model three > model five > model one > model two. These results indicated that model four was the best alternative, which was then proposed to the company.

For further studies, other MCDM methods can also be evaluated for use in resolving problems encountered in selecting CNC machines. The present study used AHP to find the criteria weights; however, they can also be weighted using other methods, such as measuring their attractiveness using a categorical-based evaluation technique, entropy weight, or SWARA methods.

REFERENCES

Agdaie, M.H., Zolfani, S.H. and Zavadskas, E.K. (2013). " Decision Making in Machine Tool Selection: An İntagrated Approach With SWARA and COPRAS-G Methods", Engineering Economics, 24(1): 5-17.

Al Harbi, K.M. (2001). Application of the AHP in Project Management, International Journal of Project Management, 19(1), 19-27.

Arıkan Kargı, V. S. (2015). Yöneticilerin Fasoncu Seçim Kararında Analitik Hiyerarşi Süreç Modeli. Ekin Basım Yayın.

Ayağ, Z. ve Özdemir, R.G. (2006). "A Fuzzy AHP Approach to Evaluating Machine Tool Alternatives", Journal of Intelligent Manufacturing, 17: 179-190

Ayağ, Z. (2007). "A Hybrid Approach to Machine Tool Selection Through AHP and Simulation", International Journal of Production Research, 45(9): 2029-2050.

Aksoy, E., Ömürbek, N. and Karaatlı, M.(2015). "Ahp Temelli Multımoora Ve Copras Yöntemi İle Türkiye Kömür İşletmeleri'nin Performans Değerlendirmesi", Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 33(4): 1-28.

Arslan, M.Ç., Çatay, B. and Budak, E. (2004). "A Decision Support System For Machine Tool Selection", Journal of Manufacturing Technology Management, 15(1): 101-109

Çakır,E and Akar,G.S (2017) . "Bütünleşik Swara–Topsıs Yöntemi İle Makine Seçimi: Bir Üretim İşletmesinde Uygulama, International Journal Of Academic Value Studies, 3(13):206-216.

Çimren. E, Budak, E. and Çatay, B.(2004). "Development of a Machine Tool Selection System Using Analytic Hierarchy Process" in:R Teti (Ed.), Proc. Of the 4th CIRP International Seminar on Intelligent Computation in Munufacturing Engineering, Sorrento, Italy:193-198.

Çimren. E, Çatay, B. and Budak, E.(2007). "Development of a Machine Tool Selection System Using Analytic Hierarchy Proces", International Journal of Advanced Manufacturing Technology".

Dağdeviren, M. (2008). "Decision Making in Equipment Selection: An Integrated Approach with AHP and PROMETHEE", Journal of Intelligent Manufacturing, 19: 397–406.

Duran, O. and Aguilo, J. (2008). "Computer-aided Machine-Tool Selection Based on a Fuzzy-AHP Approach, Expert Systems with Applications", 34: 1787-1794.

İç,Y.T. and Yurdakul,M.(2008).” İşleme Merkezi Seçimine Yönelik Bir Karar Destek Sisteminin Geliştirilmesi”, Gazi Üniversitesi Mühendislik Mimarlık Fakültesi Dergisi, 23(1):85-95.

Karim, R. and Karmaker C.L. (2016). “Machine Selection by AHP and TOPSIS Methods”, American Journal of Industrial Engineering, 4(1): 7-13

Kaya, İ., Kılınç, M.S. and Çevikcan, E. (2007),” Makine-Teçhizat Seçim Probleminde Bulanık Karar Verme Süreci”, Mühendis ve Makina, 49(576): 8-14.

Lin, Z-C. and Yang, C-B.(1996) “Evaluation of Machine Selection by the AHP Method”, Journal of Materials Processing Technology, 57(1): 253-258.

Oeltjenbruns, H., Kolarik, W.J. and Schnadt- Kirschner, R.(1995). “Strategic Planning in Manufacturing Systems- AHP Application to an Equipment Replacement Decision”, International Journal of Production Economics, 38(1): 189-197.

Saaty,T., L.(1994). Fundamentals of Decision Making and Priority Theory, RWS Publications,Pittsburg.

Saaty, T.L.(2005). Theory and Applications of the Analytic Network Process: Decision Making with Benefits, Opportunities, Costs and Risks, RWS Publications.

Saaty, T. L. (2008). “Decision Making With The Analytic Hierarchy Process”, Int. J. Services Sciences, 1(1): 83-98.

Tuzkaya, G., Gülsün, B., Kahraman, C. ve Özgen, D. (2010). “ An integrated Fuzzy Multi-Criteria Decision Making Methodology for Material Handling Equipment Selection Problem and an Application”, Expert Systems with Applications, 37: 2853–2863.

Vatansever, K. and Kazançoğlu, Y. (2014). “ Integrated Usage of Fuzzy Multi Criteria Decision Making

Techniques for Machine Selection Problems and an Application”, International Journal of Business and Social Science, 5(9), 12-24.

Yurdakul, M.(2004). “AHP as a Strategic Decision- Making Tool To Justify Machine Tool Selection”, Journal of Materials Processing Technology, 146(1): 365-376.

Yurdakul, M. and İç, Y.T. (2009). “ Analysis of the Benefit Generated by Using Fuzzy Numbers in a TOPSIS Model Developed for Machine Tool Selection Problems”, Journal of Materials Processing Technology, 209: 310–317.