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Doç. Dr. Ayşe Çatalcalı CEYLAN
Dr. Öğretim Üyesi Çağla Melisa KAYA

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CONTENTS

CHAPTER 1

A BLOCKCHAIN BASED ELECTRONIC VOTING SYSTEM DEVELOPMENT

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1. Introduction

Today, many countries face difficulties in verifying the identity of the voters, safely transmitting the votes to the necessary institutions, and ensuring the transparency and accuracy that will determine the winner of the election. After voting, the voter leaves the booth and votes are thrown into the ballot box, and the vote is mixed with other ballot papers. Thus, voting is done in accordance with confidentiality. Lastly, election officials count the votes. At this point, the public must wait for the counting process to end. There are two important points in this process. One of them is to make the right decision about valid and invalid votes, which polling station officials often disagree on. Another important point is the security of the computers and software used for election. Many traditional measures are taken for electoral security and reliability. These measures are both costly, complex, and controversial. Even election applications made with central servers can cause problems because someone can change the data in the database and the source code on the web server. For example, there is a possibility that identities or personal information can be stolen by hackers. A traditional database system partially fulfills the security requirements and therefore, alternative technologies should be explored. Along with the recent developments in technology, electronic voting systems are considered to replace traditional pen and paper voting mechanisms (Kim et al., 2020).

Although the use of electronic voting systems has the potential to increase the security and the effectiveness of the voting process, this has not really happened. The centralized management and the storage of voting data and results have drawbacks in addition to the current worries regarding the use of electronic voting systems (Culnane et al., 2019; Ewing, 2019; Ryan PYA et al., 2015). According to the studies, using electronic voting may present the following difficulties: data integrity, reliability, transparency, ballot secrecy, consequences of malfunction, voters without formal education, need for specialized IT skills, equipment storage, security, fraud-related issues, and cost (Esteve et al., 2012).

In 2008, with the emergence of Bitcoin and Blockchain technology, the foundation of an immutable, cryptographically secure, and distributed database system was laid (Nakamoto, 2008). Rather than having a network, a central server, and a database; blockchain is a network and a database. Blockchain is a peer-to-peer network of computers, called nodes, that share all data and code on the network. No more central servers are needed with this technology because a group of computers can talk to each other on the same network. Basically, a decentralized node for electronic voting is provided with blockchain technology (Jafar et al., 2021). Since applications created using blockchain technology are distributed and

owned by numerous parties, no one can alter or update the data in the blockchain (Garg et al., 2019). Therefore, blockchain offers a fascinating alternative to traditional electronic voting methods with characteristics like decentralization, transparency, non-repudiation, and security protection (Gao et al., 2019; Huang et al., 2021). This eliminates the many security issues mentioned above.

The blockchain technology has begun to be tested in many applications. All data is secured with cryptographic hashing and verified by a consensus algorithm. In this study, the possible effects of blockchain implementation will be covered. A permitted peer-to-peer blockchain architecture and common cryptographic tools in conjunction with the smart contract system developed using the Solidity programming language will be applied. Smart contracts are programmed agreements that go into effect automatically when certain criteria are met. Smart contracts are utilized as a legally enforceable agreement between parties, just like traditional written contracts. Smart contracts eliminate the need for a middleman by automating transactions and enabling direct, automatic agreement-making between parties (Hjálmarsson et al., 2018).

There are various issues related to the traditional pen and paper voting procedures such as ballot stuffing, voter-ID issues, booth capturing, outdated voting machines, long election periods and big queues at polling places. All these reasons frustrate voters and make them lose their confidence in a democratic voting system. The aim of this study is to provide secure, transparent, and accessible electronic voting among insecure parties and change the traditional voting process. In brief, the basic problems that plague the current democratic elections will try to be eliminated. The difference of this study from others is that the end-user interface is going to be much simpler and more convenient compared to other electronic voting systems making it more attractive for users to vote. It is also going to be a more secure and much faster system allowing user transactions to be processed more rapidly.

The rest of the paper is organized as follows. Next section discusses the latest literature review including blockchain based voting systems. Third section mentions the methods used in this paper. Fourth section explains the development of the blockchain based electronic voting application and finally, the last section states the conclusions and the future work.

2. Literature Review

If a suitable structure is given, blockchain technology can well be used for anonymous elections and voting. Due to the blockchain technology, which can bring transparency to the elections, fake votes can be prevented, and participants can control their own votes. Since the votes will be on the

blockchain, the states and the voters will have control permission. Thus, they can make sure that none of the votes are changed, reversed, removed, or no illegitimate votes are added. However, scalability problems exist with blockchain-based voting systems that are currently in use. On a small scale, these systems are usable. However, because they rely on modern blockchain frameworks like Bitcoin, Ethereum, Hyperledger Fabric, etc., their systems are inefficient to manage millions of transactions at the national level (Jafar et al., 2021). Currently, blockchain voting systems are best suitable to be used in small scale elections such as schools, associations, foundations, institutions, or small and mid-size businesses.

Blockchain Based Voting Systems

There are different kinds of blockchain voting applications available. One of them is Follow My Vote. For use in globally sponsored elections, this application creates open source, end-to-end verified blockchain voting software (Follow My Vote, 2022). The goal of Follow My Vote is to advance truth and liberty by enabling people to engage in effective communication and put non-coercive solutions to societal issues into action. In a nutshell, it works to establish international standards for the voting systems' integrity (Cucurull et al., 2018).

In collaboration with the Swiss city of Zug and Lucerne University of Applied Sciences, worldwide IT service company Luxoft Harding, Inc. created the first customized blockchain electronic voting system called e-Vote (Luxoft-1, 2022). Luxoft declares its commitment to make this platform open source and creates a Blockchain for Government Alliance so that anyone can join developing the source code of e-Vote as well as promote blockchain use in public institutions to encourage government acceptance of blockchain-based services (Luxoft-2, 2022).

Founded in 2015, Agora.vote was used in one region of Sierra Leone's March 2018 presidential election. The technological innovations that form the foundation of Agora's architecture include a customized blockchain, distinctive participatory security, and a legal consensus process (Agora, 2022). Agora's native token is called the vote. It urges people to support a safe and open electoral process.

Another blockchain-based online voting system called Polys is supported by open-source cryptographic techniques. These are run by Kaspersky Lab. Polys supports student councils, unions, and associations in organizing elections and distributing election information to the student body (Sayyad et al., 2019). Online elections using Polys increase community productivity, strengthen relationships with group leaders, and draw in new supporters (Polys, 2022). By assisting local governments,

state governments, and other organizations to concentrate on gathering and drafting proposals, Polys seeks to save them time and money.

Voatz developed a blockchain-based voting system for smartphones that allows voters to cast distant, anonymous ballots and check that their votes were accurately counted. Voters certify the accuracy of the information provided by the applicants and themselves on the application and provide proof of their identities by a picture and biometric evidence, such as a fingerprint or retinal scan that acts as a distinctive signature (Voatz, 2022).

On the Ethereum blockchain, there is a decentralized voting network called Netvote. For the system's user interface, Netvote uses decentralized apps. Election administrators can design ballots, set registration guidelines, create ballots, and start and stop voting using the administrator app. The Voter app is used by individual voters for registration, voting, and voter identification and can be combined with other gadgets (like biometric readers). Then, election results are computed and verified using the Tally App (Alexander et al., 2018).

There is also the blocko company. This company supports the creation of a new voting system on the blockchain. Blocko's Coinstack platform is working to establish a blockchain system to receive voting projects and election results. Through this program, voters will propose their own ideas and decision makers and local governments will fund the best and winning ideas/projects (Blocko, 2022).

Another application is Ethereum Stack Exchange. It is both a Q&A and a voting site for ethereum stack exchange users. The platform is a decentralized application platform and uses smart contracts. Stack exchange is by far the most popular question and answer site where developers can get in-depth and specific responses to coding challenges. Although mainly used in tech, the discourse on Stack exchange covers everything from religion to home brewing (Ethereum Stack Exchange, 2022).

Related Literature

There are other blockchain voting systems suggested by scientists. A decentralized anonymous transparent electronic voting system with a low bar for participant confidence was proposed by Lai et al. called DATE (Lai et al., 2018). They believe that the existing DATE voting mechanism is appropriate for extensive electronic elections. Unfortunately, the lack of a third-party authority on the scheme accountable for auditing the vote after the election process makes their suggested solution insufficient to defend against DoS attacks. The platform's limitations make this system only suited for modest scales (Gao et al., 2019).

A blockchain-based anti-quantum electronic voting mechanism with an audit feature has been proposed by Gao et al. (2019). In order to make the code based Niederreiter algorithm more resilient to quantum attacks, changes have also been made to it. A regulator for certificateless cryptography is The Key Generation Center (KGC). It not only acknowledges the voter's anonymity, but it also makes the audit process easier. However, a closer look at their method demonstrates that, even with a limited voter turnout, there are still significant security and efficiency advantages for a small-scale election. If the number is large, some efficiency is sacrificed to improve security (Fernandez-Carames and Fraga-Lamas, 2020).

Block-based e-voting architecture (BEA) was proposed by Khan, K.M. et al. (2020) and involved rigorous experimentation with permissioned and permissionless blockchain architectures under various voting population, block size, block generation rate, and block transaction speed scenarios. According to their plan, the election process necessitates the creation of voter and candidate addresses. Votes from voters are subsequently sent to candidates at these addresses. To track the votes and their statuses, the mining group updates the main blockchain's ledger. Until a miner updates the main ledger, the voting status is not confirmed. At the polling place, the vote is subsequently cast using the voting machine. There are, however, certain weaknesses in this paradigm. There is no regulatory authority to restrict invalid voters from casting a vote, and it is not protected from quantum attach. Their methodology is inaccurate and do not give importance to the integrity of the voters.

The Blockchain-based Electronic Voting Scheme (BES), proposed by Yi (2019), provides strategies for enhancing electronic voting security in a peer-to-peer network. The system was tested and designed on Linux computers in a P2P network. Attacks using countermeasures are a big problem in this strategy. This approach is not suitable for centralized usage in a system with multiple agents and calls for the engagement of trustworthy third parties.

3. Methods

This study is a web application of electronic voting. An administrator starts an election process by logging in to the system and determining the candidates. After that, voters vote for the candidate they want. Finally, the result of the election is computed. The web application developed in this study is best suited for small and mid-scale elections such as schools, associations, foundations, institutions, or small and mid-size businesses.

First, both the administrator and the voter need an account and an address with Ethereum's cryptocurrency Ether (usually metamask is used). Administrators identify candidates along with their parties when they

connect to the network. Voters cast their votes and pay a small transaction fee to write that transaction on the blockchain. This transaction fee is called “gas”. When voting takes place, some nodes in the network, called miners, compete to complete this transaction. The miner who completes this process is rewarded with Ether, which is the fee paid for the vote. In return, it is ensured that the vote is recorded correctly.

The application is divided into two parts: the user interface and the background Ethereum network. There is a traditional front-end client created using HTML, CSS and Javascript. Ethers.js will be used to communicate with smart contracts and send transactions. Users will connect to the Ethereum network with the Infura API and perform various operations with HTTP requests. Finally, since Infura does not support wallet functions, Truffle will provide the HD wallet in the testing phase and enable the wallet to be able to transact in Infura API and sign the transactions being sent. The business logic of this need to be applied into smart contracts. In the smart contract, the functions will be written according to the actions of the administrators and the voters.

Every change made in a blockchain is called a transaction. Transaction is the path which the outside world interacts with the Ethereum network. The transaction is used when someone wants to change or update the state stored on the Ethereum network. Each transaction requires a transaction fee or a service fee. Ether is often used as a service fee, also called a transaction or a gas fee. Since this application is running on the testnet, test ether will be used to pay this fee. Test ether will also be used to help select the ropsten testnet. After selecting, test accounts will be seen in this testnet. Then, when the user makes a transaction, after the transaction is approved, this approved transaction is sent to the ethereum testnet, which has been determined as the endpoint. In short, the front-end takes input from the user and creates requests to be sent to smart contracts. Due to ether.js, the transaction is confirmed and sent to the network. The smart contract is where the application’s business logic is written [3]. Figure 1 below shows the logic of the application.

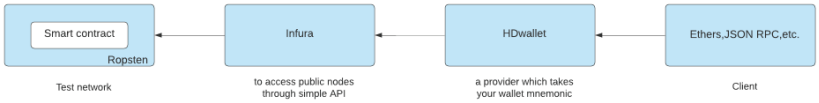

Figure 1. *Logic of the application*

The pages that the end users can see in the user interface of the application will be the administrator and the voting pages. The candidates and the parties can be determined from the administrator page. If an incorrect candidate is added to the system, it can be deleted. On the election

page, the voters will be able choose which candidate to vote for and vote for that person.

4. Development of the System

4.1. Arhitectural Design of the System

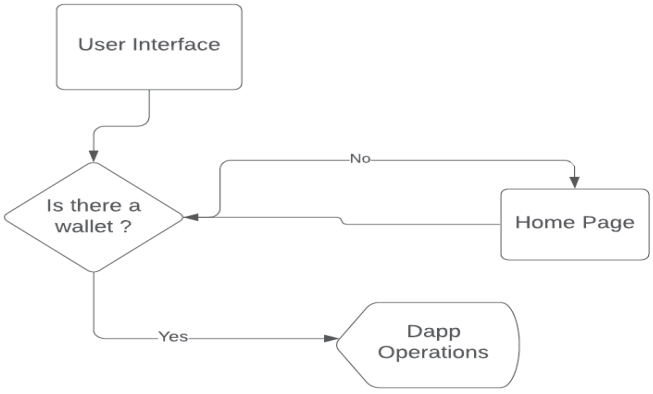

Figure 2. *Interface Logic*

The interface relationship is shown in Figure 2. The user must have a wallet address when logging in to the application. It is important to use a wallet address in decentralized applications (dapps), as there are processes such as confirming transactions, paying gas fees, figuring out in which address to operate, where to connect and process. If the users do not log in with their wallet addresses, they cannot perform any actions. Else, if the users have logged in to the application with their wallet addresses, the dapp transactions will start because the application is integrated with the basic functions of dapp. Thus, the system will be able to communicate with the smart contracts and perform the transactions. Below are the explanations of the features of this application.

- **User Interface:** It contains all of the pages and the elements as well as the necessary methods.
- **Home page:** The page that inform the users about the application and direct them to the login page and provide access.
- **Dapp operations:** Since a dapp application is created when connecting to the system, the libraries and the APIs related to it start to work even while connecting, so the smart contract can be communicated in the ethereum network and the application can be run in a decentralized way.

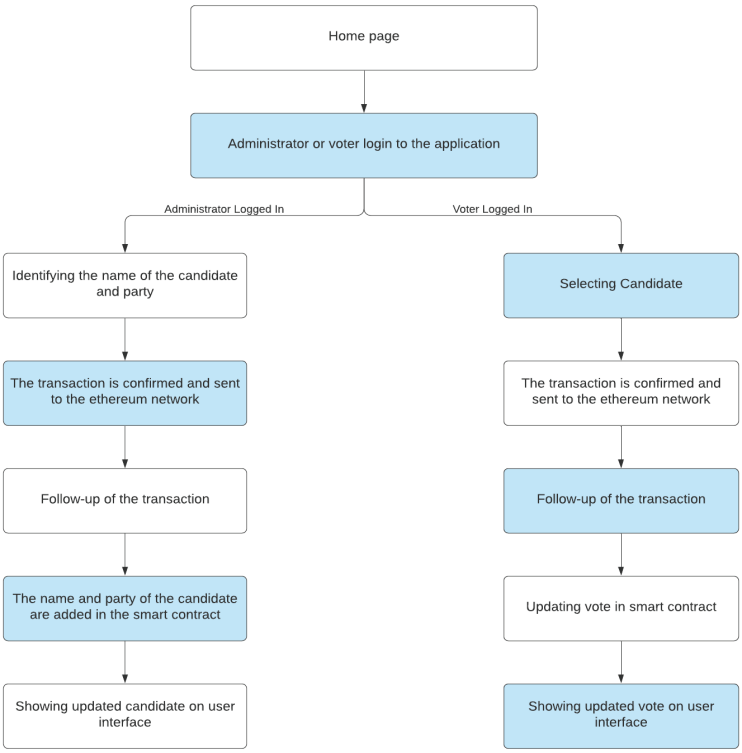

Figure 3. *System Architecture*

Figure 3 above shows the actions that the user will take in the system. First, when logging in to the application, it is determined whether the user logging in is an administrator or a voter so that the application can bring up the correct page according to the type of the user. If it is an administrator, the administrator enters the names and parties of the candidates to be elected. If it is a voter, the voter votes for one of the determined candidates. It doesn't make a difference if it is an administrator or a voter, the same action will take place in both. The transactions are going to be confirmed and reported to the ethereum network. After the transaction is approved, a certain amount of gas fee is going to be paid. Then, a notification will be sent to the ethereum network, and the network approval process will be started. The transaction hash on the user interface will be shown, allowing both the voters and the administrators to track their transactions via etherscan. io. The values in the smart contract are updated with the transaction sent by both the administrators and the voters. After updating these values, the administrators and the voters can see that their pages were updated, and new values were created.

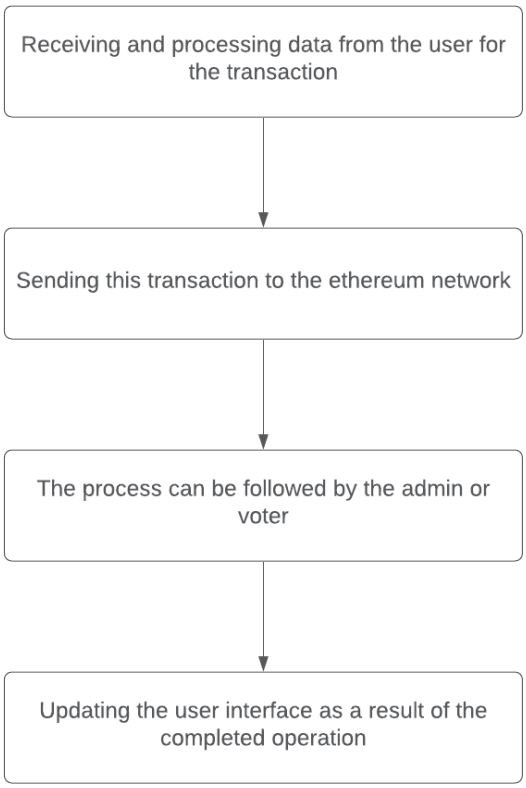

Figure 4. *Layered Architecture*

The process from the realization of the transaction to the approval of it by the ethereum network both from the administrator and the voter side is shown as a layered architecture in Figure-4. To interact with the Ethereum network, json-rpc calls need to be sent to an Ethereum node. Therefore, in the first layer, the JavaScript code is processed in JSON RPC format, in the type requested by Ethers.js and Infura API. Then, this data, which is brought to the desired format, will be signed, and sent to the Ethereum network, through the Ethers library. In the third stage, the transaction can be followed via etherscan.io, because of the transaction hash displayed on the front end and returned to the application. Then, the transactions sent are implemented in the contract that is deployed to the ethereum network. Finally, the data is updated in the user interface and access to the new data is provided.

4.2. Interface Design

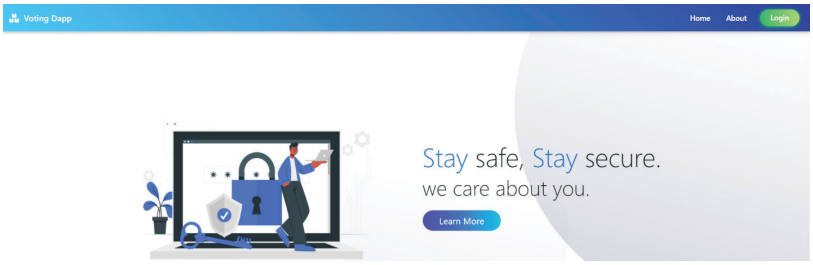

Figure 5. *Home Page*

Figure 6. *About Page*

As can be seen in Figure 5, when the user logs in to the site, the home page will greet the user. The user can switch to the about page to get more information about the application, and to the login page to log in to the system. The user can also switch to the about page by clicking the *learn more* button.

As seen in Figure 6, information about the application will be given when the user logs in to the about page. In addition, information is given about the issues to be considered while voting. The user must read this page carefully to vote correctly.

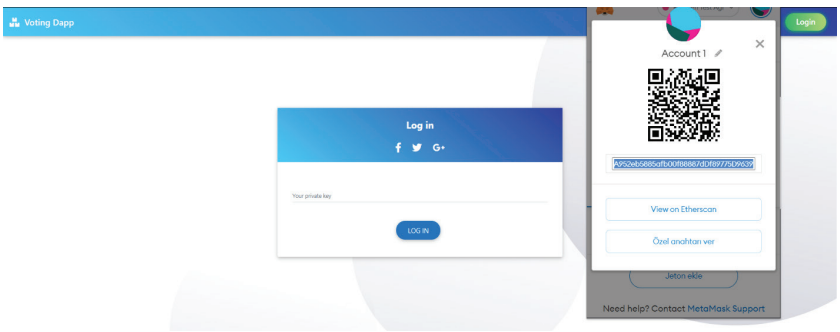

Figure 7. *Login Page*

As can be seen in Figure 7, this is the login page. In order for voters to vote, the metamask plugin must be installed in Chrome and voters must create an account there. If the user has not created an account with the metamask wallet in the application, no functionality of the application will work. Then the user gets the private key of the account from the metamask wallet and is directed to the administrator panel or to the voter page after logging in according to the private key the user enters. If the user clicks without entering a password or enters an incorrect password, the application will give an error. The user must enter the correct private key.

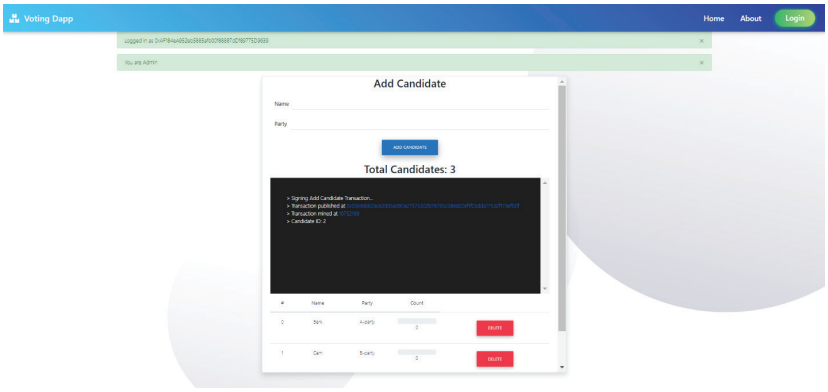

Figure 8. *Admin Page*

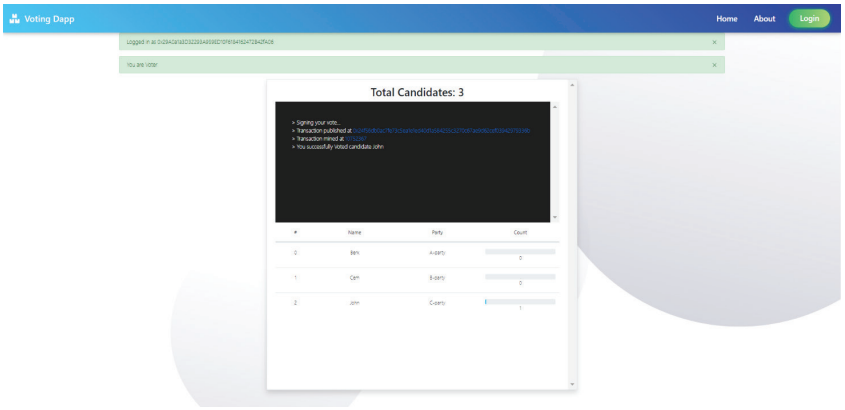

Figure 9. *Voter Page*

As can be seen in Figure 8, this is the administrator page. After the administrator connects to the application, s/he can see the public key on the screen and confirm that it is his/hers. Also, since the administrator's public key is defined as private, the application can recognize that s/he is logged in to the application and subsequently, prints out 'you are the administrator' text to the screen. Then, the administrator adds both the name and the

party of the candidate so that the voters can vote. After the administrator clicks the add candidate button, the process of confirming the transaction and sending it to the network begins. A screen with this information has been designed so that the administrator can follow this process. There is the transaction hash in it. By clicking on it, the administrator will be directed to the etherscan.io site and will be able to see the details of the transaction. The block number where the transaction is recorded can be seen in addition to the candidate ID with transaction mining. Afterwards, the administrator can log in to metamask and check how much balance is left in his/her account, as a certain amount of gas fee needs to be charged from the account. The details of the transaction can be reviewed from this page. Finally, if the administrator has entered an incorrect candidate and a party name after all these processes have been completed, there is still the ability to delete it. After clicking delete, the candidate and the party names are deleted. Again, this process can be followed on the screen.

As can be seen in Figure 9, this is the voter page. After the voters connect to the application, they can see the public key on the screen and confirm that it belongs to them. Voters, who then choose their candidates, can vote by pressing the voting button. After voting is completed, this button closes and the process of confirming the transaction and submitting it to the network begins. A screen with this information has been designed so that the voters can follow this process. There is the transaction hash in it. By clicking on it, they will be directed to the etherscan.io site and will be able to see the details of the transactions. The block number where the transaction is recorded can be seen in addition to when the transaction is completed with transaction mining. The text 'you voted successfully' appears. Then, the voters can log in to the metamask and check how much balance is left in their accounts, as a certain amount of gas fee will be charged from their accounts. They can also review the details of the transactions from this page. Finally, if the voters try to vote again and log in to the page, they cannot vote because the voting button will be off. They will also see the text 'this election has been voted on'.

5. Conclusion

In this study, an application that will function as a completely decentralized electronic voting system is implemented and it is aimed to solve the problem of safe electronic voting. According to the studies, it is seen that voting systems using blockchain technology have started to be tested in small size elections and have achieved successful results, but relevant tests are being carried out in larger size elections such as national or governmental elections. In the application, a permissive blockchain architecture and common cryptographic tools are used, along with a smart contract system developed in the solidity programming language, to access

a secure peer-to-peer network. Since the final application has been tested using the necessary approaches, it meets the important requirements of an electronic voting system and can be concluded that it is a well working system. The voting process using this application is much faster and safer, the data is stored securely and reliably, and the voting process is done in real time. Also, the voting process and the calculation of the number of votes are faster, there is a more democratic decision-making mechanism, and it can be ensured that all votes are counted and not removed or replaced.

In conclusion, the admin determines the names of the candidates and their parties in this application and can see the total votes received by each candidate. After that, the voters vote for the designated candidates. During the voting process, anyone can follow the process and make sure that it has been done correctly due to the follow-up screen in the application. This screen is also on the administrator side. The administrator can also follow the process while adding the candidates. The voters cannot vote again after the voting is completed. In addition, if the voters want, they can also get information about the voting and the logic of the system from the about section of the website before they vote.

The main limitation of this study is that it is only designed for small and mid-size elections such as schools, associations, foundations, institutions, or small and mid-size businesses. Scalability problems still exist with blockchain-based voting systems that are currently in use. When the scale of the election becomes larger, these blockchain-based voting systems becomes slower. Currently, these systems rely on modern blockchain frameworks like Bitcoin, Ethereum, Hyperledger Fabric, etc. and those frameworks are inefficient to manage millions of transactions such as in a national-level government election. Future studies may try to use a different technology to design an electronic voting system for larger elections or investigate blockchain technology deeper to find a way to improve the system for larger elections.

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CHAPTER 2

DID I UNDERSTAND WHEN I BECAME A MOTHER?

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Becoming a mother is one of the most critical decisions a woman can make as having a child is a life-long responsibility. Women add to their daily duties and responsibilities one more after they become a mother (Welldon, 2019). Motherhood… This concept becomes a part of women's life way before they give birth. Women incorporate the concepts of being a mother and motherhood in their lives starting from the early stages of pregnancy, and even before pregnancy. The baby grows up with its mother's ideas on motherhood. Nevertheless, it is not possible to talk about a universal concept of motherhood because there are different perceptions and expectations of motherhood in different periods, ages, and cultures.

The history of motherhood overlaps with the history of mankind. However, the need to define the concept of motherhood has emerged later in time. Firstly, it is imperative to differentiate between becoming a mother and motherhood. Becoming a mother is defined as giving birth at the end of pregnancy. On the other hand, motherhood means that a woman meets the needs of her baby consistently and regularly to keep it alive after giving birth (Akşit, Kuşku, Oktay, Demirsoy and Şaylıgil, 2017). The concept of motherhood isn't introduced to women's life the moment they decide to be a mother. There have been ongoing research and articles on motherhood since 1940s. Contrary to the approaches that see motherhood as a means of oppression for women, the perspective that affirms motherhood and sees it as a unifying factor for women developed after the 1980s and brought new perspectives to motherhood discussions. In this context, discussions on motherhood have been shaped around two different rhetoric. On the one hand, "motherhood as an institution" is perceived as the reason for marginalizing women and gender discrimination. On the other hand, the idea of "motherhood" is based on the affirmation of the state of being a woman. As gender studies have become more popular, motherhood has been associated with the female gender and has become a factor that could get women to be approved by the society (Uğurlu, 2013). Moreover, motherhood can help women from different backgrounds to have a common point and connect with one another. Thurer (1994), who examined how technological, economic, cultural, and political factors in different eras have affected motherhood practices in different societies, claims that instincts led to human activities in archaic ages. Motherhood wasn't regulated according to societal rules in these ages and was ruled by nature. Thurer (1994) describes the mothers of these ages as natural or instinctive mothers and claims that motherhood and mothers were glorified. Motherhood mythos was abolished with the written history. In middle ages, social and cultural codes of motherhood were shaped around religion and superstitions. Women held onto their roles as wives and mothers while men claimed power in societal relationships. Married

women were mainly expected to bear children and take on the domestic responsibilities (Trevino, 2010). Even though women's roles and duties have changed over the centuries, they have remained as the main figure who is responsible for raising children the right way. Nonetheles, it is observed that social expectations on motherhood in modern times have been similar and the effects of scientific discourse on motherhood have been studied. In the light of these studies, concepts such as "scientific" or "emphatatic" mother have emerged and motherhood has turned into an international phenomenon.

Motherhood is beyond being a mere physical process. It has a social, cultural, and historical aspect. However, each woman has a different viewpoint of motherhood (Miller, 2010). Badinter (2010) states that women can accept and reject motherhood. Or they deliberate it themselves first. Each woman has a different pregnancy and birth experience. They have their own caregiving practices. Thus, they are expected to have different perceptions of motherhood. Furthermore, this perception can change over time. Necessities of motherhood and expectations of mothers change as time passes (Bayer, 2013).

The reality of our age and the determinant of motherhood is the diversity of choices. This diversity also manifests itself in women's employment conditions. In this context, some women embrace motherhood completely, some reject it completely, and some try to find a balance between motherhood and work life (Sadıkoğlu,2019).

According to Badinter (1992), a woman's social position is first measured by how well she fulfills her motherhood duties and then they are granted social and political rights. This process, built for the name of a mother's love, is only meaningful when a woman takes very good care of her children and gives all her love and devotion to them. In particular, the idea that motherhood is instinctive, which forms the basis of the biological perspective, and the publications that try to prove this idea determined the social position of women. Motherhood has an important role in terms of women's social status, and the identity of womanhood is established through this biological function and role. The most concrete indicator of this situation is the fact that women form identities through motherhood (Vincent, 2010). A woman who has a child is first defined as a mother such as a working mother or an executive mother or a stay-at-home mother.

From a feminist perspective, motherhood has been an important field of discussion for understanding and analyzing gender inequalities, gender regime and power relations. On one hand, there are the debates on motherhood, which oppresses women, reproduces gender roles, and creates a field of power and domination for patriarchal ideology. On the other

hand, we have the approaches that perceive motherhood as an experience. The supporters of the first group rejects definining womanhood through motherhood and think of motherhood as an institution that oppresses and restricts women. For this group, which also criticizes the construct of family, the freedom of women is only possible by getting rid of the roles of being a mother and taking control of reproductive technologies. The second group in the feminist approach discusses the empowerment of through individual and subjective experiences and autonomy. They also believe that motherhood can turn into a more liberating experience for women by getting rid of the institutional pressure shaped by the patriarchal ideology. The issue seems to have become multidimensional with the thought that motherhood cannot be explained by reducing it to a singular form and that a universal essentialist and universalizing form cannot be obtained in these discussions.

The psychological approach of motherhood begins with psychoanalysis. Accordingly, the mother-child relationship initiates the process of becoming an individual. Klein (1952) states that the mother-infant relationship meets both the physical and the emotional needs of the baby. The healthy reactions of the mother ensure the healthy growth of the child. Otherwise, the unresolved conflict between the mother and child together with the fear of physical and psychological abandonment negatively affect adult mental health. Bowlby (2012) mentioned the attachment dimension of the mother-child relationship. The bonds established with the mother during infancy affect the individual's senses and perceptions even in adulthood. Therefore, the secure bonds established with the mother during infancy may also affect the bond that the mother will establish with her own baby later.

Many different cultures, including the Turkish culture, see the mother as the main care-giver and responsible for the development of the baby. In addition to the positive results in the development of the baby, the mother is also held responsible for the negative consequences that may arise. Studies carried out only twenty or thirty years ago held unresponsive mothers responsible for autism and major mental illnesses and a more recent study reveals that many different psychopathologies are still attributed to mothers (Caplan and Hall, 1989).

The thoughts and expectations women have for motherhood can be a reflection of their relationship with their own mothers. The parenting style they grew up with can reflect on their own relationships with their children and women can construct the concept of motherhood through their children (Baumrind, 1991). Their expectations and behavior on being a good, bad or perfect mother can ruin the relationship they have with their children and even hinder their ability to become aware of the children's

needs. Moreover, the intergenerational doctrines on motherhood can affect a woman's beliefs on what a mother is.

In this context, the purpose of this study is to describe what women think of motherhood before and after they have become a mother themselves in addition to examining how the relationship with their mothers reflects on their parenting style.

Method

This chapter consists of the design and population and sample of the study as well as the data collection and analysis methods.

Design of the Study

Qualitative research focuses on individuals' reality and the language they use to describe their world culturally and historically, rather than finding a single generalizable truth. People's need for explaining their experiences and feelings, a sine qua non of qualitative research, is also of great importance in the field of mental health. Since qualitative research makes it possible to investigate how individuals perceive and interpret their experiences (Merriam, 2009), this study tries to understand what kind of experiences women have after becoming a mother and how they interpret these experiences with qualitative research method, case study.

Case study design from the qualitative research methods was employed in this study as we collected goal-oriented data. Case studies provide the researchers with the tools to examine a situation in depth (Yıldırım and Şimşek, 2011). Case study model is frequently used in research by mental health professionals such as social workers, psychological counselors, and psychologists (Parmar, 2014). It can be said that researchers were drawn to use this method for reasons such as the thought that individuals are much more than numerical expressions, and the richer sets of data are obtained in explaining human behavior compared to quantitative methods. With the case study model, the nature of a rich inner world can be analyzed without being limited to measurable features. One of the strongest aspects of this method is that the person experiencing the problem is personally involved in the research.

Participants

20 mothers, who lived in different parts of Turkey, volunteered to participate in the study. Convenience sampling from purposeful sampling methods was employed to choose the participants (Patton, 2018). The age of the mothers differs between 22 and 29 (M= 23.64; SD=1.32).

Data Collection

Interview questions were prepared using Google Forms as individual interviews were not possible to carry out. Questions were sent for expert opinion and necessary changes were made before the questions were made available for the participants. Then, the survey link was sent to the new mothers who volunteered to participate in the research. The link for the Google Form was sent to each participant separately with a confidentiality note attached, explaining that any information that could reveal their identity would be changed and their privacy would be ensured at all times. Data was collected during the months of April and May in 2020. The answers that the participants gave were recorded electronically first and printed as hard copy after the data collection process was finalized.

Data Analysis

Data was organized via Microsoft Excel Program and analyzed using content analysis. Content analysis helps researchers put similar codes together under themes and present the data in a way that the reader would understand easily (Yıldırım and Şimşek, 2011). In this study, content analysis was carried out in four different stages. First, the statements of the participants were transferred to excel by the researchers. Secondly, the answers of the participants were read and the first codes were determined. Third, the codes determined were combined under comprehensive categories reflecting the experience of motherhood (Saldana, 2009). For example, responsibility, worth everything, above all, very difficult and motherhood scary codes are gathered under the theme of I understand my mother because they include experiences of two different ends of motherhood experience. Finally, the internal homogeneity of the categories and the heterogeneity between the categories were evaluated.

Validity of Study

To determine the validity of the study, validity strategies like triangulation of investigator, member checking, and thick descriptions were used (Creswell, 2014). Triangulation of investigator is the investigation and analysis of the same data by several researchers independently, and comparison of their results. In member checking, participants are expected to review the drafts to confirm that the study reflected their perspectives accurately, to warn the authors of problem areas in case the manuscript is published, and to assist the authors with new ideas and comments (Patton, 2002). In this context, study findings and comments were mailed to 20 participants separately to determine whether the participants' perspectives were reflected accurately in the study and whether they shared the opinions professed in the study, and 12 participants provided feedback. Ten participants used expressions like "study findings demonstrated that I was not lonely when I'm struggling with motherhood."

Direct quotations were used to strengthen the validity of the research. To ensure the coder reliability, data was coded again and again in different times. After Miles and Huberman's formula (2016) was employed to increase the reliability, an agreement was reached by 80%. Furthermore, as part of the triangulation, more than one coder was involved in the coding process. Thick description was also used to give detailed descriptions and interpretations of the findings.

Participants were given pseudonyms as Mother1, Mother2, Mother3, Mother20.

Results

Demographic Information of the Participants

The general information about the mothers who volunteered to participate in the study is given in Table 1.

Table 1. Demographic Information of the Participants

Demographic Information		Frequency (f)	Percentage (%)
Number of Children	1 child	17	85
	2 children	3	25
Mother Alive/Passed	Alive	20	100
	Passed	-	-
The Length of Motherhood	1-3 years	14	70
	5-9 years	3	15
	10 years and above	3	15
Age	25-30	8	40
	31-36	7	35
	37 and above	5	25
TOTAL		20	100

Majority of the participants have an only child and have been a mother for 1-3 years. Mothers of all participants are alive, and most of the participants are between the ages of 25 and 30.

How did your thoughts on motherhood change after being a mother?

Themes, codes, and frequency of the codes based on the findings are presented in Figure 1.

Figure 1. Thoughts That Changed After Being a Mother

All the participants stated that their thoughts on motherhood changed after giving birth. Majority of them pointed out that being a mother has proven to be more difficult than they initially thought as can be seen in Mother3's statement below:

"I figured it was very difficult. Raising a good human is more difficult than everything else in the world. It is not about doing what the child wants."

Another aspect of motherhood that the participants emphasized is the change that happened in their *responsibilities*. Mother10 expresses her thoughts on this change below:

"It is very challenging. There is no limit to motherhood. You have a child whose responsibility falls on you throughout your life. I started to live my life based on my child's needs and I am giving up on many things. I think being a mother is both very fulfilling and limiting."

However, participants highlighted that *it is worth everything* to be a mother despite the hardships and responsibilities it brings with. *It is beyond everything* that they have ever felt and knew. They accept that *motherhood is sacred*. Mother20: *"It's beyond what I thought. It's beyond making sacrifices. It feels like your heart is beating outside in someone else's body."* Mother17 adds:

"I realized motherhood is really a sacred mission."

Finally, Mother8's statement sums up the thoughts that changed with being a mother:

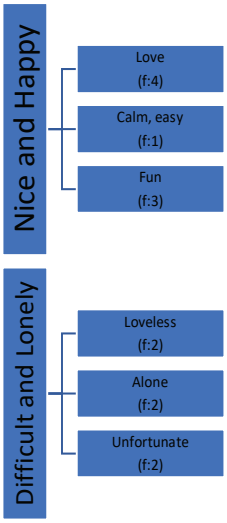
"First of all, I argue with my mother much less. I now understand her better. Being a mother is not giving birth. It's taking care of the child. It requires a great deal of patience. And not every child is the same."

The statements of the women participating in the research show that their thoughts about motherhood in the prenatal period change after the birth. The reason for this change may be the motherhood experience itself or the communication with the baby. It is noteworthy to mention that the change is mostly positive.

What did you think of your own childhood before being a mother?

Themes, codes, and frequency of the codes based on the findings are presented in Figure 2.

Figure 2. What They Think of Their Own Childhood



Some of the participants described their childhood as *nice and happy* although some described it as *difficult and lonely*. Mother7 on her difficult childhood: *"I had a very difficult childhood. I grew up witnessing my parents' fights."*

Mother12 on her peaceful childhood:

"I always felt both my parents' love and affection as a kid myself."

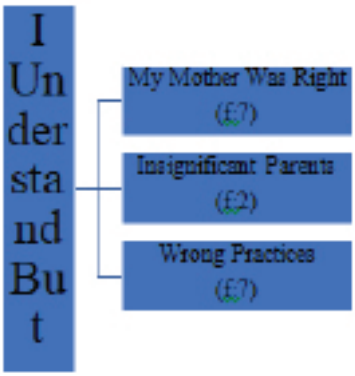
While some of the mothers participating in the study stated that their childhood experiences were positive, some of them stated that they were lonely in their childhood. The mothers' expectations about motherhood

and the way they evaluate their postpartum experiences can be affected by this situation.

What did you perceive differently about your own childhood after being a mother?

Themes, codes, and frequency of the codes based on the findings are presented in Figure 3.

Figure 3. Perceptions Changed after Being a Mother



Some of the participants think their parents were right in their actions when they look back at their childhood. However, some of them stated that they now notice how stunted their communication have been with their parents. Mother2 says:

"I now understand why my mother acted the way she did, but I don't think she was right."

Mother6 contributes:

"They were insensitive and uninterested. My upbringing is the reason why I lack self-confidence. But I think my mother behaved that way without even thinking and questioning because she was under a lot of pressure."

Mother7 thinks her parents have been insignificant throughout her life:

"I had both parents with me at home, but they were pretty insignificant figures. I filled the gap with my sister."

Some participants think they had adequate parents and they were right in their actions. Mother11; *"I started to understand my parents and their parenting style better."*

In general, participants pointed out that they have started to understand their parents' parenting style better after they became mothers themselves, but they don't approve it. Mother10 sums it up:

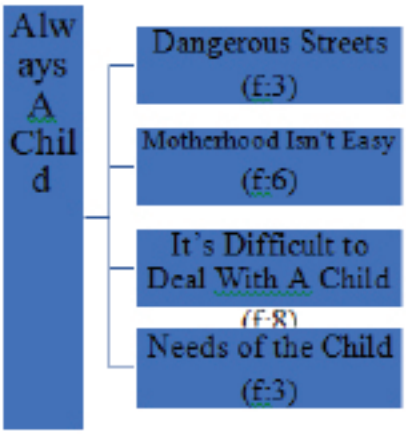
"I now know how difficult sleepless nights are and how hard it is to try to raise a child as a decent human being. It's so difficult to try to teach them privacy, ethics, what is good and what is bad. I learnt that I cannot be a strong mother all the time, but I have to pretend. Times I have to pretend have doubled up."

All the new mothers who participated in the study stated that they understood their mother's parenting styles and behaviors after becoming a mother. In other words, being a mother enabled them to empathize with their own mothers. Even though some of the participants stated that they understood why their mothers engaged in negative behaviors, they thought that these were not healthy behaviors. We can see that the mothers participating in the research can go different ways in the relationship they establish with their own children. Those who cannot notice their mothers' wrong behaviours and cannot prevent themselves from behaving likewise continue similar parenting patterns. However, those who do not apply their mothers' wrong parenting style to their children have the courage to change the wrong teachings that have been passed down for generations.

Do you think your mother was right when you think about the relationship with your child?

Themes, codes, and frequency of the codes based on the findings are presented in Figure 4.

Figure 4. Subjects Their Mothers Were Right



Participants all agree their mothers were right in that *streets are dangerous*, *it is difficult to deal with a child*, *it is hard to meet the needs of a child* and *motherhood is not an easy task*.

Mother10 thinks her mother was right about her concerns and she will

always be worried about her child's safety: *"I used to tell my mom that she shouldn't worry so much when I was 15-16. I now understand that I will always worry about my child regardless of his age."*

Mother11 thinks her mother was right when she said caring for children and meeting their needs were hard: *"You can't sleep right when he is hungry. It is absolutely true that you also hurt when your child falls and hurts himself."*

Mother18 agrees with Mother11 and adds: *"My mother always warn me that I shouldn't buy so many toys for my child. She thinks only a couple of toys are enough. She is indeed right about that. Buying everything the children want makes them greedy and insatiable."*

Mother3 thinks her mother's gut instinct to protect her children was right: *"I now believe that the streets are very dangerous."*

All the new mothers who participated in the study stated that their mothers' rules and disciplinary behaviors towards them were justified after they became mothers. In general, the statements of the participating new mothers show that a fear arises because of the need to protect the healthy existence of the children. So, their mother is right because they experienced the same fear.

Do you ever think to yourself that you will never act like your mother in your relationship with your child?

Themes, codes, and frequency of the codes based on the findings are presented in Figure 5.

Figure 5. Subjects That They Do Not Want Be Like Their Mothers

Some participants stated that their mothers used physical violence against them, and they would never do the same to their children. Mother4 on physical violence:

"I love my mom dearly, but she used to beat us up. Maybe we were not well-behaved enough and deserved it, but I would never hit my child."

Majority of participants emphasize the fact that they have emotional problems with their mothers, that they wouldn't react to their children in the same way their mothers did. Mother2 says:

"I will never hurt my child emotionally and act like nothing has happened in front of others. I will always respect my child's emotions (anger, jealousy, etc.) and allow her to express her feelings freely."

Mother15 talks about something similar; *"After my son's birth, I thought to myself that I would never hide my feelings like my mom did. I would tell my son that I love him. I would teach him that being emotionally open is important."*

On the other hand, Mother9, Mother5 and Mother20 all agree that their mothers put them under a lot of pressure when it came to eating habits and choosing clothes and that they would never do the same to their children. Mother8 also points out that her mother often used silent treatment as a means of punishment, and she would not ever do it.

Finally, participants expressed that the marital problems their parents had affected them negatively and they would avoid doing the same. Mother11 says:

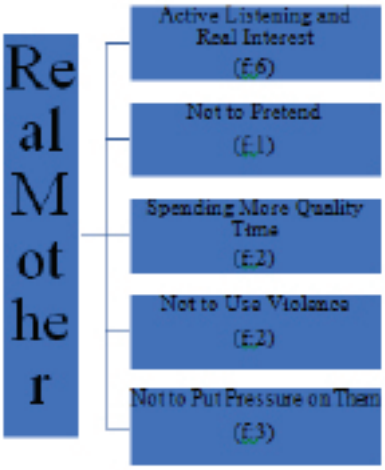
"I will always be careful to not reflect any problems I have with my husband on my children."

Among the new mothers who participated in the study, those who had a secure mother-child relationship during their childhood are not afraid to be like their mothers. However, new mothers who had a lonely childhood and were exposed to both emotional and physical violence are afraid of being like their own mothers. They state that they will not behave like their own mothers under any circumstances.

If you had the chance to go back to your childhood, how differently would you like your mother to treat you? Why?

Themes, codes, and frequency of the codes based on the findings are presented in Figure 6.

Figure 6. What Different Treatment They Would Expect from Their Mothers



Participants stated that they would want their mothers to listen to them actively and to show a real interest in them. Mother10 expresses her thoughts below:

"I would want her to tell me that she loved me. I would want her not to be so emotionally closed off. I would want her to raise us in a way that we wouldn't be so shy and passive now."

Mother12 talks about the emotional deprivation she felt as a kid; *"My mother doesn't act on her emotions. I knew she loved us much, but I wished she would have hugged and kissed me more."*

Mother2 looks at the emotional problems she had with her mother from another viewpoint:

"I wish she hadn't pretended so much and hadn't made us pretend. I wish she hadn't projected her own personal issues onto us so much."

Some of the participants stated that they didn't deserve so much pressure and violence at home. Mother4's statement summarizes it all:

"My mom sacrificed a lot. She is a giving mother who dots on her children. I remember she hugged us and kissed us a lot. It's funny that I cannot think of a happy memory with my mom, though. I don't know. Maybe it's because we never went out together or did social activities together. Maybe she could have done more. I don't think her losing her temper and hitting us was a big deal (she didn't hit us a lot, though. Classic throwing a slipper). I can't say that I wish she hadn't hit us. I have several siblings and we were naughty. But I think her behavior influenced me in my relationship with my child. I wish she could control her anger and teach us how to do so, too."

Most of the new mothers who participated in the study stated that if they had the chance to travel back to the past, they would like their mothers to listen to them more and act more closely. These expectations can also be seen as determinants of how mothers will treat their own children.

Discussion and Conclusion

Based on the findings of the study, all participants stated that their thoughts on motherhood changed after they became a mother themselves. Most of them pointed out that being a mother is a difficult experience which feels beyond everything else they thought they knew. One key finding showed that participants think of their childhood either as nice and happy or difficult and lonely based on how their mothers treated them. In general, participants stated that they now understand their mothers better, but they also criticize their own upbringing. And they expect and accept their mothers to be influential on their parenting style.

Participants agreed on that they would never repeat the same mistakes their mothers did. For instance, they would not hide their feelings like their mothers did and they would be more emotionally open. They would ask their mothers to listen to them and show a real interest in their specific needs when they were kids if they had the chance to travel back in time to talk to their mothers. Mcnab and Kavner's (2001) study shows that girls who have problems in their lives blame their mothers for these problems, which supports the research results. The thought that mothers know best can lead mothers to make more mistakes (Walzer & Czopp, 2011). It seems that new mothers are aware of these mistakes and want to avoid making them in their own motherhood experiences. Mothers are most criticized in the emotional dimension. This may have resulted from mothers' misconceptions and traditional approaches to childrearing and discipline (O'Leary, 1995). In today's world and in relatively more modern approaches to motherhood, empathy is emphasized more in child discipline (Van Bavel, 2010). This may explain why today's new mothers find their mothers emotionally wrong.

All participants emphasized the fact that their thoughts on motherhood changed after they themselves became a mother. The reason for this change could be that the people's own experiences affect how they assess a situation. The word "mother" may bring different thoughts and images to each person's mind. While some people perceive being a mother as someone who spends all their time taking care of children, for some others motherhood means working to support the family. Regardless of its role in the home, the relational and educational side of motherhood comes to the fore. The person who provides both physical and emotional nourishment for their children is the "mother" (Arniati, Darwis, Rahman and Rahman).

Motherhood is an experience shaped by each woman's individual practices and it differs from one woman to another (Miller, 2010). Thus, the participants' thoughts on motherhood could have been changed by the unique experience they had after being a mother themselves. The difference in the perception of motherhood is related to what the baby adds to the life of the new mother (Weaver & Ussher, 1997). Although the perception of motherhood is generally related to the health and well-being of the mother and the baby, this perception seems to be mostly positive (Liamputtong et al, 2004). These results are also consistent with the findings of the study.

Another point that the participants agreed upon is that being a mother is a unique and valuable experience despite being very hard. Motherhood is a phenomenon that would change a woman's life forever (Sever, 2015). A woman's responsibilities change after giving birth to a baby and she must adapt to these changes to keep her baby alive. Depressive feelings that occur with the change of hormones after birth can negatively affect the relationship of some mothers with their babies. Mothers who have difficulty in adapting to their changing bodies and changing roles may also struggle with feelings of loneliness. It is known that mothers have a positive perception of having given birth despite the insomnia that continues for days and the anxious mood to meet the needs of the baby. It is obvious that what mothers need in the difficult days after the baby is born is social support. Interactions with the baby, support from the spouse and the family can make this challenging adaptation process easier for new mothers (Gürçayır-Teke, 2014). The sense of motherhood is affected by the social environment of the expectant mother, especially the support and help she receives from her husband is important (Liamputtong et al, 2004). However, studies conducted in different countries show that being a mother, albeit difficult, is an enjoyable and indescribable experience (Bhopal, 1998; Liamputtong et al., 2004; Phoenix & Woollett, 1991).

When participants looked back at their childhood, majority of them stated that they had a nice and happy childhood based on the relationship they had with their mothers. However, some said they had a difficult and lonely childhood because of how their mothers treated them. Mothers have an important place in human life. This is because mothers are the first to form meaningful bonds with us. The bonds established with the mother during infancy affect how the individuals perceive both themselves and their environment, and at the same time, this perceptual structure shows its existence throughout adult life (Bowlby, 2012). Therefore, participants' positive or negative relationships with their mothers may affect how they evaluate their overall childhood. In this context, the distance between new mothers, who grew up in the traditional parenting system, and their mothers causes them to feel lonely. In other words, new mothers who did

not establish a secure bond with their mothers during childhood may have a negative perception of their childhood experiences. On the other hand, new mothers may recall their childhood memories negatively due to traditional maternal parenting styles supported by the general cultural background.

Mothers are also the first role-models we have in our lives (Bowlby, 2012). The baby sees himself in his mother's eyes. While the baby, whose mother cares for him affectionately, feels loved and safe, looking into the eyes of a worried and fearful mother can be a traumatic experience. Attachment with the mother can also manifest itself in other relationships of people in the future. Similarly, they can transfer the parenting style they learned from their mothers, that is, the learned mother-child relationship, to their own children. For this reason, participants could manifest their mothers' parenting style without realizing it when commenting on their experiences as a mother or dealing with motherhood problems. That's why they may think their mothers were right in their actions. However, it doesn't stop the participants from criticizing their mothers' wrong practices. They all stated that they would not hide their feeling towards their children and would not be uninterested in their specific needs. The most important factors in a mother-child relationship are that the mother hears what her children have to say and meets their needs in a consistent manner (Ainsworth, 1969). Participants who didn't receive the necessary attention from their mothers stated that they would not repeat the same mistake with their own kids. Mothers who hide and oppress their own feelings could have a negative effect on the mother-child relationship (Yavuzer, 1996). Thus, new mothers do not want their children to feel the same negativity. Participants who would ask their mothers to show a real interest in them could be a sign to show how the emotional gap between a mother and her child can affect the whole relationship.

Our research shows that women's perceptions and experiences of motherhood differ. However, this study shows that being a mother and being a good mother is not an easy task. The common response of women about being a mother is, "Being a mother is not easy." This study also shows that mothers reflect their relationships with their mothers to their children consciously or unconsciously. While mothers whose needs were not met by their own mothers desire to be more sensitive in understanding their children's needs, those who feel loved by their mothers tend to establish a similar trust relationship with their own children. Therefore, the transferred parenting style also affects how mothers perceive their "roles related to being a mother".

Similar to any study, the present study has certain limitations. Since the study group included new mothers between the ages of 22 to 29, the findings can only be generalized to new mothers in this age group.

The second limitation of the study is the fact that the new mothers in the sample came from same socio-economic level. Thus, these findings are considered to limit generalizability to new mothers' population with different demographics. Thus, further studies could be conducted with a larger sample of new mothers with different demographics.

Implications

This study has shown that being a mother could be a challenging experience where some new mothers may feel helpless at times. In such times, they look up to how their own mothers treated them as a kid. Therefore, coaching sessions on "motherhood" can be offered to new and expectant mothers. Individual and group therapy sessions can also be useful to help overcome the hardships and challenges of being a mother. Various studies can be designed with different family structures and larger samples on the transmission of parenting style.

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Statement of Responsibility

The authors contributed equally to the related research. Therefore, each author is equally responsible

Conflicts of Interest

There is no conflict of interest.

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CHAPTER 3

A STUDY ON EXAMINING RETAILER BRAND EQUITY AND RELATIONSHIPS OF ITS DIMENSIONS VIA STRUCTURAL EQUATION MODELING[1]

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1 This study is produced from Ali Yılmaz's unpublished master thesis (titled "The Role of Private Label Brand Experience On Retailer Brand Equity) written under the supervision of Assoc. Prof. Fatih Geçti

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INTRODUCTION

Brands create value for all constituents of the value chain such as manufacturers, wholesalers, retailers, and consumers (Baldauf et al, 2009:438). As it is known that retailers are also regarded as brands. The term brand was primarily used by the manufacturers, but in all kinds of "products," including retailers, the concept of brands can still apply. The term brand equity came into existence in 1980s. The most known definition for the term is "*the added value with which a brand endows a product*" (Farquhar, 1989:24). According to the literature, the dimensional structure of retailer equity matches brand equity (Pappu & Quester, 2006).

Compared to single products, retailers offer specific features and rich store experiences that require customization of the brand equity measure (Badenhop & Frasquet, 2021:91). Literature indicates that retailer brand equity studies are similar with brand equity studies. They are mostly under Aaker's or Keller's impressions on the subject of equity. The basis of brand equity is the image of the retailer that the consumers have in their minds (Ailawadi & Keller, 2004). In this context, retailer equity refers to values that arise in the customers' mind when they encounter the name of a particular retailer (Badenhop & Frasquet, 2021:91). The aim of this study is to examine retailer brand equity and the relations of its dimensions.

This study is organized as follows. Based on the literature review, section 1 describes the concept of retailer brand equity and its dimensions. Section 2 mentions about the methodology where the philosophical underpinnings of the research. Section 3 then presents the findings of the study based upon the methodology.

1. RETAILER BRAND EQUITY

Nowadays, retail chains are the players of the giant retailing industries and they spend a lot of money to remain so. Various retail chains such as Marks&Spencer, Sainsbury, The Gap and Ikea have been trying to build strong store equity (Steenkamp & Dekimpe, 1997). Regardless of its measuring form, the importance of a brand and its equity essentially stems from the words and acts of consumers on the marketplace. Therefore, through their purchases, consumers determine which brands have more valuable than other brands, based on whatever criteria they find important (Hoeffler & Keller, 2003). Similarly, if consumers have a good impression on a retailer, it will have strong brand equity.

Ailawadi & Keller (2004) points out that it is hard to measure brand equity but it is harder to measure retailer brand equity. Then, they suggest that the image of the retailer in the minds of customers is the foundation of brand equity. Arnett et al. (2003) suggests that retailers have brand equity and refers to it as "retailer equity". Consumers hold a view about the

retailers; their perceptions might be a tool to gain competitive advantage for the retailers. They offer a measurement method, which suggests that retailer equity is made up of 4 dimensions namely; "Store Loyalty, Name Awareness, Service Quality, Retailer Associations". Another approach to retailer brand equity adopts Keller's (1993) definition of brand equity. In this context, retailer brand equity is regarded as the differential effect of store knowledge on customer response to the marketing of the store (Hartman & Spiro, 2005). In the literature, several models were developed to visualize the term brand equity. The model shown in Figure 1 was proposed by Pappu & Quester, (2006). Their model conceptualizes retailer equity based on different viewpoints.

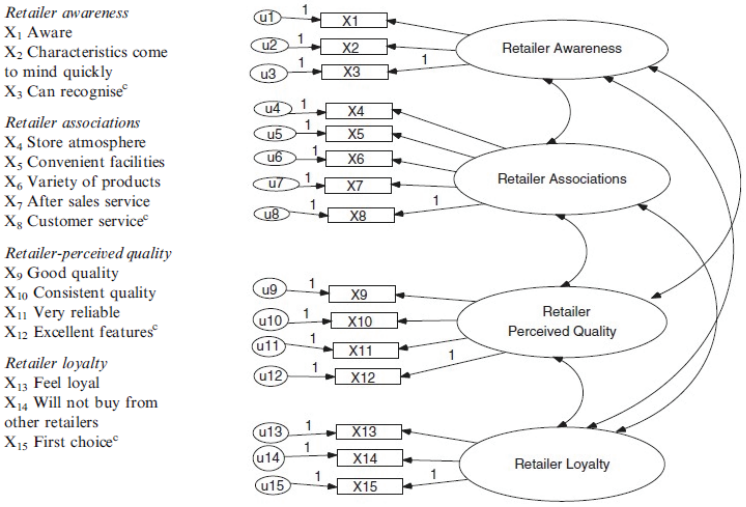
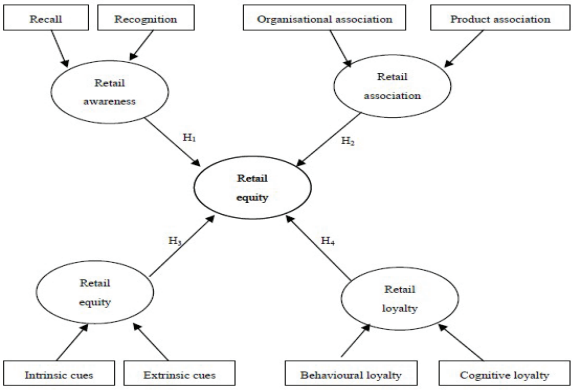


Figure 1. A Consumer-Based Retailer Brand Equity Measurement Model

Source: (Pappu & Quester, 2006:322)

In another model developed by Musekiwa et al. (2013), they suggested a model of customer-based retailer brand equity which has four dimensions: "Retail Awareness, Retail Association, Retail Loyalty, Perceived Quality". Their model is shown in Figure 2.

Figure 2. Customer-Based Retail Equity



Source: (Musekiwa et al., 2013: 47)

Assafe & Alhidari (2019) proposed a model called Store Equity. Their work suggests that Store Awareness and Store Image (SI) are the major components of Store Equity. Their model is shown in Figure 3.

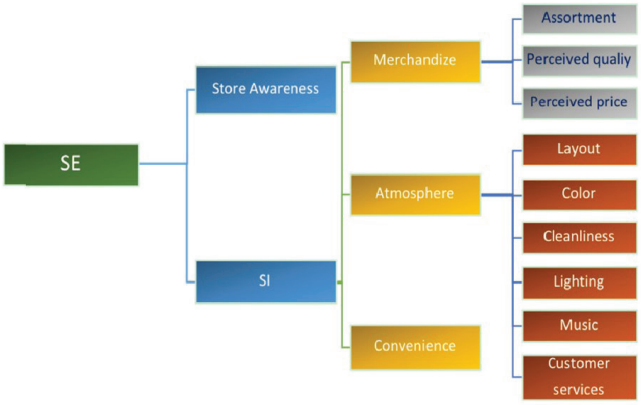


Figure 3. Conceptual Framework for Measuring Customer-Based Retail Equity

Source: (Assafe & Alhidari, 2019:124)

According to Hartman & Spiro (2005), store equity is regarded as the differential effect of store knowledge on customer response to the marketing activities of the store.

Based on the various models and explanations above, it can be suggested that most of the models related to retail brand equity are based on Aaker's (1991) model on the brand equity subject. In light of the Aaker's model, the dimensions of retailer brand equity are explained in detail below.

1.1. Retailer Awareness

If a consumer can recognize a brand among other brands, it is possible to say that the consumer is aware of that certain brand. That briefly explains the term brand awareness (Yoo & Donthu, 2001). Consumers will need to have some form of retailer awareness for retailer equity to occur. Without the awareness of the retailer, consumers would not have quality perceptions, retailer associations or retailer loyalty. Thus, similar to brand awareness, retailer awareness is regarded as consumer's ability to recognize or recall that the retailer is a member of certain retailer category (Pappu & Quester, 2006).

1.2. Retailer Loyalty

Brand loyalty is often considered as the vital of brand equity. If customers show indifference to the brand with respect to features, price and convenience that means the brand has little brand equity. Brand loyalty shows the attachment of the consumers to the brand, especially if the brand is about to make a change in the price or product features (Aaker, 1991). In order to describe retailer loyalty, Aaker's (1991) approach can be used. Thus, the same things about the retailer brands can be suggested.

1.3. Retailer Perceived Quality

According to Aaker (1991), perceived quality, which is another dimension of brand equity, can be described as the customer's perception of the overall quality or superiority of a product or service with respect to its intended purpose, relative to alternatives. Customers place importance on various things. For some people purchasing the best quality is the most important thing, while other people are mainly focused on customer relationship management.

1.4. Retailer Associations

Aaker (1991) posits that the value of a brand name is its meaning to people, its role in the creation of associations in people's minds. On the other hand, Keller (1993) divides associations into three categories as attributes, benefits and attitudes. He mentions about brand associations as the other informational nodes linked to the brand node in memory and contained the meaning of the brand for consumers. Associations can contribute to retail brand equity in various aspects. Some of the ways of value creation could be: helping process/retrieve information, differentiating the brand, generating reason to make purchase, creating positive attitudes/feeling, and providing basis for extension (Cheng & Chen, 2001).

2. METHODOLOGY

2.1. Purpose and Research Hypotheses

Based on the literature above, this main purpose of this study is to examine retailer brand equity and relationships of its dimensions. In this regard, following research hypotheses were developed as follows;

H1*: There is a relationship between retailer awareness and retailer loyalty.*

H2*: There is a relationship between retailer awareness and retailer perceived quality.*

H3*: There is a relationship between retailer awareness and retailer associations.*

H4*: There is a relationship between retailer loyalty and retailer perceived quality.*

H5*: There is a relationship between retailer loyalty and retailer associations.*

H6*: There is a relationship between retailer perceived quality and retailer associations.*

2.2. Sampling Procedures and Data Collection

The population of the research consisted of all of the Migros Supermarkets customers who were at least 18 years old and living in Türkiye. Migros, the forerunner of the modern retail sector in Türkiye is a supermarket chain, which has stores almost in all of the major cities. According to the data provided in their corporate website, first Migros store was opened in 1954 and it has 2255 stores under different store names as of June 2020 (Migros, 2020).

As there were some limitations such as cost, time and inability to the whole population, the research was limited to a sample. Using the convenience sampling method, 381 eligible consumers participated in the online survey. Before the beginning of participation, all of the participants were fully informed about the purpose of the online survey. Links to the survey was shared via social media platforms and emails. Data was collected in May, 2020.

2.3. Measures

In order to measure the validity of above hypotheses, the statements in the questionnaire form were designed based on the previous studies. At first, these statements were translated from English into Turkish. If a scale is used in another country and different language, there are certain necessary stages to follow during translation process. Thus, the statements were translated into Turkish with necessary adjustments. Marketing faculty with advanced knowledge and skills both in English and Turkish were consulted during the translation and adjustment period.

There were two parts in the questionnaire form; demographic profile of the sample and the scale measuring retailer brand equity. In the questionnaire form, 5-point Likert scale type scale (1 stating 'I strongly disagree'… and 5 stating 'I strongly agree') were used to measure retailer brand equity. The items in the retailer brand equity scale were adapted by the studies of Yoo & Donthu, (2001); Musekiwa et al., (2013) and Avcılar, (2008). Before giving it its final shape, the questionnaire was tested in a pilot study with a total of 40 Migros customers. Final touches were made to the questionnaire based on the pilot study reflections.

2.4. Analyses

Using the procedures of structural equation modeling (SEM), data was analyzed via SPSS and AMOS programs.

3. RESULTS

3.1. Sample Profile

There are total of 381 participants in the Migros analyses. The participants for the Migros survey were 242 females, and 139 males. 53,8 % of the participants were married and 12,9 % stated that they were alone. 36,7 percent of the participants were civil servants and 54,1% of the participants were bachelor's degree holders. 19,2 % of the participants stated that they had a monthly net income over 8000 TL. Demographic qualities of the survey indicated that the participants were generally young and educated people that had a family and average income.

3.2. CFA Results

Primarily, the first-order confirmatory factor analysis (CFA) was employed for the constructs validity of Retailer Brand Equity. Besides, C.R., AVE and Cronbach (α) scores of each constructs were calculated. The CFA results are indicated in Table 1.

Table 1. CFA Results of First and Second Order Models

Scales/Items	First Order Model	Second Order Model
	Factor Loadings	Factor Loadings
Retailer Awareness (C.R.=0.89, AVE= 0.62, α=0.89)		
AW1- I am aware of Migros stores.	0.69	0.69
AW2- I can recognize Migros stores among other competing stores.	0.82	0.81
AW3- Some characteristics of Migros stores come to mind quickly.	0.88	0.87
AW4- I have difficulty in imagining Migros stores in my mind.	0.80	0.80
AW5- When I think of shopping, Migros stores comes to mind	0.74	0.76
Retailer Perceived Quality (C.R.=0.86, AVE= 0.61, α=0.86)		
PQ3: The shelves allow easy shopping at/Migros store.	0.66	0.68
PQ4: Staff is customer centric at Migros store.	0.75	0.74
PQ5: Staff is neat at Migros store.	0.86	0.86
PQ6:Migros store service is swift	0.86	0.85
Retailer Loyalty (C.R.=0.86, AVE= 0.62, α=0.86)		
LOY1: I consider myself to be loyal to Migros stores.	0.77	0.78
LOY2: Migros stores are my first choice.	0.88	0.87
LOY3: I will not buy from other retailers if I can buy the same item at Migros.	0.66	0.64
LOY4: I buy most of my groceries from Migros store.	0.83	0.84
Retailer Association (C.R.=0.77, AVE= 0.53, α=0.77)		
ASSO1: I know the features of the Migros store.	0.66	0.74
ASSO2: I immediately remember the symbol and logo of the Migros store.	0.69	0.67
ASSO3: I have no trouble imagining Migros store in my mind.	0.84	0.77
Structural Parameters for the Second Order Model		
Retailer Brand Equity — Retailer Awareness		0.82
Retailer Brand Equity — Retailer Perceived Quality		0.78
Retailer Brand Equity — Retailer Loyalty		0.73
Retailer Brand Equity — Retailer Association		0.93

Model Fit Statistics	χ2/df =3.03 GFI = 0.91 AGFI = 0.87 TLI = 0.93 CFI = 0.94 RMSEA = 0.07	χ2/df =3.02 GFI = 0.90 AGFI = 0.87 TLI = 0.93 CFI = 0.94 RMSEA = 0.07

Table 1 indicated that the factor loadings of all dimensions were greater than 0.60. The reliability scores (CR, AVE and Cronbach Alpha) of the dimensions yielded the acceptable values. According to the findings on fit indexes, the measurement model provided acceptable fit ($\chi 2/df = 3.03$; GFI = 0.91; AGFI = 0.87; TLI = 0.93; CFI = 0.94; RMSEA = 0.07). Since fit statistics and factor loadings were within the acceptable ranges, it could be said that the convergent validity was provided in the measurement model.

The second order factor analysis was employed to review the dimensions of retailer brand equity. The sub-dimensions of retailer brand equity were grouped into a main dimension. According to the findings, retailer associations was found to be the most exploratory (0.93) dimension representing retailer brand equity. Other sub-dimension were respectively retailer awareness (0.83), retailer perceived quality (0.78) and retailer loyalty (0.73).

The analysis of discriminant validity was calculated via the chi-square difference test (Bagozzi et al, 1991). The results are shown in Table 2.

Table 2. Result of the Discriminant Validity Analysis

Models	**χ2**	**df**
The Constrained Model	519,524	103
The Unconstrained Model	294,637	97
Δ χ2	224,887	
Δ df		6

As stated above, discriminant validity was calculated via the chi-square difference test. According to the $\chi 2$ distribution table, the critical value with 6 degrees of freedom and 5% significance level is 12.59. Thus, the critical value ($\chi 2(6) > 12,592$) indicated that discriminant validity was provided.

Hypotheses Testing

The results of covariance values and hypotheses testing are indicated shown in Table 3.

Table 3. The Results of Covariance Values and Hypotheses Testing

			Estimate	S.E.	C.R.	P	Result
Retailer Awareness	<-->	Retailer Loyalty	,215	,029	7,472	***	**H1** Supported
Retailer Awareness	<-->	Retailer Perceived Quality	,178	,023	7,726	***	**H2** Supported
Retailer Awareness	<-->	Retailer Association	,220	,026	8,508	***	**H3** Supported
Retailer Loyalty	<-->	Retailer Perceived Quality	,225	,029	7,729	***	**H4** Supported
Retailer Loyalty	<-->	Retailer Association	,268	,032	8,411	***	**H5** Supported
Retailer Perceived Quality	<-->	Retailer Association	,194	,024	8,036	***	**H6** Supported

*** p <0.001

Table 3 showed that statistically significant relationships among the dimensions retailer brand equity were upheld. Thus, all of the proposed hypotheses were supported. It was found that all of the relationships among the dimensions of retailer brand equity were significant and positive.

Standardized regression weights of the retailer brand equity dimensions are indicated in Table 4.

Table 4. Standardized Regression Weights

Standardized Regression Weights			Estimate
AW1	<---	Retailer Awareness	,691
AW2	<---	Retailer Awareness	,810
AW3	<---	Retailer Awareness	,870
AW4	<---	Retailer Awareness	,807
AW5	<---	Retailer Awareness	,759
PQ3	<---	Retailer Perceived Quality	,676
PQ4	<---	Retailer Perceived Quality	,743
PQ5	<---	Retailer Perceived Quality	,860
PQ6	<---	Retailer Perceived Quality	,848
LOY1	<---	Retailer Loyalty	,779
LOY2	<---	Retailer Loyalty	,870

LOY3	<---	Retailer Loyalty	,645
LOY4	<---	Retailer Loyalty	,837
ASSO1	<---	Retailer Association	,743
ASSO2	<---	Retailer Association	,670
ASSO3	<---	Retailer Association	,775

Table 4 shows the standardized regression weights of retailer brand equity dimensions. All of the items indicated significant effects as all were greater than 0.60.

CONCLUSION

In light of the literature review, this study attempted to examine the concept of retailer brand equity and its dimensions. Using structural equation modeling procedures, the dimensions of Migros Supermarkets retailer brand equity were investigated and proposed research hypotheses were tested.

Primarily, the first-order confirmatory factor analysis was employed for the dimensions that comprised retailer brand equity. Upon enhancing the acceptable reliability and validity scores, the second-order confirmatory factor analysis was performed. The aim of this analysis was to reveal to what extent the sub-dimensions explained the concept of retailer brand equity. According to the results, the dimensions represented Migros Supermarkets' retailer brand equity were respectively retail association (0.93), retailer awareness (0.83), retailer's perceived quality (0.78) and retailer loyalty (0.73). This result suggests how important association is in creating brand equity for retailers. When Migros brand equity is taken into account, it has been revealed that loyalty to the store is relatively less explanatory compared to other variables. The relationships among the dimensions of Migros Supermarkets' retailer brand equity were tested with structural equation modeling. According to the results, significant and positive relationships between the constructs were found. Thus, all of the proposed hypotheses were supported.

Since this study deals with retailer brand equity and the examination of its dimensions, it might provide different implications. Retailer brand equity, a concept that emerged with the adaptation of the concept of brand equity to retailers, actually reveals how valuable a retail brand is perceived by consumers. The results show that Migros, one of the most important and pioneer brands of the Turkish retail industry, is perceived as a valuable brand for the customers participating in the research.

This study has some limitations. Obtaining data through online questionnaire is regarded as a constraint. Using the convenient sampling method with the participation of limited number of Migros' customers is an-

other limitation. Thus, the results may not be able to generalize. Since the psychological conditions of the participants at the time of completing the online questionnaire were not known, the reliability of the answers could be questionable. This could create a limitation.

After this research, some research avenues might be recommended for scholars who are interested in that subject. In the future studies, different types of retailers might be investigated in terms of their retailer brand equity. Therefore, some comparisons between these retailers can be made. As Migros operates in different countries, similar studies might be done on different Migros customers living in different countries.

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CHAPTER 4

DETERMINATION OF PUBLIC PERSONNEL'S MOTOR INSURANCE POLICY SELECTION BY ANALYTICAL HIERARCHY PROCESS AND TOPSİS HYBRID APPROACH: BARTIN PROVINCE APPLICATION

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1. Introduction

Globalization brings with it many changes and developments. Population is at the forefront of the changes experienced. There is a noticeable change in both numbers and demographic factors. Technology is perhaps the place where the development is most evident. With the developments experienced, information technologies have now been in every aspect of our daily lives. Information technologies have become indispensable in almost every aspect of our lives, together with the technologies used in a device used in the kitchen, computers used in communication or satellites used in NASA.

The automotive sector is an industry where technological developments are visibly evident. Automotive sector globalization affects both the quality and number of vehicles. With the increase in population, people's vehicle demands are also increasing. Increasing demand in the automotive sector supports its development in some sectors. One of these sectors is motor insurance policies. With the technological developments in the automotive sector, vehicles are now produced more comfortable and luxurious. In this case, it increases the cost of vehicles. At this point, the risk factor is important. Because as the cost of vehicles increases, the cost of any accident increases.

Certain laws and regulations have been made in the world and in Turkey to ensure the safety of both people and vehicles. One of these regulations in Turkey is compulsory traffic insurance. With the compulsory traffic insurance, the negative situations that the human factor will encounter are minimized, while the financial losses they will suffer in their vehicles are reduced. Although compulsory traffic insurance tries to reduce losses, it does not fully compensate. Because technological developments have increased the quality of vehicles. This quality is reflected in the price. The prices of qualified vehicles are also increasing. Although compulsory traffic insurance guarantees to calculate the cost of the vehicle based on certain risk factors and to pay for it, these provisions are within certain limits.

Motor insurance are policies that guarantee to cover the damage to the vehicle in case of any negativity and accident (Gençosman, 2006). Motor insurance policies are more comprehensive than traffic insurances. It offers vehicle owners broader coverage and additional coverage. The market share of automobile insurance policies is increasing day by day around the world. In this case, it increases the competition between automobile insurance companies (Karagöz, Demir and Günel, 2019). Because companies want to increase their share in this market. The high market shares have led to an increase in the number of motor insurance companies. With the increasing number, the selection of the motor insurance policy has become more complicated.

The aim of this study is to find a solution to this complex problem. In the study, criteria were determined by making use of both the literature and experts in order to help the user in the selection of automobile insurance. When the literature is searched, it has been seen that there are many criteria affecting the selection of the motor insurance policy. These criteria were evaluated and eliminated by the insurance experts. After the evaluation of the experts, 14 criteria affecting the motor insurance selection were determined. In addition to the criteria, 10 alternatives were determined. It is modeled using the analytical hierarchy process with the specified criteria. In the model created, 10 alternative automobile insurance companies were evaluated with the TOPSIS method. The results were evaluated.

Within the scope of the study, the factors affecting the choice of automobile insurance policy of the public personnel in the province of Bartın were tried to be determined. The prepared study consists of six chapters. In the first part; by introducing the subject, general information was given and the subject and its importance were tried to be explained. In the second part; the criteria to be used in the research are mentioned. In the third part; a literature study on the subject has been done. In the fourth chapter; the method to be used in the study is mentioned. In the fifth section; the implementation phase of the research is included. In the sixth chapter, the results are interpreted and suggestions for future studies are presented.

2. Literature research

Saaty in the 1970s. It has been widely used in many fields due to the reasons such as the method is understandable and easy to use. The TOPSIS approach was developed by Hwank and Yoon in 1981. In the TOPSIS method, alternatives are evaluated. Because the method is easy to use and understandable, it has been frequently used in the literature.

Detailed literature study was carried out, many studies related to motor insurance policy selection were found. For this reason, considering that it will contribute to the literature, it has been tried to approach the selection of automobile insurance policy from a different perspective. In the study, restrictions were made as public personnel in the province of Bartın in the choice of automobile insurance policy. Thus, it is aimed to contribute to the literature by looking at the problem from a different perspective.

In the study, the purpose of which was not mentioned before, the factors affecting the choice of automobile insurance policy of the public personnel working in the province of Barın were determined in detail and the alternatives were listed by calculating the importance of these factors using the AHP and TOPSIS methods. Thus, a table has been presented that users can consider when choosing an automobile insurance policy. In Table 1, there is a detailed literature study.

Table 1. Studies on Motor Insurance Policy Selection

Year	Author(s)	Findings of the Research
2004	Gozüngü	In the study, the factors affecting the automobile insurance selection were evaluated by chi-square and t-test.
2010	Filiz and Sengoz	Conjoint Analysis was used to determine the factors that car owners in Izmir give importance when choosing automobile insurance. At the end of the study, brand perception emerged as the most important criterion.
2011	Durmus	In the study, it was measured which factors affect the people living in the province of Tokat to obtain an automobile insurance policy. Logit model was used in the study.
2011	Demireli and Timur	In the study, the factors that affect corporate customers' choice of automobile insurance company were evaluated.
2012	Eygu and Sogukpinar	In this study, the level of vehicle owners having an automobile insurance policy and the factors affecting the policy are examined.
2014	Schmid	In the study, the suitability of car insurance prices in the USA was analyzed.
2014	Honka	In this study, automobile insurance demands in the USA were examined.
2015	Gümüş and Şerit	In the study, the relationship between the demographic characteristics of vehicle owners and their tendency to have automobile insurance was examined.
2016	Erol and Alma	In the study, the factors affecting the insurance policy were examined. Logistic regression method was used in the study.
2016	Donmez and Basar	In the study, it was emphasized whether the information provided by the motor insurance companies in Istanbul affected the purchase.
2017	Tayyar and Dincer	In the study, the factors affecting the choice of automobile insurance were evaluated by TOPSIS and VIKOR methods.
2018	Gümüş and Ozdemir	In the study, the factors affecting the preference of motor insurance in Aydın were examined.
2019	Karagoz, Demir and Gunel	In the study, the factors affecting the automobile insurance preference of Sivas Cumhuriyet University employees were determined.

3. Factors and Alternatives Considered in the Selection of Motor Insurance Policy

Are many criteria to be considered in the selection of the automobile insurance policy to be preferred for vehicles. Since each of these factors has different importance, it is necessary to consider each of them when choosing. The automobile insurance policy to be chosen for the vehicle is an important issue. Because in case of any negativity encountered, the preferred automobile insurance and the guarantees offered by these automobiles to the user are important. There are many academic studies on the selection of motor insurance policy and the criteria to be considered. These studies were examined in detail and a list of criteria to be used was created.

But the number of criteria in the resulting list is very large. This complicates the decision-making action rather than making it easier. For this reason, the number of criteria in the created list has been eliminated. The criteria to be used in the study were evaluated by automobile insurance experts, and the number of criteria was reduced by determining the important criteria. In the study, fourteen criteria were determined in the list created by taking the opinions of various motor insurance experts. In addition, the alternatives to be evaluated were determined by the questionnaire on the website www.arabalar.com . Insurance experts the list of criteria to be considered in the selection of an automobile insurance policy is given in Table 2.

Table 2. Criteria Affecting the Choice of Motor Insurance Policy

Criteria	Explanation
HOS: Damage Payment Period	It indicates the period in which the loss will be paid in case the insured applies to the insurance company for compensation of the damage in the face of any negativity.
AT: Assistance Guarantee	It covers the services that must be provided within the motor insurance policy or with an additional guarantee. These services can take various forms such as roadside assistance, replacement vehicle, accommodation.
AH: Assistance Services	It shows the quality of the services offered under the assistance guarantee.
HOY: Claims Payment Approach	It shows the general attitude towards the insured in case of negativities that require payment.
HI: No Claim Discount	It is the discount that the insured will gain in the next period if he does not experience any adverse events during the motor insurance period.
ASA: Contracted Service Network	If insurance companies have created a positive alternative to the direct indemnity payment method to customers in motor insurance damages, and if the insured use the services contracted with the insurance company for damage repairs, they are excluded from the money chain. System and the service included in this system, which allows them to have their repairs done without contacting the insurance company, network across the country, taking into account all brands (Yücenur, 2018).
SKY: Expansion of Sales Channels	It shows the prevalence and accessibility of the automobile insurance company throughout the country.
CAT: Glass and Accessories Coverage	It shows that the repair is made once or unlimitedly according to the insurance companies or the accepted policy.
MY: Exemption Structure	Includes all of the guarantees included in the motor insurance policy. It is the exemption fee to be applied against natural disasters such as earthquakes, floods and fires.
PF: Policy Price	It is the price that the insurance company determines and offers according to certain risk factors and demographic characteristics of the person.
MA: Brand Perception	It shows that the automobile insurance company is known.

FG: Firm's Financial Strength	This criterion shows the relationship between the price the insurance company will pay to the insured in case of any negativity and the payment period.
MYI: Customer Approach Principle	It shows the importance given to customer satisfaction by the automobile insurance company and its attitude in customer relations.
FI: Price Stability	It shows that the determined policy price continues unchanged in the following periods, except for the means of exchange such as inflation.

In Table 3, the alternatives to be used within the scope of the study are given.

Table 3. Alternative Motor Insurance Policies

Code of Alternatives	Explanation
A1	AXA Insurance
A2	Anadolu Insurance
A3	Ak Insurance
A4	Allianz Insurance
A5	Ergo Insurance
A6	Solar Insurance
A7	Groupama Insurance
A8	Euroko Insurance
A9	Mapfre Insurance
A10	Yapı Kredi Insurance

4. Method

In this study, a hybrid model was created by using AHP and TOPSIS methods used in multi -criteria decision making problems. By giving the application steps of the AHP and TOPSIS methods, these steps were used to determine the most suitable option for automobile insurance selection.

4.1. Analytical Hierarchy Process (AHP)

Multi -criteria decision-making techniques, was developed by Saaty in the 1970s (Tümînçin, 2016). AHP is a mathematical method that can evaluate qualitative and quantitative criteria (Wu, 2010) together (Dağdeviren & Eren, 2001). AHP method is one of the most preferred methods in multi -criteria decision making problems. Because AHP is the most easy to use and understand method (Punniyamoorty, 2012). Therefore, AHP is frequently used in the literature.

There are three main topics in the AHP method. These titles consist of main criteria, sub-criteria and alternatives after the aim to be achieved in the top layer of the model, which is created as a hierarchical structure (Scholl, 2005). The hierarchical structure of AHP is as shown in figure 1.

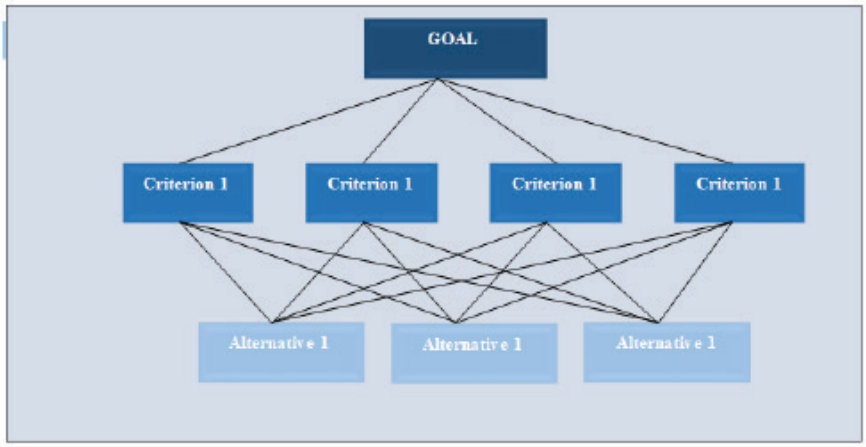

Figure 1. AHP Hierarchical Structure

As can be seen in Figure 1, the hierarchical structure of the AHP method makes it easier to understand and apply. This situation causes the method to be preferred frequently. In the AHP method, pairwise comparisons are made between the criteria. As a result of the pairwise comparison, the criterion and alternative with the highest value are determined.

It is effective in choosing the AHP method that it provides fast and effective decisions to decision makers. Because each factor in the decision-making structure prolongs the decision-making process and reduces the effectiveness of the decision. The AHP method includes the steps indicated in figure 2 below.

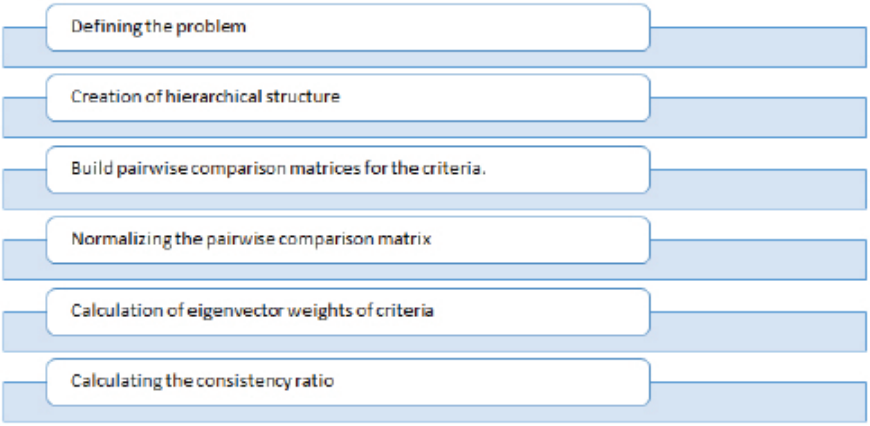

Figure 2. AHP Steps

1-9 scale developed by Saaty in the 1980s is used to evaluate expert opinions. Table 4 shows the scale used.

Table 4. AHP 1 – 9 Scale

Explanation	Severity Level
Equally important	1
moderately important	3
Quite Important	5
Very important	7
Highly important	9
Intermediate Values	2,4,6,8

In the AHP method, the criteria, sub-criteria and alternatives are subjected to pairwise comparison and their importance values are calculated. If an alternative is to be determined in the method, each alternative is subjected to a pairwise comparison with the determined criteria, and their weights are determined and these weights are ordered from largest to smallest. The steps used in calculating the importance of criteria are given in Table 5 below.

Table 5. AHP Process Steps

1- According to the scale in Table 4, B decision matrices are formed based on the opinions of the experts.
2- The geometric mean of Decision Matrices is found.
3- A new F decision matrix is created as a result of the geometric mean.
4- Normalizing the F matrix , [c_{ij}] matrix is obtained.
5- The weight values are obtained by dividing the sum of the row values of the C matrix by the number of criteria (n).
6- The λ value is calculated.
7- (CR) consistency is calculated. (CR< 0.1)

Table 6. Random Index (RI) Values

Number of Criteria	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI Value	0	0	0.52	0.89	1.11	1.25	1.35	1.40	1.45	1.49	1.51	1.53	1.56	1.57	1.59

Purpose of the consistency analysis, which is one of the important decisions of the AHP, is to determine whether the decision maker behaves consistently when comparing the criteria (Tüminçin, 2016). Consistency, that is, the CR value should < 0.1. If the ratio is large, it should be checked by returning to the pairwise comparison matrix (Aytekin et al., 2021). The fact that the number of criteria determined in the study is high reduces the probability of obtaining consistent results in the analysis (Kwiesielewicz and Uden, 2004). In AHP studies, the number of criteria cannot fall below two.

4.2. TOPSIS (Technique for order Preference by Similarity) Method

Multi -criteria decision making methods, was developed by Hwang and Yoon in 1980. TOPSIS makes the most appropriate alternative selection in line with the criteria weights determined (Hwang and Yoon, 1981). Unlike other MCDM methods, in the TOPSIS method, pairwise comparisons and transformations are not made. In this case, it facilitates the application of the method. For this reason, the TOPSIS method is widely used in the literature.

The basis of the TOPSIS method is the point closest to the ideal (positive ideal) and the farthest (negative ideal) point from the ideal. At the positive ideal distance point, the cost element is made minimum. Other benefits are maximized. In this way, maximum benefit is obtained from minimum price. At the negative ideal distance point, the cost element is maximized. Other benefit elements are kept to a minimum. Thus, the minimum benefit to be obtained from the maximum price is measured. The method reveals positive and negative ideal distances. Thus, ideal and non-ideal solutions emerge.

In order to apply the TOPSIS method, there must be at least two alternatives. The structure of the TOPSIS method is not complicated. Therefore, it is widely preferred in many areas such as supplier selection, establishment location selection, personnel selection.

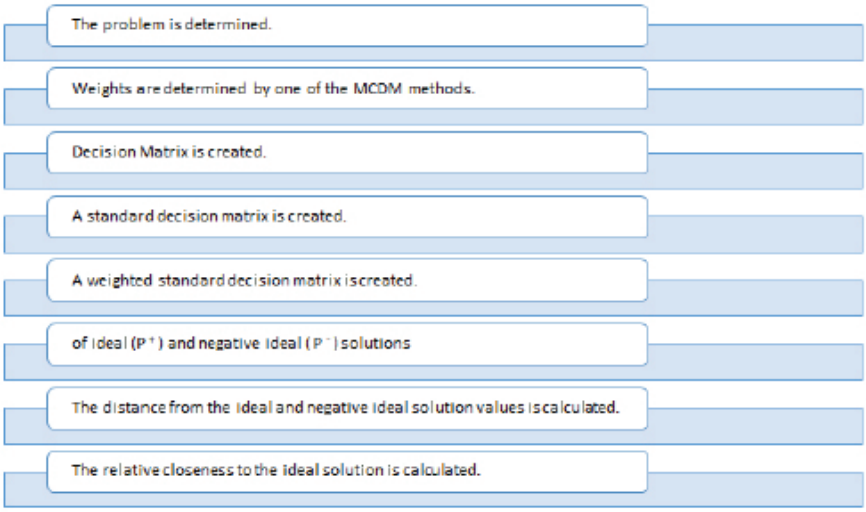

Figure 3. TOPSIS Steps

In the TOPSIS method, a normalized matrix is first created in line with the weight values determined. A new matrix is created by multiplying the

weight value of each element in the normalized matrix created. Then there are the positive ideal and negative ideal points. In the last step, the distance coefficient is calculated for each alternative. As a result of the calculations, the rankings of the alternatives emerge. The operation steps of the TOPSIS method are given in the table below.

Table 7. TOPSIS Process Steps

1- (m), the decision matrix F, which includes the evaluation according to the criteria (n), is created.	$F = \begin{bmatrix} x_{11} & \cdots & x_{1n} \\ \vdots & \ddots & \vdots \\ x_{m1} & \cdots & x_{mn} \end{bmatrix}$
2- Creation of the standard decision matrix (R)	$R = \begin{bmatrix} x_{11} & \cdots & x_{1j} \\ \vdots & \ddots & \vdots \\ x_{i1} & \cdots & x_{ij} \end{bmatrix}$ $r_{ij} = \frac{x_{ij}}{\sum_{m=1}^{n} x_{mj}^2}$ (14)
3- A weighted standard decision matrix (K) is created	$K = \begin{bmatrix} w_1 r_{11} & \cdots & w_n r_{n1} \\ w_1 r_{21} & \ddots & \vdots \\ \cdots & \cdots & w_n r_{mn} \end{bmatrix}$ $W_{mn} = w_m * N_{mn}$ (15)
4- Positive ideal (A^+) and negative ideal (A^-) solution values are obtained. Note: j (*Maksimizasyon*) benefit J' (*Minimizasyon*) characterizes harm.	$A^+ = \{(maxv_{ij} \mid j \in J), \quad (minv_{ij} \mid j \in J')\}$ $A^- = \{(minv_{ij} \mid j \in J), \quad (maxv_{ij} \mid j \in J')\}$
5- Calculation of distance from ideal and negative ideal solution values Note: The Euclidean approach is used.	$S_j^+ = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^+)^2}$ $S_j^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2}$
6- Calculation of relative closeness to the ideal solution	$C_i^* = \frac{S_j^-}{S_j^- + S_j^+}$ $0 \leq C_i^* \leq 1$

Value $0 \leq$ it takes a value in the range of ≤ 1. The value = 1 indicates that the alternative is in the positive ideal solution range, and the value indicates that the alternative is at the negative ideal point.

5. Application

5.1. Purpose and Importance of the Research

In the period called the automobile age, breaks are now in every part of our lives. While the automobile took its place as a luxury use in the previous periods, it is one of the most basic needs today. The rapid development of technology also has a large share in the emergence of this situation. The intense and active life of human beings during the day emphasizes the importance of the concept of time. Instead of wasting time on public transport, people reach their desired destination faster and more smoothly with their own personal vehicles. All these reasons are factors that increase vehicle use. Again, the development and progress of technology has also shown itself in the vehicle industry. This situation causes vehicle prices to increase. Each new technology added to vehicles also affects vehicle prices. In this case, it brings with it some risks. With the high vehicle prices,

the need to secure these prices and vehicles has arisen.

Although traffic insurance is compulsory for all vehicles, the coverage of this insurance does not cover the value of the vehicle. While it secures some points, it also causes high losses. At this point, motor insurance policies come into play. Although not mandatory, almost all luxury vehicles are insured vehicles. Because vehicle prices are increasing, traffic insurances do not fully cover these costs. The situation is different in the helmets. They guarantee certain risk factors over the fair value of the vehicle.

In this study, the automobile insurance policy selection problem for the vehicles of the vehicle owners who are in the position of decision maker is discussed. Motor insurance policies contain a difficult and complex process for vehicle owners. Vehicle owners need to consider many factors when choosing an automobile insurance policy, which includes different guarantees for different risk groups for their vehicles.

Criteria weights by weighting the determined criteria, and to determine the best alternative based on the weights obtained. Thus, it is desired to facilitate the decision-making actions of decision makers.

A detailed literature study was conducted in the study, the existence of different criteria was observed. In this case, the number of criteria increased. The high number of criteria complicates the decision-making action. For this reason, common criteria were determined by taking the opinions of insurance experts. While determining the criteria to be used in the study, opinions were taken from three experts working in different insurance companies. In line with expert opinions, new criteria were determined to be used in the study.

5.2. **Limitations of the Research**

Considering some conditions that may cause differences in the evaluation of criterion weights in the research, the research has been advanced in this context. At the beginning of these differences are the experts who will be selected at the point of determining the criteria used in the study. For this reason, experts working in different companies were preferred when choosing experts.

Another limitation of the study is the determination of the people to whom the survey will be administered. The city where the study will be implemented has been determined as Bartın. The province of Bartın was decided upon considering various factors such as the ease of data collection and the acceleration of the study. In the determination of the alternatives used in the study, the ten most popular companies were included in the survey application made for the evaluation of automobile insurance companies.

Detailed literature review was made, it was seen that many studies

were carried out on the subject. Based on this situation and in order to contribute to the literature, it was decided to conduct the study to public officials. Considering the differences in duties and salaries of public personnel, public personnel with different titles and duties were preferred. Ultimately, the study was the motor insurance choice of the civil servants working in the province of Bartın.

5.3. **Findings of the Research**

In the research, first of all, the AHP method was used to determine the importance of the criteria. In the next stage, alternatives were determined using the TOPSIS method. In the study, first of all, the criteria to be used were determined by making face-to-face interviews with three people working as experts in insurance companies. In the second step, the criteria weighted. Expert opinions were obtained by using Saaty's 1-9 scale. In the third stage, the alternatives are listed with the TOPSIS method based on the weights obtained by the AHP method.

1. Step: A single pairwise comparison matrix was created by combining the opinions of the experts with the geometric mean for the province of Bartın. The pairwise comparison matrix created for the criteria is given in Table 7.

Table 8. Geometric Average Matrix of Criteria for Bartın Province

Criteria	HI	FI	PF	MT	AT	CAT	AH	ASA	HOY	HOS	SKY	FG	MA	MYI
HI	1.00	0.42	0.31	1.09	1.17	1.01	1.09	0.39	0.43	0.32	1.26	0.58	1.17	0.43
FI	2.36	1.00	0.43	1.09	1.09	2.36	2.19	0.37	0.43	0.32	0.50	0.54	0.42	0.46
PF	3.23	2.31	1.00	2.54	2.19	3.16	2.54	0.39	0.50	0.47	0.62	0.58	0.58	0.58
MT	0.92	0.92	0.39	1.00	1.49	1.87	3.47	0.58	0.69	0.69	0.92	0.62	0.92	0.79
AT	0.85	0.92	0.46	0.67	1.00	0.79	1.17	0.29	0.25	0.25	1.17	0.54	0.58	0.29
CAT	0.99	0.42	0.32	0.53	1.26	1.00	0.92	0.23	0.22	0.20	0.33	0.47	0.29	0.29
AH	0.92	0.46	0.39	0.29	0.85	1.09	1.00	0.50	0.43	0.23	0.54	0.54	0.63	0.62
ASA	2.54	2.73	2.54	1.72	3.47	4.32	1.99	1.00	1.47	0.86	2.54	0.85	1.60	0.85
HOY	2.31	2.31	1.99	1.46	4.02	4.65	2.31	0.68	1.00	0.79	2.93	1.99	4.65	4.02
HOS	3.16	3.16	2.14	1.46	4.02	5.00	4.32	1.16	1.26	1.00	2.36	1.60	1.85	1.49
SKY	0.79	1.99	1.60	1.09	0.85	3.00	1.85	0.39	0.34	0.42	1.00	0.50	0.92	0.58
FG	1.72	1.85	1.72	1.60	1.85	2.14	1.85	1.17	0.50	1.57	1.99	1.00	1.06	0.92
MA	0.85	2.36	3.23	1.09	3.23	3.47	1.58	0.62	0.22	0.54	1.09	0.94	1.00	0.62
MYI	2.33	2.19	1.72	1.26	3.47	3.47	1.60	1.17	0.25	0.67	1.72	1.09	1.60	1.00

2. Step: A normalized decision matrix is created to evaluate the criteria for the province of Bartın.

Table 9.Normalized Comparisons of Criteria for Bartın Province

Criteria	HI	FI	PF	MT	AT	CAT	AH	ASA	HOY	HOS	SKY	FG	MA	MYI
HI	0.04	0.02	0.02	0.06	0.04	0.03	0.04	0.04	0.05	0.04	0.04	0.05	0.07	0.03
FI	0.10	0.04	0.02	0.06	0.04	0.06	0.08	0.04	0.05	0.04	0.04	0.05	0.02	0.04
PF	0.13	0.10	0.05	0.15	0.07	0.08	0.09	0.04	0.06	0.06	0.06	0.05	0.03	0.04
MT	0.04	0.04	0.02	0.06	0.05	0.05	0.12	0.06	0.09	0.08	0.08	0.05	0.05	0.06
AT	0.04	0.04	0.02	0.04	0.03	0.02	0.04	0.03	0.03	0.03	0.03	0.05	0.03	0.02
CAT	0.04	0.02	0.02	0.03	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.04	0.02	0.02
AH	0.04	0.02	0.02	0.02	0.03	0.03	0.04	0.06	0.05	0.03	0.03	0.05	0.04	0.05
ASA	0.11	0.12	0.14	0.10	0.12	0.12	0.07	0.11	0.18	0.10	0.10	0.07	0.09	0.07
HOY	0.10	0.10	0.11	0.09	0.13	0.12	0.08	0.08	0.13	0.10	0.10	0.17	0.27	0.31
HOS	0.13	0.14	0.12	0.09	0.13	0.13	0.15	0.13	0.16	0.12	0.12	0.14	0.11	0.11
SKY	0.03	0.09	0.09	0.06	0.03	0.08	0.07	0.04	0.04	0.05	0.05	0.04	0.05	0.04
FG	0.07	0.08	0.09	0.09	0.06	0.06	0.07	0.13	0.06	0.19	0.19	0.08	0.06	0.07
MA	0.04	0.10	0.18	0.06	0.11	0.09	0.06	0.07	0.03	0.06	0.06	0.08	0.06	0.05
MYI	0.10	0.10	0.09	0.07	0.12	0.09	0.06	0.13	0.03	0.08	0.08	0.09	0.09	0.08

3. Step: weight values of the criteria are calculated for the province of Bartın.

Table 10. Weight Values of Criteria for Bartın Province

criteria	HI	FI	PF	MT	AT	CAT	AH	ASA	HOY	HOS	SKY	FG	MA	MYI
Weights	0.04	0.04	0.07	0.06	0.03	0.02	0.03	0.10	0.13	0.12	0.05	0.09	0.07	0.08
Arrangement	11	10	7	8	13	14	12	3	1	2	9	4	6	5

4. Step: After the weighting process, the CR value is found to test the consistency of the model.

Table 11. Consistency Values of Criteria for Bartın Province

land	CI	CR	
15.13	0.09	0.06	<0.10

To test the consistency of the model, consistency analysis was performed by calculating the CR value. In the analysis, when the CR value was $0.06 < 0.1$, our n model was consistent.

5. Step: The TOPSIS method is used to evaluate and rank the alternatives. In order to create the decision matrix, the information obtained from expert decision makers and the data of http://www.arabalar.com were used. It is defined between 1-10 so that the identified alternatives can be easily shown in the tables. A1: Axa Insurance, A2: Anadolu Insurance, A3: Ak Insurance, A4: Allianz Insurance, A5: Ergo Insurance, A6: Güneş Insurance, A7: Groupama Insurance, A8: Eureko Insurance, A9: Mapfre Insurance, A10: Yapı Kredi Insurance. Each decision maker evaluated each alternative on a scale of 1-10 for all criteria, and Table 12 was formed by taking the geometric mean to combine these values.

Table 12. Decision Matrix

Criteria	HI	FI	PF	MT	AT	CAT	AH	ASA	HOY	HOS	SKY	FG	MA	MYI
A1	5.82	5.78	4.05	4.96	8.02	4.96	7.23	8.10	6.36	6.41	6.73	8.10	9.00	4.57
A2	4.89	5.37	5.08	4.25	6.44	5.29	6.41	7.20	5.18	5.95	6.61	8.27	8.56	4.42
A3	4.89	5.14	4.07	5.14	6.96	4.42	6.32	7.37	5.49	6.00	5.97	7.27	6.81	3.90
A4	4.92	6.36	5.08	4.89	5.95	4.68	6.70	7.52	5.34	6.27	5.70	7.27	7.54	3.76
A5	6.58	5.49	4.25	3.84	5.71	4.45	6.36	6.99	5.71	6.27	5.42	6.08	6.61	3.84
A6	4.07	4.01	3.60	3.84	3.76	3.42	3.20	3.41	3.76	3.60	3.60	3.60	3.76	3.76
A7	4.89	5.34	5.08	4.24	5.27	4.16	5.95	5.50	4.55	6.55	4.67	4.76	5.27	3.48
A8	5.14	4.45	4.58	4.92	5.70	4.05	5.71	6.00	4.24	5.55	5.34	6.27	5.58	3.60
A9	4.92	4.94	5.57	4.05	6.36	5.71	4.92	6.70	4.38	5.41	4.55	4.69	5.00	3.65
A10	4.45	5.70	5.71	4.89	6.00	4.99	4.40	6.36	4.76	6.27	4.99	6.08	6.41	3.76

6. Step: The normalized decision matrix is created. The normalized decision matrix is given in Table 13.

Table 13. Normalized Decision Matrix

Criteria	HI	FI	PF	MT	AT	CAT	AH	ASA	HOY	HOS	SKY	FG	MA	MYI
A1	0.36	0.34	0.27	0.35	0.42	0.34	0.39	0.39	0.40	0.34	0.39	0.40	0.43	0.37
A2	0.30	0.32	0.34	0.30	0.33	0.36	0.35	0.34	0.33	0.32	0.38	0.41	0.41	0.36
A3	0.34	0.35	0.30	0.40	0.43	0.34	0.40	0.41	0.40	0.37	0.42	0.44	0.40	0.37
A4	0.31	0.38	0.34	0.34	0.31	0.32	0.36	0.36	0.34	0.34	0.33	0.36	0.36	0.31
A5	0.41	0.33	0.28	0.27	0.30	0.30	0.34	0.33	0.36	0.34	0.32	0.30	0.31	0.31
A6	0.25	0.24	0.24	0.27	0.19	0.23	0.17	0.16	0.24	0.19	0.21	0.18	0.18	0.31
A7	0.30	0.32	0.34	0.30	0.27	0.28	0.32	0.26	0.29	0.35	0.27	0.23	0.25	0.28
A8	0.32	0.27	0.30	0.34	0.29	0.28	0.31	0.29	0.27	0.30	0.31	0.31	0.27	0.29
A9	0.31	0.30	0.37	0.28	0.33	0.39	0.27	0.32	0.28	0.29	0.26	0.23	0.24	0.30
A10	0.28	0.34	0.38	0.34	0.31	0.34	0.24	0.30	0.30	0.34	0.29	0.30	0.31	0.31

7. Step: A weighted decision matrix is created using the normalized decision matrix. The weights determined for the criteria in Table 10 are multiplied by each element of the normalized decision matrix in Table 13 to form a weighted decision matrix. The weighted decision matrix is given in Table 14.

Table 14. Weighted Decision Matrix

Criteria	HI	FI	PF	MT	AT	CAT	AH	ASA	HOY	HOS	SKY	FG	MA	MYI
A1	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.04	0.05	0.04	0.02	0.04	0.03	0.03
A2	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.04	0.04	0.04	0.02	0.04	0.03	0.03
A3	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.04	0.05	0.05	0.02	0.04	0.03	0.03
A4	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.04	0.04	0.04	0.02	0.03	0.03	0.03
A5	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.04	0.05	0.04	0.02	0.03	0.02	0.03
A6	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.02	0.03	0.02	0.01	0.02	0.01	0.03
A7	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.03	0.04	0.04	0.02	0.02	0.02	0.02
A8	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.03	0.04	0.04	0.02	0.03	0.02	0.03
A9	0.01	0.01	0.03	0.02	0.01	0.01	0.01	0.03	0.04	0.04	0.01	0.02	0.02	0.03
A10	0.01	0.02	0.03	0.02	0.01	0.01	0.01	0.03	0.04	0.04	0.02	0.03	0.02	0.03

8. Step: Positive ideal (A^+) and negative ideal (A^-) solutions are generated using the weighted decision matrix. Positive ideal solutions represent the best performance values, and negative ideal solutions represent the worst performance results. Positive and negative ideal solutions are shown in Table 15.

Table 15. Positive and Negative Ideal Solutions

Criteria	HI	FI	PF	MT	AT	CAT	AH	ASA	HOY	HOS	SKY	FG	MA	MYI
A^+	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.04	0.05	0.02	0.02	0.04	0.03	0.03
A^-	0.01	0.01	0.03	0.02	0.01	0.01	0.01	0.02	0.03	0.05	0.01	0.02	0.01	0.02

9. Step: The distance of the weighted values to the positive ideal solutions (S+) and the distance to the negative ideal solutions (S-) are calculated. The results are shown in Table 16.

Table 16. Discrimination Measures

	Si+	SI-
A1	0.020	0.047
A2	0.023	0.039
A3	0.022	0.050
A4	0.026	0.036
A5	0.029	0.032
A6	0.051	0.024
A7	0.041	0.017
A8	0.034	0.024
A9	0.037	0.022
A10	0.034	0.025

10. Step: Method section, the closeness to the ideal solution is calculated and ranked. The ranking is shown in Table 17.

Table 17. Laptop Ranking

Arrangement	Insurance Policies	Result (C*)
1	Axa Insurance	0.699
3	Anadolu Insurance	0.623
2	Ak Insurance	0.690
4	Allianz	0.578
5	Ergo Insurance	0.527
9	Güneş Insurance	0.322
10	Groupama Insurance	0.293
7	Euroko Insurance	0.413
8	Mapfre Insurance	0.374
6	Yapı Kredi Insurance	0.420

6. Conclusion

Depending on the population growth, the number of vehicles used in traffic also increases. The development of technology also shows itself in the automotive sector and the qualities of vehicles are changing. Vehicles

are now produced more qualified and more luxurious. The increase in vehicle prices brings into account a number of risk factors. The most important of these risks is the risk of accident. Accidents, earthquakes, floods. Etc. Vehicles can be damaged in natural disasters. In this case, it causes financial losses to the vehicle owners. In order to minimize these losses, the traffic insurance and motor own damage policy sector gains importance.

Compulsory traffic insurances are made under certain conditions by taking into account some risk factors. This insurance, which is valid for 1 year, covers some of the damages related to the vehicle, not all of them. Considering the high vehicle prices, this leads to financial losses. At this point, private insurance policies come into play. Motor insurance policies minimize the financial losses of vehicle owners by making automobiles over their current market values. Each automobile insurance company offers guarantees to vehicle owners with different guarantees, taking into account different risk factors. Insurance selection represents a very complex process for vehicle owners. They need to make their choices taking into account certain factors. This part contains a very complex problem.

Criteria affecting the selection by considering the problem of motor insurance policy selection, which is an important issue for vehicle owners, and then the determined alternative brand motor insurance policies were listed. In our study, there are criteria included in the literature in line with expert opinions. It is expected that the criteria that the public personnel residing in the provinces of Bartın will pay attention to in the selection of the motor insurance policy, without any discrimination with the results that emerged at the end of the study, will find the degree of importance and will shed light on the decision maker and make the decision-making process easier by choosing an alternative.

Considering that gender and public institutions and positions in the related study will affect the result, seven different public personnel with different genders were preferred as experts in the study. In line with the information received from the experts, while determining the criteria to be considered in the selection of the motor insurance policy, these criteria were eliminated by the motor insurance experts by taking the criteria in the literature. Finally, some criteria have been put forward for the evaluation of decision makers. These criteria are no claim discount, policy price, price stability, damage payment period, claim payment approach, customer relations approach, firm's financial strength, brand perception, assistance services, assistance guarantee, contracted service network, exemption structure, prevalence of sales channels and glass and key 14 criteria have been determined as guarantee.

In determining the alternatives and brands, the evaluation questionnai-

re of the motor insurance policies available on the website of www.arabam.com was used. Here is the motor insurance policy survey evaluated by users. The 10 alternatives that received the most votes in this survey were selected to be used in the study. Alternatives to be included in the study were determined as axa insurance, ak insurance, anadolu insurance, ergo insurance, groupama insurance, solar insurance, mapfre insurance, yapı kredi insurance, allianz insurance and euroko insurance.

In the study, 14 criteria and 10 alternative values were determined as a result of the opinions of the experts.

Weight values of the main criteria are examined;

Criteria that experts attach the most importance to is HOY, and this ranking continues as HOS, ASA, FG, MYI, MA, PF, MY, SKY, FI, HI, AH, AT and CAT. HOY, HOS, ASA, FG and MYI criteria are higher than the other criteria and these five criteria constitute 53% of the weights. According to experts, the most important criteria when choosing an automobile insurance policy are HOY, HOS, ASA, FG and MYI, and the suitability of these criteria will positively affect other criteria. The weights of the criteria evaluated with the opinions of the experts are given in Figure 4. The weights of the criteria that the public personnel working in the province of Bartın attach importance to when choosing an automobile insurance policy are given in Figure 3.

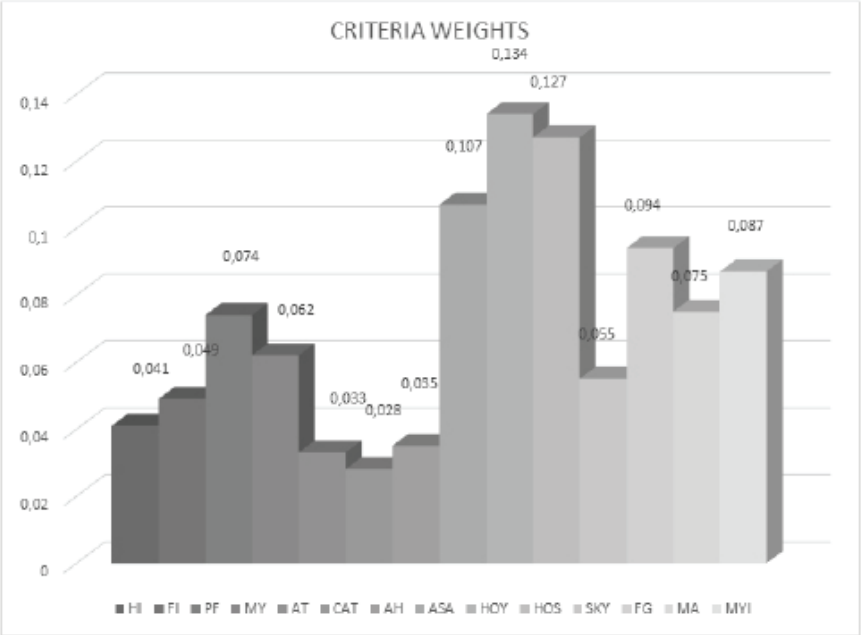

Figure 4. Bartın Province Criterion Weights

When the alternatives determined according to expert opinions are examined;

AXA Insurance was the insurance company that received the most votes by the experts. Ak fuse has almost the same values as axa fuse. As it can be understood from here, the most suitable alternative when choosing

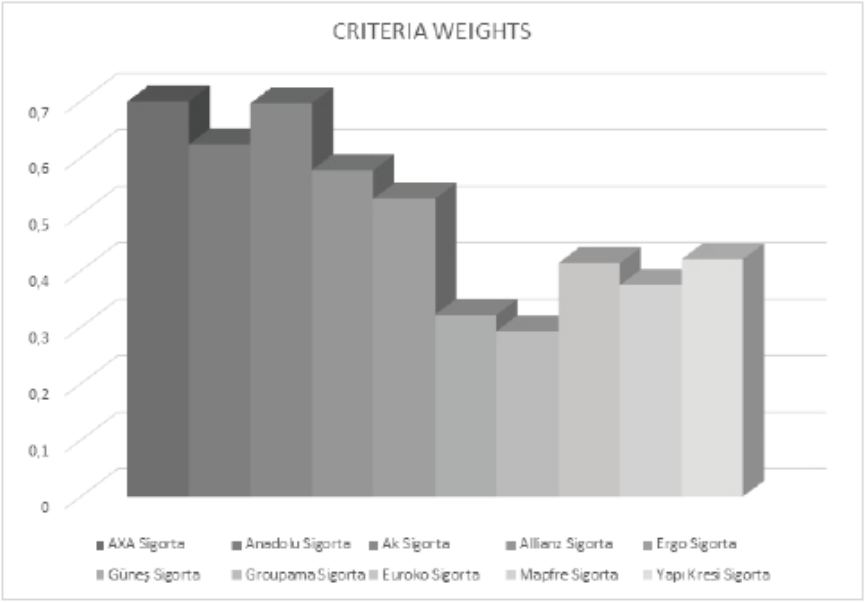

Figure 5. Ranking of Alternatives

The alternative ranking of public personnel in the province of Bartın, based on opinions, differs significantly from the results of the survey taken from www.arabam.com . The alternative in the first row did not change, and the rest of the ranking differed. This situation is directly related to the city difference and the prevalence of automobile insurance companies. The two companies at the end of the ranking do not operate widely in Bartın.

When the information in the literature and expert opinions are examined, one of the most important points in the selection of an automobile insurance policy is the claim payment approach. The automobile insurance policy, which is preferred without paying attention to this feature, will cause the vehicle owners to be adversely affected in case of any negativity. In other words, when choosing an automobile insurance policy, the decision maker should first examine the company's approach to damage payment after the accident, pay attention to whether there are any problems related to this issue, and evaluate other factors. The criteria determined in subsequent studies can be evaluated with different decision-making methods, and the differences that may arise can be examined and the methods can be compared with each other.

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CHAPTER 5

DETERMINATION OF FACTORS AFFECTING PUBLIC EMPLOYEES' CHOICE OF RENTAL HOUSING ACCORDING TO BIG AND SMALL CITIES: BARTIN – ISTANBUL COMPARISON

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1. Introduction

From the past, human beings have continued their lives as nomads by adopting a hunter-gatherer life. With the introduction of agriculture into human life, the process known as the agricultural revolution (neolithic revolution) began. With the introduction of man to agriculture, the foundations of the settled order were laid. With the beginning of agricultural life, people had to leave the nomadic lifestyle. Because the agricultural revolution requires continuity and a process. People should not leave the agricultural land during the period from planting the plant to the harvest period. With this situation, the settled order started. The settled order has brought many innovations and changes. At the beginning of these changes is the need for the bar.

Shelter is one of the most basic human needs. In 1943, Abraham Maslow introduced a five-level theory of human psychology called the hierarchy of needs pyramid. According to Maslow's theory, people have various needs. These needs have a triangular hierarchy. It emphasizes that starting from the bottom in theory, it is not possible to move to a higher level without fully meeting the needs of a step. The lowest level of this hierarchy is the basic physiological needs. Physiological needs include eating, drinking, sleeping, sheltering, etc., which are necessary for human survival. Consists of needs. For these reasons, it has become one of the most important issues for human beings in the bar with the transition to settled order.

From the past to the present, the increase in population, industrialization, technological developments, etc. Situations have increased the importance of housing need and changed the expected qualities. The need for housing, which emerged in the early days to protect from wild animals, includes many qualities today. Housing is the place where people meet their sheltering needs individually or with their family. Housing is a right given to all human beings, as guaranteed by the Universal Declaration of Human Rights and the UN Convention on Economic, Social and Cultural Rights (Sur, 1998).

Perhaps the most important excess supply in the world is experienced in the housing sector. Because with globalization, the development of technology and the increase in population, the need for housing is increasing. With the increase in the world population and the developments experienced, human beings have tended to live individually rather than collectively. This situation has increased the need for housing even more. The developments experienced not only caused an increase in the need for housing, but also changed and developed from the expectations and demands of the housing used for protection in the first periods.

People pay attention to many factors when choosing housing. In this case, it makes the housing selection decision difficult. The presence of many factors makes the act of choice a more complex problem. This

complexity differs even more according to the cities. In big cities and small cities, people focus on different features. Because city differences have the effect of changing the order of importance of sought-after features. This is a major problem.

Decision making is a very difficult and complex process. During the decision-making process, the decision maker tries to determine the most suitable alternative by considering many criteria that affect the decision. With the increase in the number of criteria, the decision-making process gets longer and this action of the decision maker turns into an even more complex and difficult structure. Various methods have been developed to assist the decision maker in his decisions and to make this action simpler. The leading of these methods is multi- criteria decision making (MCDM) methods. This method, which is frequently preferred, provides various conveniences to the decision maker in the decision action.

Analytical Hierarchy Process (AHP) method, which is one of the MCDM techniques and is frequently used, is frequently used in decision-making actions. The AHP method was first introduced by Thomas L. Saaty in the 1970s. It has been developed over time and has become a helpful method for the user in decision-making. The AHP method is a method frequently used in the literature. There are various reasons for this, but the most important one is the features of the criteria. The criteria that the decision maker will use in his decision can show both objective and subjective features. In such cases, the AHP method can offer a solution to the user. Another important reason for using the AHP method is that it is easy to use. The use of this method, which is both easy to use and easy to understand, is common for such reasons. In the study, the AHP method was preferred due to the high number of criteria.

Housing selection problem is important in many aspects. Although the first aim is shelter, human beings want to meet their various needs such as comfort and peace in the house where they will continue their life. In the prepared study, the factors affecting the choice of housing, which is an important problem for human beings, are discussed. Each person's expectations from housing are different. Because of these differences, decision making becomes difficult.

In the study, at the stage of determining the factors affecting the selection of rental housing for public personnel, a detailed literature review was made and the factors affecting it were determined. Based on the information obtained, 14 criteria were determined that could affect the selection of rental housing. The criteria determined in the study were evaluated using the AHP method. The opinions of six different public officials who are experts in their fields and live in two different cities were taken. At the end

of the study, the criteria weights were found and a score ranking was made for the users to consider in their decision-making actions.

Within the scope of the study, it was tried to determine the factors affecting the choice of rental housing of public personnel. The prepared study consists of six chapters. In the first part; by introducing the subject, general information was given and the subject and its importance were tried to be explained. In the second part; the criteria to be used in the research are mentioned. In the third part; a literature study on the subject has been done. In the fourth chapter; the method to be used in the study is mentioned. In the fifth section; the implementation phase of the research is included. In the sixth chapter, the results are interpreted and suggestions for future studies are presented.

2. Factors Considered in the Selection of Rental Housing

For rent there are many factors to consider when choosing a residence. Since each of these factors has different importance, it is necessary to consider each of them when choosing. These factors play an important role in determining the residence in which the person will continue his life. Each person pays attention to many different features while determining the house they will live in. This brings with it a difficult selection process. There are many criteria to be used in the selection of the house to be rented or purchased. When the literature is scanned, it has been determined that many academic studies have been done on this subject. A detailed list of criteria was prepared by examining these studies. Since the high number of criteria both complicates the decision-making action and affects the accuracy of the result, the number of criteria was reduced by taking the opinions of various real estate experts. A common criteria list was created by taking the opinions of five different real estate experts in the provinces of Istanbul and Bartın, where the study will be conducted. There are fourteen criteria in the list created. Real estate professionals the list of criteria to be considered in the selection of rental housing, taking into account their opinions, is given in Table 1.

Table 1. Criteria Affecting the Preference of Rental Housing

Criteria	Explanation
F: Price of the Housing	It shows the maximum fee to be paid for the house to be rented. It is one of the important elements that individuals pay attention to in both purchased and rented houses. The low price is welcomed by the individual.
B: Size of Residence	People tend to prefer larger and more spacious housing in their rental housing preference. Size and price increase in direct proportion. As the size of the house increases, the price also increases.
Y: Age of Residence	Houses have a certain useful life. As the age of the house increases, the wear and tear is also greater. Again, the individual who will choose a house wants the house to be newer. Because with the developing technology, the rate of encountering some negativities decreases.

KD: Floor Status of the Residence	While people are choosing housing, they try not to prefer housing especially from the first and last floors. Due to reasons such as heating, security, noise, and higher costs, individuals pay attention to the mezzanine level of their preferred residences.
C: Facade of Residence	While individuals are choosing a house, they also pay attention to the heating and sun exposure feature of the house. This plays an active role in reducing costs. Again, the same situation emerges as a factor that increases the price of the house.
O: Parking lot of the residence	The increase in population also brought the problem of parking. The increase in population is directly proportional to the increase in the number of vehicles. In this case, it is among the criteria that the individual will consider when choosing a residence.
KG: Concierge and Security of the Residence	While choosing a residence, the safety criterion is of great importance. People will prefer housing and (Apak et al., 2002). Again, the concierge feature represents an important service especially for the working segment.
M: View of the Residence	The view of the house emerges as an important factor for the decision maker. The view offered at any point of the house increases the preference rate of the house.
IO: Interior Features of the Residence	It is an important element for many people. When deciding on a house, a person prefers it in line with certain features. Many interior features such as the number and size of rooms, the structure and size of the kitchen, the condition of the toilet and bathroom are important for the users.
HD: Mobility Around the Residence	The elements around the residence are important. Proximity to schools or entertainment venues is among the reasons for choosing residences.
IYY: Proximity of the Residence to the Workplace	For individuals living in metropolises, error is also an important factor for those living in small cities. People spend a significant part of their lives in transportation. Especially for employees, these periods become intolerable both on the way to work and when leaving work. Therefore, in order to shorten the time spent in traffic, individuals prefer residences close to their workplaces.
DAY: Resilience of Housing to Natural Disasters	The loss of life and property in natural disasters from past to present is too great to be ignored. Considering this situation, individuals want the buildings they prefer to be resistant to natural disasters.
U: Transportation of the Residence	The increase in population has also led to an increase in the number of buildings. This situation has increased the distance from the city center to the work. As the number of buildings increases, the distances away from the center increase. In this case, it brings with it the transportation problem. Although this criterion is not very important for users who have their own vehicle, it is very important for people who will use public transportation. The ease of transportation increases the value of the house.
BS: District where the residence is located	The neighborhood where the residence is located is among the important reasons for preference by users. Although it is not very important for some, privileged neighborhoods are more preferred in terms of both security and prestige.

The above-mentioned criteria were obtained through literature review, and it was decided to be used in the research by determining in line with the opinions of real estate experts.

3. Literature Study

Saaty in the 1970s. It has been widely used in many fields due to the reasons such as the method is understandable and easy to use. When a detailed literature study was conducted, many studies related to housing selection were found. For this reason, it has been tried to approach the choice of housing from a different perspective, considering that it will contribute

to the literature. There are many academic studies directly related to the choice or purchase of housing. In the study, restrictions such as public personnel and rental housing were made in the choice of housing. Thus, it is aimed to contribute to the literature by looking at the problem from a different perspective.

In the study, the factors affecting the choice of rental housing for public personnel, whose purpose was not mentioned before, were determined comprehensively and the importance levels of these factors were calculated using the AHP method. Thus, a table has been presented that users can consider when choosing rental housing. In Table 2, there is a detailed literature study.

Table 2. Studies on Housing Selection

Year	Author(s)	Findings of the Research
1990	Saaty	In the study, eight criteria affecting the choice of housing were handled with the AHP method, and alternative housing was selected in line with these criteria.
1994	Ball and Srinivasan	In the study, the housing selection problem was handled using the AHP method.
1995	Schnieder-jans et al.	In the study, an AHP-based goal programming method was used to select the appropriate housing.
1999	Bender et al.	In the study, the importance levels of the factors affecting the choice of commercial real estate were determined by the AHP method.
2000	Bender et al.	In the study, determining the desired environmental conditions in commercial real estates was carried out by using the seven criteria AHP method and weighting was done.
2007	Kauko	Criteria affecting the choice of housing were handled with the AHP method and the criteria were weighted.
2011	Timor	In the study, nine criteria affecting the housing selection were handled with the AHP method and alternative housing selection was made.
2014	Yıldırım	Criteria that are effective in the selection of housing were examined using the Gray Relational Analysis method.
2016	Gürbüz	In the study, nine criteria affecting the housing choice of academicians were handled with the AHP method, and the most suitable alternative housing was selected.
2017	Baykan and Uğur	Criteria and nine alternatives affecting the choice of housing were examined using the Gray Relational Analysis method.
2018	İpek and Şahin	In the study, fifteen criteria affecting the housing choice of a family living in Isparta province were evaluated using AHP and Gray Relational analysis methods.
2019	Karadağ, Gultekin and Mutlu	In the study, a scale was developed using the structural equation model to determine the criteria affecting the choice of housing.
2020	Alkan and Durduran	Criteria affecting the housing choice of a family living in Muğla province were discussed using AHP and TOPSIS methods. While determining the degree of importance with the AHP method, the most suitable housing alternative for the family was determined with the TOPSIS method.

4. Analytical Hierarchy Process (AHP)

The Analytical Hierarchy Process (AHP) was introduced by Myers and Albert in 1968 (Tüminçin, 2016). The method was made available by Thomas L. Saaty in the 1970s. AHP qualitative and quantitative criteria (Wu, 2010) is a mathematical method that can be evaluated together (Dağ-

deviren & Eren, 2001). AHP method is one of the most preferred methods in multi -criteria decision making problems. Because AHP is the most easy to use and understand method (Punniyamoorty, 2012). Therefore, AHP is frequently used in the literature. AHP helps the decision maker to choose the most suitable one among the alternatives by grading the criteria in the solution of very complex problems. The AHP method models the current problem in a hierarchical structure, making the relationships between criteria and alternatives visible. The hierarchical structure of the model allows it to be divided into various levels and easy to understand. The relationship between layers in the hierarchy is unidirectional (Liberatore and Nydick, 2008). There are three main topics in the AHP method. These titles consist of main criteria, sub-criteria and alternatives after the aim to be achieved in the top layer of the model, which is created as a hierarchical structure (Scholl, 2005). The hierarchical structure of AHP is as shown in figure 1.

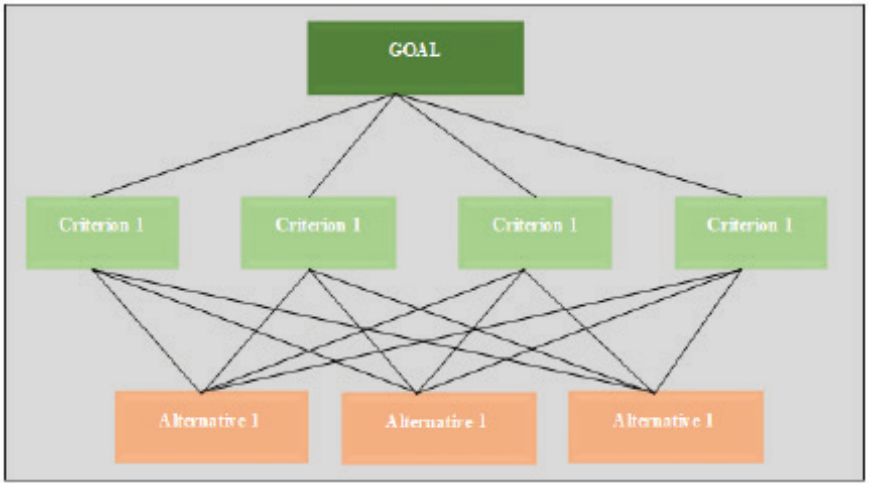

Figure 1: AHP Hierarchical Structure

It is effective in choosing the AHP method that it provides fast and effective decisions to decision makers. Because each factor in the decision-making structure prolongs the decision-making process and reduces the effectiveness of the decision. The AHP method includes the steps indicated in the figure below.

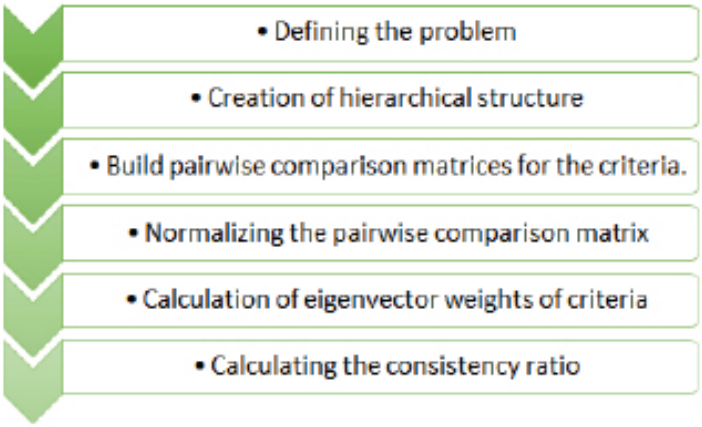

Figure 2: AHP Steps

Scale developed by Saaty in the 1980s is used to evaluate expert opinions. Table 3 shows the scale used

Table 3. AHP 1 – 9 Scale

1- According to the scale in Table 3, B decision matrices are formed based on the opinions of the experts.	$B = \begin{bmatrix} x_{11} & \cdots & x_{1k} \\ \vdots & \ddots & \vdots \\ x_{i1} & \cdots & x_{ik} \end{bmatrix}$
2- The geometric mean of Decision Matrices is found.	$C_{nm} = \sqrt[k]{X_{nm}^{(1)} * X_{nm}^{(2)} * \ldots * X_{nm}^{(k)}}$
3- A new F decision matrix is created as a result of the geometric mean.	$F = \begin{bmatrix} x_{11} & \cdots & x_{1m} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & x_{nm} \end{bmatrix}$
4-Normalizing the F matrix, [c ij] matrix is obtained.	$c_{ij} = \frac{x_{ij}}{\sqrt{\sum_{b=1}^{a} x_{bj}^2}}$
5-The weight values are obtained by dividing the sum of the row values of the C matrix by the number of criteria (n).	$w_i = \frac{\sum_{b=1}^{a} C_{ij}}{n}$
6- The λ value is calculated.	$\lambda = \frac{\sum \frac{d_i}{w_i}}{n}$
7- (CR) consistency is calculated. (CR< 0.1)	$CR = \frac{(\lambda - n)/(n-1)}{RI}$

Table 5. Random Index (RI) Values

Number of Criteria	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI Value	0	0	0.52	0.89	1.11	1.25	1.35	1.40	1.45	1.49	1.51	1.53	1.56	1.57	1.59

Purpose of the consistency analysis, which is one of the important decisions of the AHP, is to determine whether the decision maker beha-

ves consistently when comparing the criteria (Tüminçin, 2016). Consistency, that is, the CR value should be < 0.1. If the ratio is large, it should be checked by returning to the pairwise comparison matrix (Aytekin et al., 2021). The fact that the number of criteria determined in the study is high reduces the probability of obtaining consistent results in the analysis (Kwiesielewicz and Uden, 2004: 712-712). In AHP studies, the number of criteria cannot fall below two. It continues to increase, starting with at least two criteria. But as the number increases, the consistency will decrease. Therefore, the optimum number of criteria should be determined. Since the AHP operates on criteria, the inability to determine the number of criteria correctly will affect the entire study.

5. **Application**

1.1. **Purpose and Importance of the Research**

In the research, the problem of housing selection, which is the most essential need for human beings, has been discussed. Housing selection problem brings along a very difficult and complex process for decision makers. The decision maker needs to consider and evaluate many factors when choosing a house. The aim of the study is to determine the criteria to be considered in this difficult and complex process and to rank the importance as a result of the opinions of the experts in order to guide the user. Thus, it is desired to facilitate the decision-making actions of decision makers.

a detailed literature review was made in the study, many factors to consider when choosing rental housing were found. It was decided to reduce this situation based on the thought that it would make the decision-making action more difficult and complex. In line with the opinions of five real estate experts in two different cities, the number of criteria was reduced and a new criteria list was created to be used in the study.

1.2. **Limitations of the Research**

Considering some conditions that may cause differences in the evaluation of criterion weights in the research, the research has been advanced in this context. At the beginning of these differences is the geography of living. The cities to be preferred should accurately reflect the general sample. For this reason, it was decided to compare metropolitan and small cities in the study. It has been determined as Istanbul in order for the metropolitan to be elected to provide common benefits to many people. The province of Istanbul is the city with the most populous population according to Turkey's averages. Another feature of Istanbul is that it is a city of worldwide importance. While deciding on the small city to be chosen, it was determined as the province of Bartın because it is easy to obtain data

considering that small cities have similar characteristics. In addition to the ease of obtaining data, the touristic structure of Bartın province was also effective in the election.

One of the constraints to be considered in the research is the gender characteristic. Since the gender difference is thought to be effective in the choice of housing, three of the experts whose opinions were consulted in the study were female and three were male.

Another constraint brought to the research is the constraint of public personnel. When a detailed literature review is made, the housing selection problem has been discussed in many aspects. Therefore, when it is thought to contribute to the literature, the study was made for public personnel. Considering the differences in duties and salaries of public personnel, public personnel with different titles and duties were preferred.

1.3. **Findings of the Research**

AHP method was used to determine the importance of the criteria in the research. Expert opinions were obtained by using Saaty's 1-9 scale in the study. Opinions of six different experts from two different cities were taken to reflect different views and characteristics. Considering that it will affect the result, six different experts were selected by considering gender and job differences.

1. Step: A single pairwise comparison matrix was created by combining the opinions of the experts with the geometric mean for the province of Istanbul. The pairwise comparison matrix created for the criteria is given in Table 6.

Table 6. Geometric Average Matrix of Criteria for Istanbul Province

Criteria	F	B	Y	NE	C	HE	KG	M	IO	HD	IYY	DAY	U	BS
F	1.00	4.22	4.22	1.71	4.22	4.22	5.00	3.00	1.00	3,56	1.00	0.69	0.69	1.00
B	0.24	1.00	1.44	6.73	3.00	2.08	2.08	0.48	0.33	2.47	0.33	0.20	0.69	0.33
Y	0.24	0.69	1.00	0.33	0.48	0.84	2.08	0.48	0.48	1.00	0.28	0.20	0.41	0.48
NE	0.58	0.15	3.00	1.00	3.00	1.71	2.08	0.33	0.48	1.00	0.24	0.24	0.41	0.48
C	0.24	0.33	2.08	0.33	1.00	1.19	0.69	0.41	0.28	1.00	0.24	0.20	0.24	0.41
HE	0.24	0.48	1.19	0.58	0.84	1.00	1.00	1.00	0.28	1.22	0.24	0.20	0.28	0.33
KG	0.20	0.48	0.48	0.48	1.44	1.00	1.00	0.69	0.28	0.58	0.24	0.20	0.28	0.28
M	0.33	2.08	2.08	3.00	2.47	1.00	1.44	1.00	0.48	1.22	0.28	0.20	0.28	0.48
IO	1.00	3.00	2.08	2.08	3,56	3,56	3,56	2.08	1.00	2.47	0.48	0.28	0.41	2.08
HD	0.28	0.41	1.00	1.00	1.00	0.82	1.71	0.82	0.41	1.00	0.28	0.20	0.28	0.48
IYY	1.00	3.00	3,56	4.22	4.22	4.22	4.22	3,56	2.08	3,56	1.00	0.28	0.58	1.44
DAY	1.44	5.00	5.00	4.22	5.00	5.00	5.00	5.00	3,56	5.00	3,56	1.00	2.47	4.22
U	1.44	1.44	2.47	2.47	4.22	3,56	3,56	3,56	2.47	3,56	1.71	0.41	1.00	3.00
BS	1.00	3.00	2.08	2.08	2.47	3.00	3,56	2.08	0.48	2.08	0.69	0.24	0.33	1.00

2. Step: A normalized decision matrix is created to evaluate the criteria for the province of Istanbul.

Table 7: Normalized Comparisons of Criteria for Istanbul Province

Criteria	F	B	Y	NE	C	HE	KG	M	IO	HD	IYY	DAY	U	BS
F	0.11	0.17	0.13	0.06	0.11	0.13	0.14	0.12	0.07	0.12	0.09	0.15	0.08	0.06
B	0.03	0.04	0.05	0.22	0.08	0.06	0.06	0.02	0.02	0.08	0.03	0.04	0.08	0.02
Y	0.03	0.03	0.03	0.01	0.01	0.03	0.06	0.02	0.04	0.03	0.03	0.04	0.05	0.03
NE	0.06	0.01	0.09	0.03	0.08	0.05	0.06	0.01	0.04	0.03	0.02	0.05	0.05	0.03
C	0.03	0.01	0.07	0.01	0.03	0.04	0.02	0.02	0.02	0.03	0.02	0.04	0.03	0.03
HE	0.03	0.02	0.04	0.02	0.02	0.03	0.03	0.04	0.02	0.04	0.02	0.04	0.03	0.02
KG	0.02	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.04	0.03	0.02
M	0.04	0.08	0.07	0.10	0.07	0.03	0.04	0.04	0.04	0.04	0.03	0.04	0.03	0.03
IO	0.11	0.12	0.07	0.07	0.10	0.11	0.10	0.08	0.07	0.08	0.05	0.06	0.05	0.13
HD	0.03	0.02	0.03	0.03	0.03	0.02	0.05	0.03	0.03	0.03	0.03	0.04	0.03	0.03
IYY	0.11	0.12	0.11	0.14	0.11	0.13	0.11	0.15	0.15	0.12	0.09	0.06	0.07	0.09
DAY	0.16	0.20	0.16	0.14	0.14	0.15	0.14	0.20	0.26	0.17	0.34	0.22	0.30	0.26
U	0.16	0.06	0.08	0.08	0.11	0.11	0.10	0.15	0.18	0.12	0.16	0.09	0.12	0.19
BS	0.11	0.12	0.07	0.07	0.07	0.09	0.10	0.08	0.04	0.07	0.07	0.05	0.04	0.06

3. Step: The weight values of the criteria for the province of Istanbul are calculated.

Table 8. Weight Values of the Criteria for the Province of Istanbul

Criteria	F	B	Y	NE	C	HE	KG	M	IO	HD	IYY	DAY	U	BS
Weights	0.11	0.06	0.03	0.04	0.03	0.03	0.03	0.05	0.08	0.03	0.11	0.20	0.12	0.07

4. Step: After the weighting process, the CR value is found to test the consistency of the model.

Table 9. Consistency Values of Criteria for Istanbul Province

Landa	CI	CR	
15,190	0.091	0.05	<0.10

To test the consistency of the model, consistency analysis was performed by calculating the CR value. Since the CR value was $0.05 < 0.1$ in the analysis, our model was consistent.

After calculating the weights of the criteria for the province of Istanbul, the same procedures are performed for the province of Bartın.

1. Step: A single pairwise comparison matrix was created by combining the opinions of the experts with the geometric mean for the province of Bartın. The pairwise comparison matrix created for the criteria is given in Table 10.

Table 10. Geometric Average Matrix of Criteria for Bartın Province

Criteria	F	B	Y	NE	C	HE	KG	M	IO	HD	IYY	DAY	U	BS
F	1.00	4.22	1.71	3,56	4.22	5.00	5.00	4.22	0.58	5.00	1.71	0.58	1.22	1.22
B	0.24	1.00	1.71	3,56	2.47	3,56	3,56	3,56	0.34	4.22	0.58	0.24	0.58	0.28
Y	0.58	0.58	1.00	2.03	2.03	0.69	0.69	1.71	0.58	1.71	0.24	0.20	0.58	0.33
NE	0.28	0.28	0.49	1.00	2.08	3.00	0.69	1.71	0.24	1.71	0.20	0.49	0.20	0.28
C	0.24	0.41	0.49	0.48	1.00	0.69	0.69	1.00	0.24	3,56	0.34	0.28	0.49	0.49
HE	0.20	0.28	1.44	0.33	1.44	1.00	0.58	1.44	0.20	3,56	0.24	0.24	0.24	0.28
KG	0.20	0.28	1.44	1.44	1.44	1.71	1.00	1.71	0.28	1.71	0.24	0.24	0.20	0.24
M	0.24	0.28	0.58	0.58	1.00	0.69	0.58	1.00	0.28	1.44	0.24	0.24	0.49	0.58
IO	1.71	2.92	1.71	4.22	4.22	5.00	3,56	3,56	1.00	4.22	0.58	0.49	0.69	0.28
HD	0.20	0.24	0.58	0.58	0.28	0.28	0.58	0.69	0.24	1.00	0.28	0.49	0.24	0.20
IYY	0.58	1.71	4.22	5.00	2.92	4.22	4.22	4.22	1.71	3,56	1.00	0.69	0.69	1.44
DAY	1.71	4.22	5.00	2.03	3,56	4.22	4.22	4.22	2.03	2.03	1.44	1.00	1.71	4.22
U	0.82	1.71	1.71	5.00	2.03	4.22	5.00	2.03	1.44	4.22	1.44	0.58	1.00	1.71
BS	0.82	3,56	3.00	3,56	2.03	3,56	4.22	1.71	3,56	5.00	0.69	0.24	0.58	1.00

2. Step: A normalized decision matrix is created to evaluate the criteria for the province of Bartın.

Table 11. Normalized Comparisons of Criteria for Bartın Province

Criteria	F	B	Y	NE	C	HE	KG	M	IO	HD	IYY	DAY	U	BS
F	0.11	0.19	0.07	0.11	0.14	0.13	0.14	0.13	0.05	0.12	0.19	0.10	0.14	0.10
B	0.03	0.05	0.07	0.11	0.08	0.09	0.10	0.11	0.03	0.10	0.06	0.04	0.07	0.02
Y	0.07	0.03	0.04	0.06	0.07	0.02	0.02	0.05	0.05	0.04	0.03	0.03	0.07	0.03
NE	0.03	0.01	0.02	0.03	0.07	0.08	0.02	0.05	0.02	0.04	0.02	0.08	0.02	0.02
C	0.03	0.02	0.02	0.01	0.03	0.02	0.02	0.03	0.02	0.08	0.04	0.05	0.06	0.04
HE	0.02	0.01	0.06	0.01	0.05	0.03	0.02	0.04	0.02	0.08	0.03	0.04	0.03	0.02
KG	0.02	0.01	0.06	0.04	0.05	0.05	0.03	0.05	0.02	0.04	0.03	0.04	0.02	0.02
M	0.03	0.01	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.06	0.05
IO	0.19	0.13	0.07	0.13	0.14	0.13	0.10	0.11	0.08	0.10	0.06	0.08	0.08	0.02
HD	0.02	0.01	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.08	0.03	0.02
IYY	0.07	0.08	0.17	0.15	0.10	0.11	0.12	0.13	0.13	0.08	0.11	0.12	0.08	0.11
DAY	0.19	0.19	0.20	0.06	0.12	0.11	0.12	0.13	0.16	0.05	0.16	0.17	0.19	0.34
U	0.09	0.08	0.07	0.15	0.07	0.11	0.14	0.06	0.11	0.10	0.16	0.10	0.11	0.14
BS	0.09	0.16	0.12	0.11	0.07	0.09	0.12	0.05	0.28	0.12	0.08	0.04	0.07	0.08

3. Step: Weight values of the criteria are calculated for the province of Bartın.

Table 12. Weight Values of Criteria for Bartın Province

Criteria	F	B	Y	NE	C	HE	KG	M	IO	HD	IYY	DAY	U	BS
Weights	0.12	0.07	0.04	0.04	0.03	0.03	0.03	0.03	0.10	0.02	0.11	0.16	0.11	0.11

Step 4: After the weighting process, the CR value is found to test the consistency of the model.

Table 13. Consistency Values of Criteria for Bartın Province

Landa	CI	CR	
15,488	0.1145	0.07	<0.10

To test the consistency of the model, consistency analysis was performed by calculating the CR value. Since the CR value was 0.05 < 0.1 in the analysis, our model was consistent.

5. Conclusion

The developments experienced have led to differences in the wishes and needs of people in the position of consumers. This differentiation is experienced in almost every field. Housing, which is the most basic need, increases its importance day by day with the transition from nomadic lifestyle to settled order with the agricultural era. The houses, which were used for protection in the first days of the settled order, are being added for various reasons today, increasing their importance day by day. Because it is one of the most basic physiological needs.

Aimed to determine the importance ranges of the criteria affecting the selection by considering the problem of housing selection, which is an important issue for human beings. In our study, there are criteria included in the literature in line with expert opinions. It is expected to shed light on the decision maker and make the decision-making process easier by finding the importance levels of the criteria that the public personnel residing in Istanbul and Bartın provinces will pay attention to in the selection of rental housing, regardless of the results that emerged at the end of the study.

Considering that the geographical region of residence, gender and public institutions and positions in the relevant study will affect the result, six different public personnel living in two different geographical regions were chosen as experts in the study. In line with the information received from the experts, while determining the criteria to be considered in the selection of rental housing, these criteria were eliminated by the real estate experts by taking the criteria in the literature. A new criteria list was created with the common opinion of five real estate experts. Finally, some criteria have been put forward for the evaluation of decision makers. These criteria are the price of the house, the size of the house, the age of the house, the floor situation of the house, the facade of the house, the parking lot of the house, the doorman and security of the house, the view of the house, the interior features of the house, the mobility around the house, the proximity of the house to the workplace, the resistance of the house to natural disasters, the transportation of the house. Fourteen criteria have been determined in the form of the district where the residence is located.

In the study, the weight values of fourteen criteria for two different provinces were determined as a result of the opinions of the experts. When the criterion weights are analyzed on a city basis;

Criteria that the experts attach the most importance to are DAY, and this ranking continues as F, IYY, U, BS, IO, B, Y, NE, KG, C, O, M and HD. DAY, F, IYY, U and BS criteria are higher than the other criteria and these five criteria constitute 61% of their weights. According to experts, the most important criteria when choosing rental housing are DAY, F, IYY, U and BS, and the suitability of these criteria will positively affect other criteria. The weights of the criteria evaluated with expert opinions for the province of Bartın are given in figure 3.

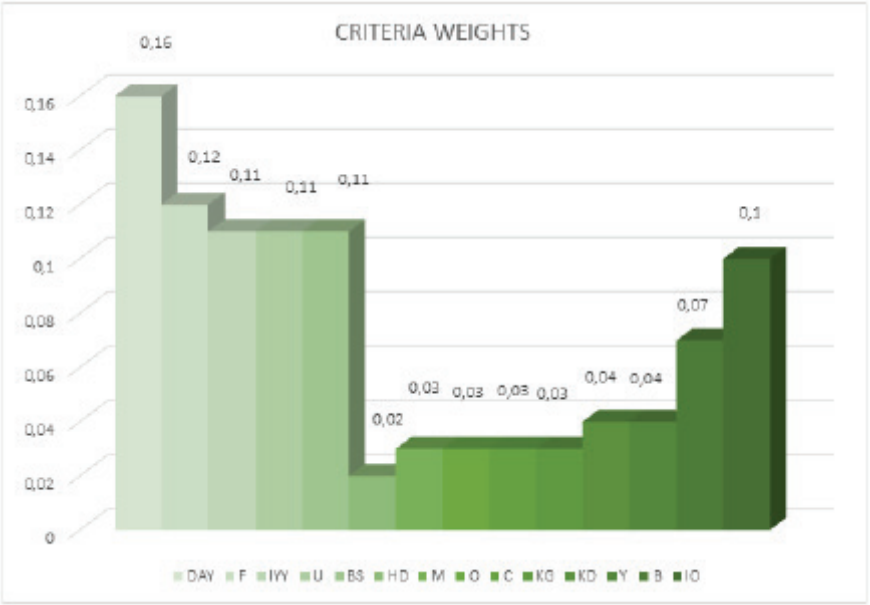

Figure 3. Bartın Province Criterion Weights

Istanbul are examined, the criteria that experts attach the most importance to are DAY, and this ranking continues as U, IYY, F, IO, BS, B, M, NE, Y , KG, C, O and HD. DAY, U, IYY and F criteria are higher than other criteria and these four criteria constitute 54% of their weights. According to experts, the most important criteria when choosing rental housing are DAY, U, IYY and F, and the suitability of these criteria will positively affect other criteria. The weights of the criteria evaluated with expert opinions for the province of Istanbul are given in figure 4.

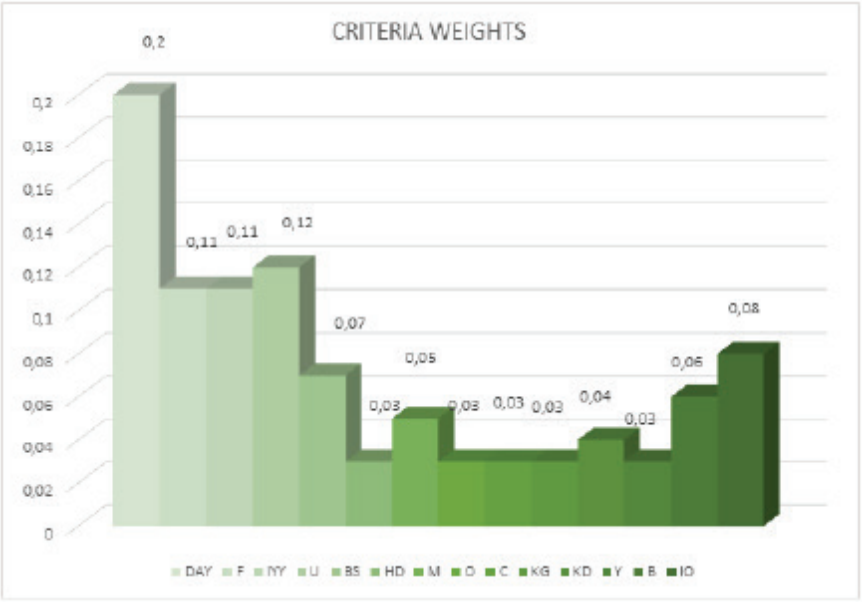

Figure 4. Istanbul Province Criterion Weights

When the findings obtained in the study are examined;

Criteria for resilience to natural disasters are evaluated, it has a rate of 16% (1st degree important) for Bartın, while this criterion has a rate of 20% (1st degree important) for Istanbul. In both cities, the criterion of resilience to natural disasters emerges as the criterion with the highest degree of importance. Starting from this point, the indispensable result of some criteria has emerged, regardless of city difference.

When the price criterion is evaluated, it has a rate of 12% (2nd degree important) for Bartın, while this criterion has a rate of 11% (4th degree important) for Istanbul. Based on this result, while the importance of different criteria is high for metropolitan cities, it emerges as the second most important criterion for small cities.

Criterion has the same degree of importance for Bartın (3rd degree important) and Istanbul (3rd degree important) with a rate of 11%.

When the transportation criterion is evaluated, it has a rate of 11% (4th degree important) for Bartın, while this criterion has a rate of 12% (2nd degree important) for Istanbul. This situation reveals the transportation problem in metropolitan cities. It is considered as a more important criterion than the price in the metropolitan area.

When the neighborhood criterion is evaluated, it has a rate of 11% (5th degree important) for Bartın, while this criterion has a rate of 7% (6th degree important) for Istanbul.

When the mobility criterion is evaluated, it has a rate of 2% (14th deg-

ree important) for Bartın, while this criterion has a rate of 3% (10th degree important) for Istanbul.

When the landscape criterion is evaluated, it has a rate of 3% (13th degree important) for Bartın, while this criterion has a rate of 5% (8th degree important) for Istanbul.

When the parking criterion is evaluated, it has a rate of 3% (12th degree important) for Bartın, while this criterion has a rate of 3% (13th degree important) for Istanbul.

When the facade criterion is evaluated, it has 3% (11th degree important) rate for Bartın, while this criterion has 3% (12th degree important) rate for Istanbul.

When the Doorman and Security criteria are evaluated, it has a 3% (10th degree important) rate for Bartın, while this criterion has a 3% (14th degree important) rate for Istanbul.

When the floor condition criterion is evaluated, it has a rate of 4% (9th degree important) for Bartın, while this criterion has a rate of 4% (9th degree important) for Istanbul.

When the age criterion is evaluated, it has a rate of 4% (8th degree important) for Bartın, while this criterion has a rate of 3% (11th degree important) for Istanbul.

When the size criterion is evaluated, it has a rate of 7% (7th degree important) for Bartın, while this criterion has a rate of 6% (7th degree important) for Istanbul.

When the internal features criterion is evaluated, it has 10% (6th degree important) rate for Bartın, while this criterion has 8% (5th degree important) rate for Istanbul.

When the information in the literature and expert opinions are examined, one of the most important points in the selection of rental housing is the resistance of the rental housing to natural disasters. Preferred residence without paying attention to this feature will negatively affect security and peace. When the results of the related study are evaluated, it supports both the literature and the information obtained from the interviews with the experts. In other words, the decision maker should evaluate other factors by paying attention to whether the house to be rented first is resistant to natural disasters when choosing a rental house. The criteria determined in subsequent studies can be evaluated with different decision-making methods, and the differences that may arise can be examined and the methods can be compared with each other. Again, in the next study, alternative selection can be made by using one of the MCDM techniques in line with these criteria.

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CHAPTER 6

AN INQUIRY ON POSTMODERNISM AND ITS CONSEQUENCES

Ferdi SELIM[1]

1 The most important of the philosophers presenting the critique of the Western philosophical tradition, albeit with different purposes and styles under the name of postmodern, as Habermas puts it, "as a turning point", are Friedrich Nietzsche (1844-1900), Martin Heidegger (1889-1976), Michel Foucault (1926-1984), Jean François Lyotard (1924-1998), Hans Georg Gadamer (1900-2002) and Jacques Derrida (1930-2004). See: Pauline Marie Rosenau, Postmodernizm ve Toplum Bilimleri, trans. Tuncay Birkan, Ark Pub., Istanbul, 1998, p. 34-35. Despite their differences, Heidegger and Gadamer are on the hermeneutic side, while Derrida, Foucault and Lyotard are on the postmodern side. Rorty's new pragmatism is closely related to both postmodernism and hermeneutics. But Rorty's interpretations regarding both the mentioned philosophers and intellectual positions are so radical and different that they create controversy. For more information, See: (Dochhertty, 2002: 10).

1. INTRODUCTION

1.1. What is Postmodernism?

The postmodern era indicates a time when everything changes rapidly. Although philosophers try to focus the era in terms of thought, such an effort does not give a definite result and often cannot even offer a point of consensus due to its fluidity, pluralistic nature, even groundlessness and rootlessness. Social media and high technology commutation tools, the influence of which is increasing day by day, have expanded the relatively unframed and unrestricted structure of the concept and carried it to different channels. One of the crucial crises has been experienced in the field of epistemology within the context of all these developments. This crisis, which emerged in terms of the position and legitimation of knowledge, has led people to a change in all aspects. In order to better understand the changing position of knowledge, the aforementioned theories, social relations and the effect of technology on people in the postmodern era, it is appropriate to give general information about the meaning and emergence of generally mentioned certain philosophers and the term "Postmodernism" used to refer to a certain period. However, although we have chosen the term Postmodernism to describe the general outlines of this period, it is difficult to argue that there was a certain philosophical method or a certain common understanding that was dominant in this period. In fact, when we look at the diversity of philosophers or sociologists, who are called Postmodernists by being mentioned together with this term, and the ways of thinking that are almost completely different from each other, there is no homogeneity in this formation, on the contrary, the differences are more prominent.[1] With this thought, French philosopher Lyotard, who was a Marxist in his youth, Foucault, who is associated with the philosophy of deconstruction, Baudrillard, who gave shape to the concept of simulacrum, Rorty, the most prominent representative of the last period of American Pragmatism, is distinguished by his sophisticated interpretations of modern and postmodern life, and there are many thinkers whose names we cannot count at the moment but who have managed to influence the age are mentioned. Likewise, although some thinkers agree that the period in which we live has differences from the previous eras, they wan-

1 The most important of the philosophers presenting the critique of the Western philosophical tradition, albeit with different purposes and styles under the name of postmodern, as Habermas puts it, "as a turning point", are Friedrich Nietzsche (1844-1900), Martin Heidegger (1889-1976), Michel Foucault (1926-1984), Jean François Lyotard (1924-1998), Hans Georg Gadamer (1900-2002) and Jacques Derrida (1930-2004). See: Pauline Marie Rosenau, Postmodernizm ve Toplum Bilimleri, trans. Tuncay Birkan, Ark Pub., Istanbul, 1998, p. 34-35. Despite their differences, Heidegger and Gadamer are on the hermeneutic side, while Derrida, Foucault and Lyotard are on the postmodern side. Rorty's new pragmatism is closely related to both postmodernism and hermeneutics. But Rorty's interpretations regarding both the mentioned philosophers and intellectual positions are so radical and different that they create controversy. For more information, See: (Dochhertty, 2002: 10).

ted to distinguish themselves from others by basing on their outstanding features or the facts they cared about, and even by giving specific names to their thoughts out of concern to avoid a theory. This situation has caused both the expansion of the concept area and the increase of the already existing conceptual confusion. Those who have this opinion and do not want their names to be associated with writers, thinkers or academics who see themselves as postmodern or who are called postmodern have preferred to take a philosophical position by resorting to concepts such as "high modernity" and sometimes "post-industrial society" (Murphy, 2000: 3). It should be noted that there is no agreed-upon meaning in the term "Postmodern" due to being highlighted of the differences more than common points. The term family, which consists of derivatives of the term, postmodernnes, postmodernity, postmodernization, and postmodernism, is often confusing and used interchangeably. When the suffix 'ism' is added to the end of the concepts, the concepts turn into meanings indicating a political, philosophical or artistic movement. It is still controversial what postmodernism stands for as a movement and what explanations it brings to people. It is common acceptance to define it as an attempt to create/find the theoretical structure of the 'postmodern age' nomenclature used to describe the social changes in the last quarter of the twentieth century, the process in which postmodernism emerged (Featherstone, 2005: 33-34). The most important reason for this contradiction in terms is that the thought of Postmodernism affects almost all areas of human existence, from philosophy to cinema, from architecture to economy. It has always been difficult to appoint the exact date of the emergence of a concept and the situation becomes even more difficult when the concept examined is a controversial and complex like Postmodernism throughout its history (Calinescu 2010: 21). For example, it is stated in many sources that Postmodernism was first used in architecture, however, studies have revealed that the concept of Postmodernism was used in earlier years and in a different field. The earliest known date for the use of it is 1870. British painter John Watkins Chapman is said to be the first person to use the concept, but it is not stated what meaning he attributed to the it. In the 1930s, Spanish-American Frederico de Onis used this concept in his literary works, especially in his poems. According to him, "postmodernismo" describes the conservative recession of modernism in itself (Best&Kellner, 2011: 19-20). The concept, which did not make much noise at the time, was first used by Arnold Toynbee in the eighth volume of his "Study of History" in the 1950s (Toynbee, 1955). He called the era that opened with the Franco-Prussian war as "postmodern era" and the term was used in its mostly accepted sense. In this case, this great movement, which shows a radical change and transformation in almost every field from individuals to the society, needs to be described and explained rather than defined. It is a fact

that these assertive words, which contain relative and implicit meanings, are sometimes taken out of their true meanings and used as "slogans" leading to excessive and destructive interpretations. A real discussion of postmodernism has yet to take place. Even in the most widely read texts, the term itself has remained uncertain between extremely complex and difficult philosophical meanings and a very simple mediation that constitutes a nihilistic and cynical trend in contemporary culture. Thus, we can say that the word postmodern has been determined with an ambiguity from the very beginning. On one hand, this term is understood as the name of a historical period, and on the other hand, it is only considered as a desire, an emotional state towards future to re-evaluate the present (Dochhertty 2002: 10). As it can be understood, an ambiguity and a wide range of meanings have been mentioned from the very beginning in this text. It has also emphasized that with this conceptualization, it should always be seen as an effort to understand time, more precisely experiences, and to explain a desire or an emotional state.

Although differences have always been mentioned with the postmodern period, it should be noted that there are also common points. The aim of the intellectuals, who are referred to with this term or the period, is seeking ways to overcome, deconstruct or abolish/abandon[2] the "modern tradition" and the problematic themes coming to the fore or shaping what is modern with this tradition. In the West, there is generally an intellectual consensus on this issue but not in its details and the prefix "post" is in any case, irrespective of whether it expresses a radical break or not, refers to a change, a "reality", which follows the "reality" it describes, but at the same time differs from it and a way of thinking (Murphy 2000: 1). In this sense, it can be said the dominant theme, which gives colour to the intellectual and philosophical thought of the twentieth century, is dispute about the nature and legitimacy of the process called "modernity" and its consequences both in the intellectual and practical fields.

Postmodernism is a serious opposition to Modernism, positivist rationalism, the imperialist epistemology created by the West, and Western culture, which was formed by the post-Enlightenment capitalist system. This opposition showed itself with the transformations in economic, cultural and social fields; however, it should be stated that these transformations were not a transition from Modernism to a completely different paradigm. According to many definitions, Postmodernism shares the same paradigm with Modernism and is an internal critique of modernity and an effort to

2 Rorty specifically uses this nomenclature. This prominent name of the new pragmatism argues that many thinkers, whose name is known as postmodern, do not have a big problem with the modern philosophy tradition and these thinkers are suggesting that these vocabularies that are simply obsolete, have no function, and even produce new, unsolvable problems, should be abandoned.

offer an alternative to the modern. This effort showed itself as criticizing, questioning and opposing Modernism in all areas of life such as philosophy, art, architecture and science. In this regard, Bauman's thoughts are interesting. He sees Postmodernism as the name of the reaction of modern intellectuals or legislative intellectuals to the conditions caused by the loss of their status in the process of modernity (Bauman 2002: 116).

It is not an accurate approach to perceive the concept of postmodernism only as a concept that has a unity in itself, that is independent, that has emerged within its own dynamics of formation. Because Postmodernism is originated from Modernism. Even if postmodernist philosophers explain Postmodernism by defining it on completely different grounds such as "continuation of modernism", "rejection of modernism", "end of modernism", the unchanging truth is that Postmodernism is definitely and somehow related to Modernism. To generalize, at the expense of missing details, the last quarter of the twentieth century and the beginning of the twenty-first century can be labelled as "postism". We are now in a postist age (Murphy 2000: 1). Although it is getting increasingly vague among the nomenclatures of post-structuralism, post-empiricism, post-rationalism, and post-industrial society, Postmodernism is actually based on a central assumption, the "death of reason". Reason was once considered "the highest value of Western civilization". In fact, having reason was seen as taking a share of the divine by the ancient Greeks. But the expression "the death of reason", which belongs to Albricht Wellmer today, says more than Nitezsche's expression "God is dead": Here, the death of reason indicates the end of a historical project, the European Enlightenment (Eagleton 1999: 9; Ketenci 2007: 3-4).

2. Postmodern Condition and Position of the Knowledge[3]

The impact of postmodernism in the field of philosophy was with Lyotard, and after this philosopher, the concept has become the focus of a certain academic interest. Lyotard named his work, in which he claims that we have entered a new period, as "Postmodern Condition", which is still a preferred definition today in order to explain the prominent features of the period. In this work, the philosopher points out the changes during the

3 There have been philosophers who claim that the 'metaphysical foundations that determine the verification process of knowledge', which we can call the truth crisis or problem, have lost their legitimacy, and that such truth claims or verification theories have reached a certain language game by programming themselves and who have been more successful in criticizing this way of thinking. The "verifiability" thesis, which we can call the basic proposition of positivist thought, has been criticized by a philosopher like Carnap, Popper seriously displaced this view and after which it was defeated in many positions. Today, many postmodernist thinkers such as Quine, Sellars, Rorty, Feyerabend and Kuhn have made convincing statements that various language games that contain equal and different knowledge claims of all types of knowledge are incommensurable because they are different discourses. However, the reason why we highlight Lyotard and Baudrillard in this study is that both philosophers evaluate new reality or knowledge production tools such as technology, computer and social media.

acquisition and dissemination of knowledge after the changes in technology. He criticizes the ground of truth from which all kinds of knowledge start, rise, and which is based on a certain metaphysics as a foundation or constituent structure. While this epistemological attitude, which can be briefly called the legitimacy of knowledge, was seen as the product of a definite process until the end of the modern period, the certainty and objectivity of this process have begun to be doubted with the postmodern condition. Lyotard, who claimed most of the knowledge, including scientific knowledge, was not dependent on a pure legitimation process, was able to grasp the relationship of knowledge with power. As stated, today, many technology-oriented companies are involved in various stages of the knowledge process, from the production of information types, including scientific information, to their marketing. In this direction, truth claims that are mottos as "smooth process of knowledge" or "knowing only in order to know" as it is believed to exist in classical epistemology will lose its quality a little bit. When considered that this new way of explanation is valid for all types of information, one information will not be superior to the other. This is true whether it is scientific knowledge or religious. For Lyotard, legitimation is generally a form of validation that depends on a network of relationships such as culture, ideology, prejudice, legislators, and so on. Privilege loss of all meta-narratives, highlights diversity and pluralism and paved the way for the validity of narratives that make sense in a local, limited, and specific context (Lyotard 2013: 11, 13). When the titles of this text and the subjects under these titles are evaluated, it is claimed that the ground, on which metanarratives rise, the epistemological process and the technique, method and attitude, which are specific to this process, have been deteriorated with technology, internet and other social, economic or social changes, and after this new situation, only differences can be brought forward. Lyotard, who proposes a language game based on paralogy and a pluralistic democracy based on interpersonal communication in order to provide a local and limited form of knowledge, also expresses his wish to preserve diversity in this way (Lyotard 1990: 98). After these explanations, Lyotard's definition of Postmodern is as follows: "Simplifying to the extreme, I define postmodern as incredulity towards metanarratives. This disbelief is undoubtedly a product of progress in the sciences. But this progress foresees disbelief afterwards. The obsolescence of the metanarrative apparatus of legitimacy corresponds primarily to the crisis of metaphysical philosophy and to the university institution on which it based on. The narrative function is losing its functors, its greatest hero, its dangers, its journeys, and its purpose. Narrative language is disappearing into its elements such as narrative but denotative, prescriptive, descriptive and so on. The pragmatic valencies hidden in each element are specific to its type. Still, the postmodern condition is also stranger to the blind

contingency of delegitimation and disenchantment. Where can legitimacy remain after meta-narratives? The criterion of effectiveness is technological, it has nothing to do with judging what is right and fair. Has the legitimacy to be compromised been achieved through discussion, as Habermas supposed? Such a convention uses violence against the heterogeneity of language games. And innovation has always been arisen from separation. Postmodern knowledge is not simply a tool of authorities. It purifies our sensitivity to differences and reinforces our incomparability and tolerance. Its principle is not the expert's homology, but the inventor's paralogy." In this context, postmodern discourse distorts the foundations of violence and exclusion, as it makes heterogeneity possible. Because for Lyotard, the basis of violence and conflict is that meta-narratives based on a single language game impose their own game on other language games and types of knowledge by not allowing different forms of expression (Rojek, 1988: 10).

2.1. **Social Media, Individual and Knowledge**

In spite that postmodernism was met with great enthusiasm, this way of thinking was formed with problems when evaluated from certain points. Although the preservation of a pluralistic discourse and the meaningfulness of each claim within its own language game have a democratic appearance, it certainly created problems in certain aspects. Within this context, the most controversial aspect of Postmodernism is the statements claiming that it allows for "relativity". For some thinkers today, it is alleged that the postmodern condition has a rootless and quick side, and this superficiality is "probably the most beloved aspect of postmodern thought. Because reflection is a headache, a baffling thing, and a constant questioning, something that requires effort without knowing what the result will be for a very long period of time and energy and leads to a very stressful life (Adanır, 2005: 47). This claim ultimately traces to the fact that Postmodernism, first of all, glorifies only rebellion and criticism and is criticized for its always negative attitude. Because, according to the thinkers who brought this criticism, Postmodernism is absolutely destructive, it cannot provide any basis for defending any social, political and ethical system.

Another fact in the postmodern period is that we live in the computer age. In fact, we have passed this stage and have been living in technological conditions that we could not even imagine not for a while. While this situation provides many advantages, it also creates disadvantages at the same time. Within the context of information, the most important problem caused by this situation is that information is produced quickly, often without the source being known and verified, and makes impressions in people's life. This situation, which will be seen as a new stage of capitalism, has also led to the formation of a new human psychology; in other words, the perception, learning and knowing processes of the average person have

started to be determined by the visual media, whose effectiveness has increased tremendously. This media is controlled by capital, which is rapidly becoming transnational, and a new ideological interpretation that transcends the variables of time and space is becoming dominant on a world scale (Şaylan, 2016: 49). According to Jameson, this new phase of Capitalism will completely change cultural life. This change has first showed itself in areas such as architectural understanding, aesthetics and technology after consumption patterns. The individual of the postmodern society finds his life forms in the focus of entertainment and consumption. The focus is on television, entertainment venues, internet and mobile phones.

The individual living in this way in the postmodern world comes to the fore with his loneliness and helplessness. This thesis is put forward by postmodern philosophers, especially Baudrillard. In addition to this, it should be emphasized that what people will wear, consume, read or watch is not determined by mind as it was in the Middle Ages, religion and the Enlightenment period; now, people's preferences are determined by advertisement, internet, visual and social media. For example, all over the world, there are models presented by active and widespread house or fashion magazines, which determine the house that a person wants to reach, longs for, wants to live in, or the clothes that he will wear during his daily work, business and official meetings. Advertisements, TV series and other programs support this, and people are presented with models that are supposed to represent reality. Basic dynamics of this society, communication and information have gained a global feature with the computer-internet network; what we say here refers to the relationship/communication process starting with the network established between these tools, rather than the tool, computer, which is a processor in the technical sense. These tools mobilized the solid and limited life by making people independent of space. "Being mobilized is the expression of dominating the space, it is a prerequisite for making the living space a real living space for oneself and others."(Funk, 2009: 75). As a matter of fact, since life in postmodern times is mostly surrounded by technological tools, man leaves solidity aside in this fluid network. Sophisticated tools we come across here are computers, internet and mobile phones. Reality is no longer something that a person touches or sees; reality is reflected to people by the media (that is, social media such as Facebook, Twitter) in a language process. As Postman argues, communication tools reproduce the cultural environment of people with their unique symbols or metaphors (Postman, 1985: 15; Şaylan, 2016: 195). For Baudrillard, **hyperreality** is now dominant in this society. The difference between image and reality has disappeared.[4] The

4 Today, there are examples from many parts of the world in this regard. Here are two examples that quickly come to mind and surprise us all. A twenty-seven-year-old young man living in Tokyo wanted to marry a video game character that was created in accordance with today's

expansion of the communication network, the giving of certain messages to people through these networks, the reproduction of reality – Simulacra[5], as Baudrillard put it – have caused people to turn into an extraordinarily harmonious (hyperconformity) silent mass (Baudrillard, 2011: 14).

It should be known the information produced by social media today has reached a level that is almost more frightening than what Baudrillard said. When taken into account the social media, it is much easier for fake or fabricated news to spread to more individuals in a shorter time than the mainstream media. These environments also provide users with new sociability that enables them to tell their own stories, news and produce content, thus, unconfirmed news of individuals can get into circulation. Moreover, the examinations show that the algorithm[6] or the speed of spreading of false or fabricated information/news in social communication channels, such as Facebook, has a higher rate than the correct one. This situation of information has led to the uncertainty of the subject, who produces the information, and ultimately to the elimination of responsibility. While our information processes, which pursue the truth and aim to reveal the truth, were produced around an isolated subject-object relationship as it was addressed in the modern period, such a knowledge relationship was dispersed in the postmodern period. Oxford Dictionary, by highlighting this current situation, claimed that we are in a ***post-truth*** period in terms of knowledge, and chose this word as the concept of 2016. This concept not only indicates a disciplinary problem, but also indicates that we act in this way throughout our lives, from our daily choices to our political decisions[7].

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aesthetic criteria and that he was a fan of, and applied to the authorities in this direction. In North Korea, a married couple starved their real three-month-old girls to death while playing a game of raising a virtual child character that they became obsessed with. See: (Güzel, 2015: 74-75). These examples can be multiplied very easily. Even these two examples alone are enough to show the seriousness of the experience, the need to investigate what can be done about it and to take measures before being late.

5 While Baudrillard uses Simulacra as an appearance wanted to be perceived as reality, he uses the word simulation in the sense of "a tool, a machine, a system, artificially reproduction through a model or computer programme for the purpose of examining, demonstrating or explaining a case-specific way of functioning." See: (Baudrillard, 2011: 7).

6 An algorithm is simply a way of arranging a problem. Algorithms are limited and ordered steps (Shadoan) that enter inputs and produce results. The algorithms Facebook uses decide which posts are displayed higher and which ones are not displayed. The posts that are preferred to be shown in the News Feed section tend to be similar to the pages, likes and shares that the person interacts with.

7 It has been discussed whether social networks such as with a large number of members around the world have an effect in the Presidential elections in the USA, and these debates have notably occupied the agenda. For example, the following news was on a news site: "After the US presidential election ended with the victory of Donald Trump, Facebook and Google have come under heavy criticism, being accused of spreading disinformation with their algorithms and influencing election results due to their tendency to display popular content to users. In response to the criticism, Google and Facebook changed their content policies and announced they would remove pages containing fake news from ad network." While Google News was announcing the election results, an false news site showed the news that "Trump got most of the votes" at the top of the final election results search and caused this news to spread very quickly.

A postmodern thought that highlights and praises difference, has pushed people toward becoming more radical. In this context, discourses, which are social or point to a certain tradition, were accused of anonymity, it was not even evaluated in terms of truth and was quickly labelled as unreasonable and pushed out of people's agenda. Technology, visual and written media, movies or TV series wanted to heroize the controversial characters making the public space problematic and standing out with their differences. Those who carry certain values, preserve them and pass them on to future generations are considered outdated, or at best traditionalist or conservative. Besides, in the age that shows rootlessness as a value, people lose the future because they cannot take power from their past. It should be indicated in this case, human becomes homeless, alienated, disoriented, and worse, the absence of permanence is more liked by people. This fact is more common in today's societies. For example, when we look at 'Instagram', one of the social media tools, the fact that after stories started to be shared, people share fewer permanent pictures or videos is perhaps a proof of this. Because social media has destroyed privacy and ethical values, and people want the immoral photos they share here to fly away. From this point, it can be concluded that we do not want things that can embarrass us to be permanent. Because thoughts and feelings can change. To be honest, people disseminate their data, and they are right to be concerned today. In this context, the foremost thing that companies, which carry out their activities on the internet, marketed to internet or social media users was privacy. As an institution, the most important promise of technological companies has been privacy. As many of us have witnessed, from the simplest formation to the most complex company, the following feedbacks come from individuals or legal entities in this field: "This message is end-to-end encrypted." Again, it has become usual to encounter the following messages: "This call, this phone's password and bio-identity are special to you, even we don't know or can't reach it." We had a lack of knowledge about managing privacy and sharing it. Therefore, it is not surprising that such a situation exists. But we think it is important to ask: Who can access this information?

The effects of communication tools and social media, which are an extension of the postmodern period, on people are not limited to these. We have claimed that our psychology and our daily perceptions are deteriorating rapidly. We can give the following example to support our claims: Desire to spend time wisely. Since the postmodern individual could not stop or slow down time, he wanted to accelerate himself. For this reason, almost everyone around us has a desire to speed up and an effort to fit more

As it is known, although Trump had enough delegates for the presidency, Hillary Clinton came first in the total number of votes. See: https://journo.com.tr/yalan-haberler-google-ve-facebooka-politika-degistirtiyor Last Access Date: 08.05.2018.

time into less time. The internet offers the opportunity to watch a video at 1.5 times or twice the speed. For the postmodern subject, who starts to consume fast and thinks that time is not enough for him, this is a golden opportunity. We can watch all the videos like this in the future. It will not be surprising at all to encounter such a thing in cinemas in the future. Likewise, platforms, computer programs or phone applications allowing to do many things at the same time can be preferred more because of these features. An application that allows you to watch a video that interests you while working on Word or writing your article or new generation phones that allow us to do different things by dividing the same screen are becoming the focus of attention for almost all of us. However, the drive to fit a lot into a limited moment, has brought an unprincipled understanding of preference such as liking everything and following anyone on social media. When we look at our phone book or social media accounts, it is a fact that we come across tens or hundreds of names that we cannot remember. Facing the reality of change in the concept or feeling of friendship, is an important virtue both in Antiquity and in our culture. Also, a healthy person can't have that many things to follow. Once social media has taken over our minds, it causes it to fall apart and create too much focus that it can't keep up with. People are faced with the fear of being away from certain events, missing or deprived when they put down their tablets or phones, or when they take their eyes off the screens of these devices. There is a flow of information and at these moments, the feeling that there is so much to miss takes over people completely. However, these social media applications or technological tools we mentioned do not leave us even when we want to work. These tools call us to a virtual reality with all their charm with their notifications and whisper to us that we can do our work by looking at the screen of our mobile phone. We can only conclude these determinations with a question: "Isn't it more valuable to do a single job with due diligence and focus, and to specialize in that job?" Won't the subject, who is already completely disorganized and trying to do many things at the same time, be off the rails by trying to master most of the growing information and the information bombardment? Concerning this, Chul Han's rightful statement is noteworthy: "… It radically changes the structure and economy of attention. Perception becomes fragmented and scattered. The increasing workload has necessitated a new technique of time and attention and these techniques affecting the structure of attention. "Multitasking", which is a technique of time and attention, does not represent the advance of civilization. Multitasking is not a human ability to simply work in the late modern worker and information society. Multitasking is rather a regression. It is particularly common among wild animals. It is an indispensable attention technique for survival in the jungle. An animal busy with food has to direct itself to other duties. … **But humanity's cultural progress and cultural experience, includ-**

ing philosophy, have given us deep and concentrated attention. Culture stipulates an environment in which deep attention is possible. This deep attention is completely replaced by another form of attention: hyperattention. Sudden changes in focus between various goals, information sources, and processes indicate this scattered attention. Because hyperattention has a low tolerance for boredom, it just allows little of the deep boredom which is important to creative processes (Han, 2019: 23-24). This situation, which causes us to experience everything with shorth of breath, whispers to the postmodern subject to quickly pass the long and troublesome maturation process of deep thought.

People, not satisfied with what they have, are creating a new world for themselves on social media. In this context, social media has also caused significant changes in the perception of the concept of "love". We have begun to understand only being loved from love. This has created the thought that we have to be perfect in order to be loved by more people. The first response to this came from social media, and they offered the possibilities of being thinner, more beautiful, more perfect or flawless with various applications. However, many social media users, not satisfied with this and want to be loved more, look for ways to make themselves look better or more perfect by looking for others' flaws. A new type of culture has emerged in social media regarding this fact: "Lynch culture." There is another fact to be mentioned concerning this. The desire to be perfect, together with the programs that make people look more perfect, demonstrates the fact that cameras of mobile phones are used almost exclusively for selfies. Additionally, there are news in the written or visual media claiming that people who want to achieve this virtual beauty cause an incredible increase in the number of plastic surgeries.

So, will we be able to escape technology? Theoretically yes, but how possible is it practically? It's actually not that hard to guess. When technology becomes ordinary, could leaving technology be the choice of aristocratic people or the indicator of their prestige? The luxury of not answering incoming calls, e-mails or messages, or being able to turn off the phone on vacation, seems to be a privilege for an aristocratic class. In addition, from different aspects, hotels without internet, which offer 100% organic products in a completely natural environment, seem to be an area of enterprise that will be marketed in the future. Accordingly, it is impossible not to give credit to thinkers like Derrida. As Derrida stated, fences have been built around the gardens now, there is no way out. The horizon is narrowed. François Lyotard tries to describe the situation as follows: "The postmodernist view is therefore a pointless attempt doomed to fail to develop an anti-Modernism project to reconstruct, restructure, and correct societies." (Lyotard, 2006: 48). As Lyotard points out, there is no need to try in vain to correct and overcome the postmodern condition. The evaluations of Ly-

otard, who describe the postmodern condition with people's indifference towards the world and today, and their indifference to what is happening, also remind nihilism. According to Lyotard, although the condition seems very bad in terms of finding a way out, even in this situation, there are ways to breathe (Lyotard, 2066: 48-49).

Postmodernism has come up by ignoring the contradictory models of modernism. Postmodernism, which aims to overcome the destructive aspects of modernity, has become a part of this destructive side of modernity today. Bauman highlights this issue as follows: Postmodernity means "total liberation from the typical modern drive to overcome uncertainty and the univocal certainty of sameness". For this reason, Bauman defines postmodernity as modernity that "affirms uncertainty" and, in fact, "acknowledges the impracticability of its original project" (Bauman, 2003: 130-131).

3. Rather than Conclusion: Knowledge and Responsibility

In classical epistemology, knowledge explains a relationship between the subject and the object of knowledge. In this relationship established between who knows and is known, various logical and dialectical processes are followed in order to reveal the truth (aletheia). Although this is the technical aspect of the matter, this effort always imposes certain responsibilities on the subject. Reaching, understanding or disseminating the truth are always accompanied with keeping an ethical or social relationship, in other words, being responsible for others. The information process, which starts with knowing and recognizing oneself, and includes determining one's limits, does not remain only at this stage, and in other words, in this search that we will call wisdom, truth is not only desired for self-realization or improvement, and even for success, as we often encounter today. Truth, which is a arduous pursuit of a philosophical search, is difficult to grasp, and an effort in this direction always brings responsibility, which is an ethical attitude. In fact, this is true even for ordinary knowledge. 'Knowledge' and 'responsibility' are always together when we do our daily works, our professional activities, or our specific duties due to being a father or son. Even when performing a simple job or task, undesirable sad events can sometimes be encountered when acted with assumptions. Knowledge is such a value that directly affects life. Since the relationship between knowledge and our ethical dimension or social position is so deep, changes in the position of knowledge in today's societies have affected and changed many things.

Being able to access information quickly, disseminating this information at the same speed and breaking the link between the subject and the object, has caused the abandonment of many principles that should always exist in the information process. To put it more clearly, individuals who

cannot reach the speed of information dissemination in the digital age, often make choices without effort, with an emotional attitude, and worse, with partiality, while verifying their judgments to close this gap. Breaking the link between knowledge and responsibility, causes us to encounter a truth claim put forward by a "hidden" subject, or the claims of people who express an opinion just to manipulate or speculate. In this context, even if the investigation of the faculties and parts of the mind, which are the technical and professional subjects of philosophy, various reasoning or metaphysical assumptions made to explain how knowledge is formed, is left to a certain group, postmodern subjects should be reminded frequently that truth should not be abandoned. Likewise, in order to preserve and continue the achievements with a deep thought, it is necessary to keep political, cultural and scientific issues away from the influence of social media, which has a superficial, excessive and short-breathed appearance. As a consequence, an educational move embracing many segments of the society should be conducted through the State, taking into account the contribution of the academic environment towards increasing the number of individuals who question, think critically, doubt at a certain level and who can coexist with philosophy.

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CHAPTER 7

EVALUATION OF REGIONS AND FOUR INCOME GROUPS IN TERMS OF SOCIAL PROTECTION THROUGH CRITIC BASED GREY RELATIONAL ANALYSIS METHOD

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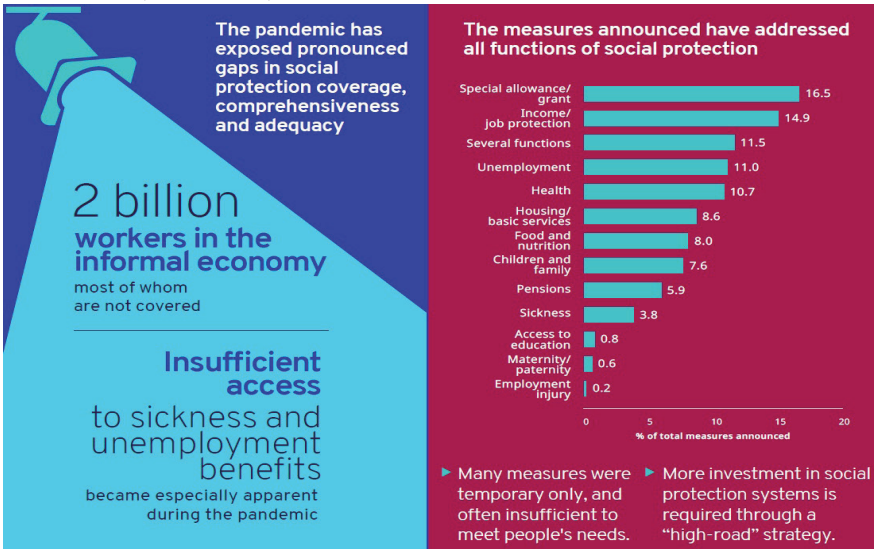
1. Introduction

The term "social protection floor" refers to a set of minimal national standards for social security that should guarantee, at a bare minimum, that all people in need have access to basic health care and income stability throughout their lives (Cichon, 2013; Nyenti & Mpedi, 2012).

The term "social protection," often known as "social security," refers to a system of policies and programs that aims to alleviate and prevent poverty and vulnerability at all stages of life. Child and family benefits, maternity protection, unemployment insurance, medical insurance, retirement security, and benefits for the disabled and the elderly are only a few of the nine primary categories of social security. Contributory schemes (primarily social insurance) and non-contributory tax-financed schemes (universal/categorical schemes and social assistance) are used by social security systems to cover all of these policy areas (Bonnet, Ehmke, & Hagemejer, 2010; ESCAP, 2022). States may fortify the social compact by making progress toward universal social protection by 2030 and by supporting and promoting human rights. The COVID-19 pandemic functioned as a challenge of the resilience of our social protection (ILO, 2021; Wernli et al., 2021). The world's social protection programs throughout the pandemic are shown in Figure 1 below.

Figure 1. The social protection measures throughout the pandemic worldwide (ILO, 2021)



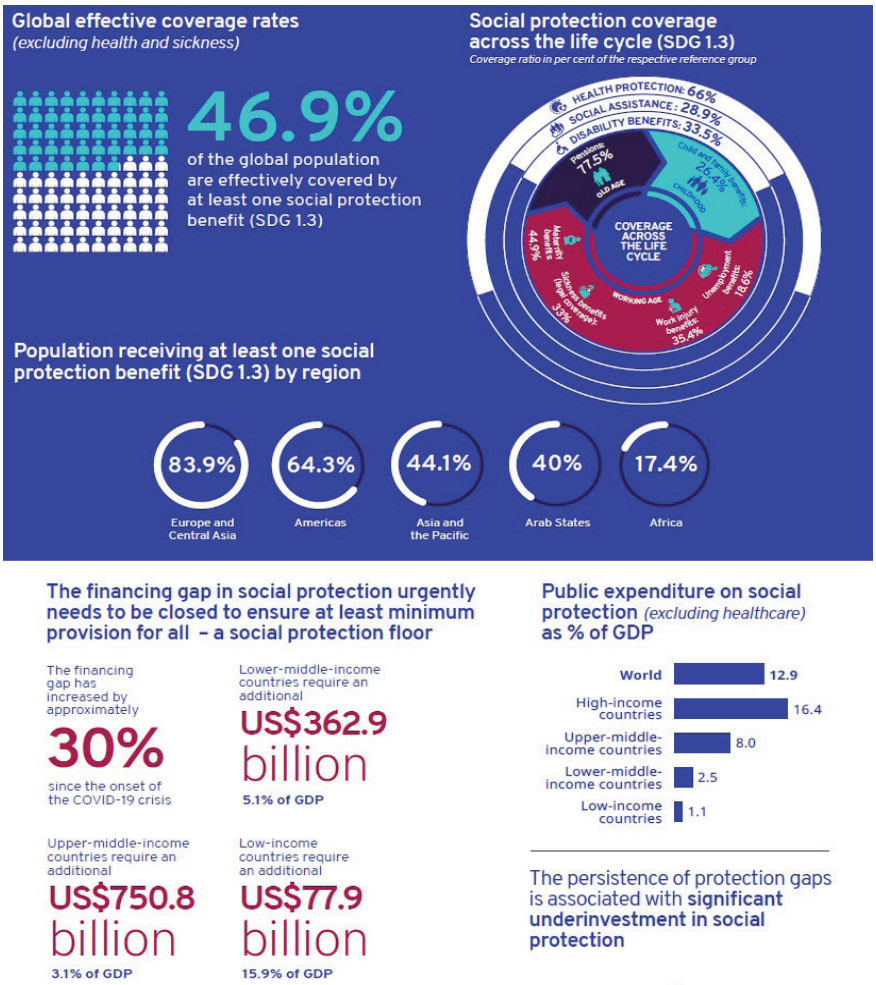
The pandemic has revealed significant shortcomings in the breadth, depth, and adequacy of social protection programs worldwide. The statistics show that millions of people, especially women, kids, and those

working in the informal sector or in other types of jobs, are in a vulnerable position (Peres, Brito, Bilo, & Balboni, 2021; Van Trang, 2022). In response to the pandemic, many governments have implemented, expanded, or adapted social protection measures to support vulnerable populations who were not previously covered or were only partially protected (Aguirre & Hannan, 2021). Initially, the COVID19 situation was new ground. All states were caught unprepared. In order to reduce the incidence of the virus and save lives, governments had to shut down the economy, plunging the globe into a recession of unparalleled proportions. While every nation struggled with the need to act immediately, nations with well-established social protection systems were able to ensure that their citizens had access to life-saving medical treatment, a steady income, and secure employment. Unfortunately, countries without reliable infrastructures have tried to implement some supports with improvising (Andia & Chorev, 2021; Nnaeme, Patel, & Plagerson, 2022)South Africa</title><secondary-title>Development in Practice</secondary-title></titles><periodical><full-title>Development in Practice</full-title></periodical><pages>29-38</pages><volume>32</volume><number>1</number><dates><year>2022</year></dates><isbn>0961-4524</isbn><urls></urls></record></Cite><Cite><Author>Andia</Author><Year>2021</Year><RecNum>577</RecNum><record><rec-number>577</rec-number><foreign-keys><key app="EN" db-id="vtwtxxxfvswepzet0s6xawwdx2vaxxzd2txp" timestamp="1663318155">577</key></foreign-keys><ref-type name="Journal Article">17</ref-type><contributors><authors><author>Andia, Tatiana</author><author>Chorev, Nitsan</author></authors></contributors><titles><title>Inequalities and social resilience in times of COVID-19</title><secondary-title>Revista de Estudios Sociales</secondary-title></titles><periodical><full-title>Revista de Estudios Sociales</full-title></periodical><pages>2-13</pages><number>78</number><dates><year>2021</year></dates><isbn>0123-885X</isbn><urls></urls></record></Cite></EndNote>.

It is crucial that both nations and the international community increase their attempts to ensure the right to social security a reality for all in a world where the large majority of people have no or inadequate access to social protection and are trapped in a cycle of vulnerability, poverty, and social exclusion (Gentilini, 2022; Tramountanis et al., 2022).

Figure 2 provides some brief information on the state of social security systems throughout the globe. The numbers reveal that some progress has been achieved, but evidently not enough.

Figure 2. The situation of social protection globally (ILO, 2021)



Most children still don't have access to the kind of social security they need. Only 26.4 percent of children worldwide receive social protection, with wide variations between regions: while 57.4 percent of children in the Americas and 82.3 percent of children in Europe and Central Asia receive benefits, only 15.6 percent of children in the Arab States and 12.6 percent of children in Africa do (Barca, Sharpe, & Flower, 2021; Bauer et al., 2021; ILO, 2021).

Several nations have taken measures to better support individuals with disabilities throughout the present health and socioeconomic crises because of the disproportionate impact that COVID19 has had on people with disabilities. But more has to be done to make sure that no one with a disability is left behind; just 8.5% of all actions outlined were specifi-

cally for individuals with disabilities (Barron et al., 2021; Spasova et al., 2021). According to the most recent ILO statistics of effective coverage, only 33.5% of individuals with serious disabilities around the world obtain a disability support, with significant regional variation. For example, while protection seems to to be nearly global average in Eastern Europe, statistics for Southern Asia and sub-Saharan Africa demonstrate a coverage rate less than 7%. The coverage rate is 85.6% in high-income nations, 11.3% in lower-middle-income nations, and 8.6% in low-income nations (Barca et al., 2021; ILO, 2021) .

Ninety-six nations throughout the world have legislated some kind of unemployment insurance, with the large number (nine out of ten) relying on social insurance programs (ILO, 2021). While unemployment benefits are available to a far higher percentage of workers in certain regions than others, just 18.6% of unemployed workers worldwide get them (SDG indicator 1.3.1). This gap is the result of several factors, including a lack of unemployment insurance programs, the statutory exclusion of some sorts of workers, high rates of long-term unemployment, and strict qualifying rules (Abdoul-Azize & El Gamil, 2021; Carter, Bédard, & Bista, 2013; Obinger & Schmitt, 2022).

Goal 1.3 of the Sustainable Development Goals (SDGs) emphasizes the importance of ensuring that all people, regardless of gender, have access to a reliable source of income in their latter years. 77.5 percent of retirees throughout the globe are now getting a pension. Although there has been some progress, there are still major inequalities between the genders, and across geographies (Bettio, Tinios, & Betti, 2013; Frey, 2021).

Because of differences in labor market structure and insufficient implementation of existing schemes, only 35.4% of employees worldwide have access to employment injury insurance (EII). This number is much lower in most low- and middle-income countries. This slows down the achievement of SDG objective 1.3, which is to guarantee that all employees are protected from occupational illness and injury (ESCAP, 2022; Lönnroth, Tessier, Hensing, & Behrendt, 2020).

36 countries, mostly in Africa or Asia and the Pacific, do not have an EII system and instead pay employees directly for work-related injuries. A growing number of nations are adopting and implementing EII systems in conformity with the social security principles specified in ILO Conventions Nos. 102 and 121. In the light of these conventions and action plans, protection will be strengthened, particularly in high-risk professions and small and medium-sized firms, and sufficient protection will be enhanced (ILO, 2021).

As a human-centered policy, social protection has a crucial function in helping individuals through changes in their personal lives, in the workplace, and in the broader economic and social landscape (Razavi, Behrendt, Bierbaum, Orton, & Tessier, 2020). Strong government will, translated into efficient plans and policies, regulatory structures, and consistent economic methods is essential if this goal is to be realized by 2030, since the 2030 Agenda including SDG objectives 1.3 and 3.8, has less than eight years left to be completed (Bierbaum & Schmitt, 2022; Durán Valverde, Pacheco-Jiménez, Muzaffar, & Elizondo-Barboza, 2020).

Social protection systems need to be forcefully strengthened to support an inclusive and durable recovery, to promote social fairness, and to achieve the fundamental right to social security for everyone in order to put efforts towards the SDGs back on its calendar schedule and even accelerate it in spite of these stated obstacles (Bierbaum & Schmitt, 2022; Kaltenborn, 2020). Some goals and key performance indicators for social protection in the 2030 Agenda are shown in Figure 3.

Figure 3. Some goals and key performance indicators for social protection in the 2030 Agenda (ILO, 2021)

The social security guidelines of the International Labor Organization (ILO) are well-known around the globe as essential guides for developing rights-based, secure, and long-lasting social protection policies and structures. This makes them essential instruments for realizing this right and implementing a rights-based strategy for social protection. These criteria are crucial guidelines for achieving the Sustainable Development Goals, particularly Goals 1, 3, 5, 8, 10, and 16 (Hagen-Zanker, Mosler Vidal, & Sturge, 2017; ILO, 2021; Novitz, 2020).

The purpose of the research is to assess the state of social security throughout the globe in relation to different regions and income groups. The purpose of the study's findings is to draw the attention of researchers, policymakers, and all other relevant individuals to the present state of this problem, which is intimately connected to many others. For instance, investing in social protection is a crucial lever for the SDGs, contributing to a wide range of targets, such as the poverty elimination (SDG 1) and hunger (SDG 2), the promotion of good health and well-being (SDG 3), gender equality (SDG 5), decent work and economic growth (SDG 8), the reduction of inequalities (SDG 10), and peace, justice, and strong institutions (SDG 16) (Hagen-Zanker et al., 2017; ILO, 2021; Novitz, 2020). It helps the environmental pillar of sustainable development, specifically SDG 13, by easing the "just transition" to more environmentally friendly businesses and social structures, which benefits both the economy and society.

Therefore, the study assessed global regions and income groups using ten indicators from the International Labor Organization (ILO) database that provide statistics on the social support systems of countries and regions, such as the percentage of the population covered by at least one social protection cash benefit, the percentage of children covered by social protection benefits, the percentage of women giving birth received maternity benefits, and the percentage of people who are blind or visually impaired who receive social protection benefits. The Grey Relational Analysis (GRA) method based on CRITIC was employed for this objective. To avoid using subjective judgments, the CRITIC approach (one of the objective weighing methods) was used. The world's regions and income groups were then assessed using the Grey Relational Analysis (GRA) technique. Similar multi-criteria decision making approaches are also often utilized in the assessment of this matter. This is clearly seen in the literature review section.

Some of the similar studies done in this subject are as follows: Blouchoutzi, Manou, and Papathanasiou (2021) propose the incorporation of a multiple criteria decision analysis approach, called PROMETHEE, for the formulation of policies concerning the social exclusion

of migrants based on indices of social inclusion. Marković, Stanković, Digkoglou, and Marjanović (2022) tried to rank European Union (EU) nations based on the composite index, which incorporates chosen social protection variables from the relevant database at EU level - Eurostat. Using the CRITIC-TOPSIS paradigm, the overall score for 2020's social performance was obtained. According to the 2013 database, JJanković Šoja, Anokić, Bucalo Jelić, and Maletić (2016) graded EU nations according to their ability to meet the goals of their various sustainable development policies. For this objective, the suitable statistical I-distance approach was used. Using an EU-wide panel data analysis, Halaskova and Bednář (2020) sought to examine the relationship between social protection expenditures and chosen socio-economic parameters. Niazi, Asghar, Basit, and ZeeshanShaukat (2021) intended to assess national efficiency on aims promoting sustainability using data from World Development Indicators (WDI) on factors involved to be SDGs advancement parameters and the grey relational grading (GRA) for ranking the countries based on their grey relational grade. The primary goal of Sousa, Almeida, and Calili (2021) was to provide a review of the literature (SLR) on MCDM approaches that assist judgements aimed at achieving the UN Sustainable Development Goals (SDGs) and implementing the 2030 Agenda for Sustainable Development in regional, national, or local contexts.mCandan and Cengiz Toklu (2022) assessed the sustainable industrialisation capability of European Union nations using an integrated spherical fuzzy AHP and grey relational analysis technique. Using Grey Relational Analysis Models, Peng, Tang, Chen, and Zhang (2021) rated the health care variables for service quality with China's medical system.

The remainder of the study is organized as follows: The second section describes each phase of the proposed MCDM methodology. Section 3 contains the obtained results. Section 4 provides conclusion and discussion.

2. Methods and data

The study's methodology are detailed below. There are ten quantitative indicators in the application. Table 1 indicates the indicator codes and their definitions.

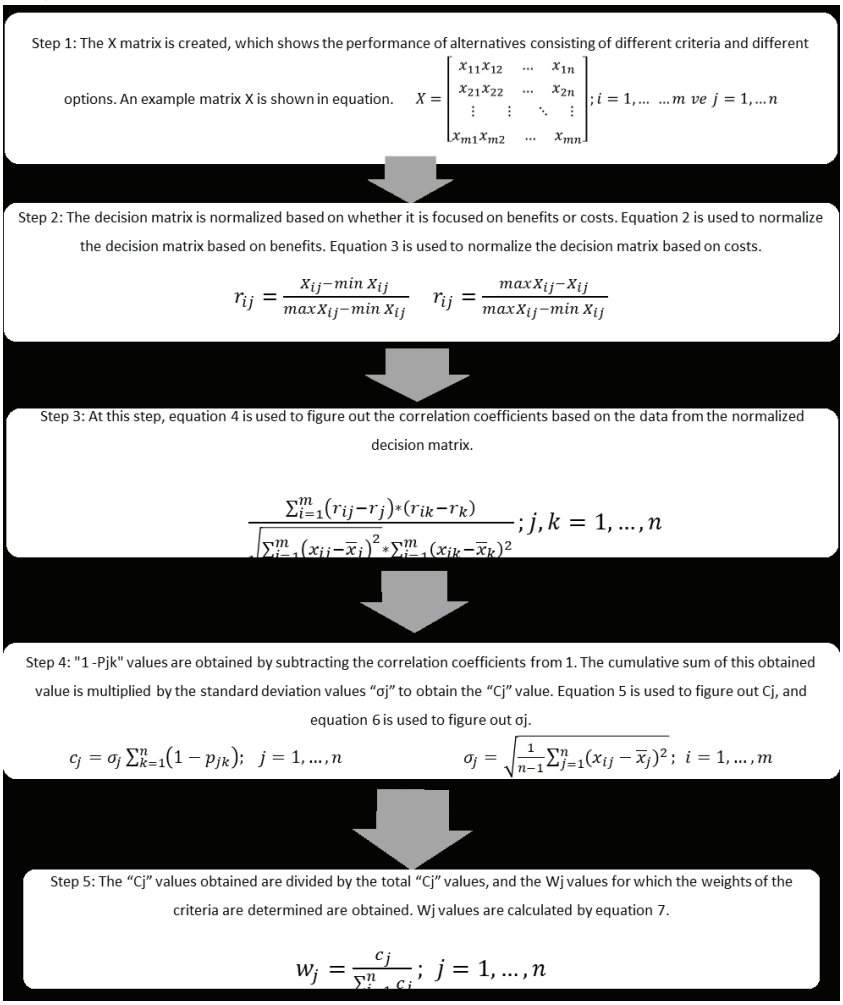
Table 1. Indicators used in the study, their codes and definitions (ILO, 2021)

Indicators	Codes	Definitions
SDG 1.3.1 –Population covered by at least one social protection benefit (excluding health)	**C1**	percentage of the population either actively contributing to or getting benefits from at least one social security system (contributory or non-contributory benefit), excluding healthcare and sickness benefits.
Children	**C2**	proportion of families with children that get financial assistance for children and/or families as a percentage of all families with children.
Mothers with newborns	**C3**	Depending on estimates of age-specific fertility rates published in the United Nations' World Population Prospects or on the number of live births adjusted for the fraction of twin and triplet births, calculate the percentage of pregnant women who received cash maternity benefits in a given year.
People with severe disabilities	**C4**	the percentage of people are getting cash benefits from the government as a percentage of the total number of people receiving disability cash payments. The latter is determined by multiplying the prevalence of disability ratios (for each country group given by the WHO) by the total population of each nation.
Unemployed	**C5**	a proportion of the number of people receiving unemployment benefits to the total number of jobless.
Older people	**C6**	the percentage of senior citizens above statutory retirement age who are getting any kind of pension for their age (contributory or non-contributory)
Workers in case of work injury	**C7**	percentage of insured employees as a percentage of total employment or workforce.
Vulnerable people covered by social assistance	**C8**	percentage of vulnerable people receiving monetary benefits from social services relative to the overall population receiving such benefits. The latter are determined by deducting from the total population all individuals of working age who are contributing to or getting benefits from a social insurance plan, as well as all those above the age of retirement who are receiving benefits from such a program.
Labour force covered by pension scheme (active contributors)	**C9**	pension coverage as a share of the workforce (measured by the number of active contributors).
SDG 3.8.1 – Universal health coverage	**C10**	It means that everyone has ready access to necessary medical care and the medications and vaccinations they need to be healthy at prices they can afford.

2.1. CRITIC (CRiteria Importance Through Intercriteria Correlation) Method

The CRITIC approach is one of the weighing techniques that produces the objective weights of the criteria prsented in the literature by Diakoulaki, Mavrotas, and Papayannakis (1995). In this approach, the standard deviation of the criterion and the correlation between the criteria are included into the weighing procedure. This method's application procedure consists of five stages, which are detailed below in Figure 4 (Diakoulaki et al., 1995).

Figure 4. The CRITIC method calculation steps (Diakoulaki et al., 1995)



2.2 Gray Relational Analysis (GRA) Method

In 1982, Ju-Long (1982) introduced the gray relational analysis (GRA) approach. When there are several criteria and the interactions between them are complicated or even conflicting, GRA might be a helpful tool. A similar strategy is proposed for tackling problems with intricate inter-relationships of variables. It compares data sets, as opposed to measuring the distance between two locations, to determine the degree of similarity or dissimilarity between two sequences that have certain correlations in common (Lee & Lin, 2011; Tang & Young, 2013).

The gray relational analysis procedure has seven stages (Karaatlı, Ömürbek, Budak, & Dağ, 2015; 2011):

Step 1: As a first step, the decision matrix is created. In the mxn-dimensional decision matrix, which consists of m number of alternatives and n number of criteria, the value of the ith alternative according to the jth first criterion is expressed as xij.

$$X = \begin{bmatrix} x_1(1) & x_1(2) & \cdots & x_1(n) \\ x_2(1) & x_2(2) & \cdots & x_2(n) \\ \vdots & \vdots & \ddots & \vdots \\ x_m(1) & x_m(2) & \cdots & x_m(n) \end{bmatrix} \quad (1)$$

Step 2: In the next step, the data is normalized. The decision matrix elements defined by different units are free from their units with the normalization process. Thus, it is possible to evaluate the criteria together. The normalization process is applied by using formula 2 when the criterion is a benefit criterion, and using formula 3 when it is a cost-oriented criterion.

$$x_i'(j) = \frac{x_i(j) - min\, x_i(j)}{max\, x_i(j) - min\, x_i(j)} \quad i = 1,2,\dots,m \quad j = 1,2,\dots,n \quad (2)$$

$$x_i'(j) = \frac{max\, x_i(j) - x_i(j)}{max\, x_i(j) - min\, x_i(j)} \quad i = 1,2,\dots,m \quad j = 1,2,\dots,n \quad (3)$$

Step 3: In this step, the difference of each value of the reference value determined by considering the maximization (benefit) or minimization (cost) criteria of the criteria is calculated, and the absolute value of these differences and the absolute value table of the distances to the reference values are obtained. Since the values of each criterion in the transformed decision matrix have values in the [0,1] value range, the reference value for the benefit criteria is determined as 1, while the reference value for the cost criteria is determined as zero.

$$x_i'(j) = 1 - \frac{|x_i(j) - x_0(j)|}{max\, x_i(j) - x_0(j)} \quad i = 1,2,\dots,m \quad j = 1,2,\dots,n \quad (4)$$

Step 4: In the matrix created in the previous step, the largest (Δmax) and smallest (Δmin) values for each criterion are determined.

Step 5: Gray relational coefficient values are calculated.

$$\varepsilon\,(x_0(j), x_i(j)) = \frac{\Delta_{min} + \xi\Delta_{max}}{\Delta_{0i}(j) + \xi\Delta_{max}} \quad (5)$$

In the formula Δi(j); Δi represents the jth value in the difference data set. The coefficient ξ is used to eliminate the possibility of being the extreme value in the Δmax data set and is usually treated as 0.5 in the literature.

Step 6: Gray relational degrees (GRD) matrix is created by multiplying the gray relational coefficient values with the weights of the criteria.

$$\gamma(x_0, x_i) = \sum_{j=1}^{n} \varepsilon(x_0(j), x_i(j) * w_i(j)) \tag{6}$$

The wi(j) in the formula represents the weight for the jth data point.

Step 7: In the last step, GRD values are ordered from largest to smallest to obtain the ranking of the compared alternatives by GRA method. The alternative with the greatest value is defined as the best alternative in terms of the evaluated criteria.

3. Results

The CRITIC weighting approach was used to determine the values of the weights. The weights obtained from the CRITIC method is shown in Figure 5.

Figure 5. CRITIC method weights

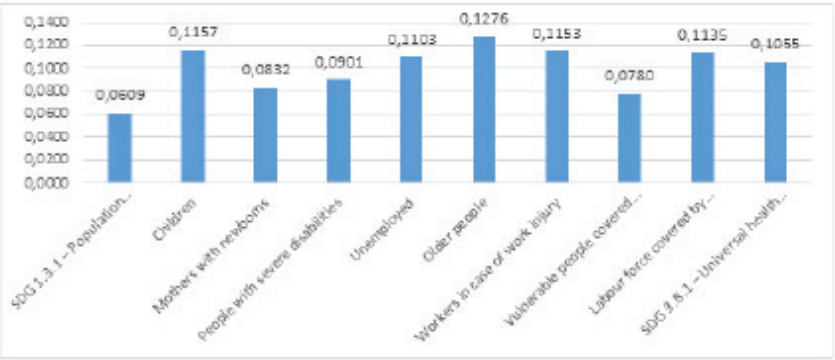


Table 2 presents the GRA technique's decision matrix, which consists of indicator weights and indicator values for each alternative compiled from the ILO (2021) database.

Table 2. GRA Decision matrix

wi	0,0609	0,1157	0,0832	0,0901	0,1103	0,1276	0,1153	0,0780	0,1135	0,1055
Region	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**
	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Africa	17,4	12,6	14,9	9,3	5,3	27,1	18,4	9,3	8,5	47,9
Northern Africa	33,8	24,7	46,5	20,9	6,7	43,8	37,5	19,1	17,4	65,8
Sub-Saharan Africa	13,7	10,5	7,5	6,7	4,9	19,8	14,8	7,1	6,1	43,8
Americas	64,3	57,4	51,9	71,8	16,4	88,1	57,4	36,7	41,1	78,7
Latin America and the Caribbean	56,3	41,5	30,5	57,7	12,5	75,4	40,8	36	30,1	75,4

Northern America	78,5	94,6	95,9	96,7	29,5	100	83,1	38	59,2	84,5
Arab States	40	15,4	12,2	7,2	8,7	24	63,5	32,2	15	63,5
Asia and the Pacific	44,1	18	45,9	21,6	14	73,5	24,8	25,3	32,9	65,4
South-Eastern Asia and the Pacific	61,5	14,8	56,6	33,7	24,2	88,3	34,9	34,1	47,5	75
Southern Asia	22,8	20,9	33,6	6,8	0,6	39,2	6,7	14,4	13,3	53,7
Europe and Central Asia	83,9	82,3	83,6	86	51,3	96,7	75,5	64,4	49	77,2
Central and Western Asia	66,9	47,9	54,7	40,4	14,7	97,2	57,4	42,8	37,2	73,1
Eastern Europe	84,6	96,7	81,4	100	67,1	95,2	80	61,2	50,7	73,2
Northern, Southern and Western Europe	90,4	96,2	99,4	95,6	61,2	97,4	78,8	75,1	51,2	81,6
World	46,9	26,4	44,9	33,5	18,6	77,5	35,4	28,9	32,5	65,6
Low income	13,4	8,5	10,5	8,6	0,8	23,2	10,2	7,8	6,6	45,1
Lower-middle income	24,9	20,9	33,3	11,3	5,5	38,6	14,4	15,2	27,1	55,2
Upper-middle income	64	22,6	52,5	40,5	17,5	91,3	36,3	34,4	70,9	76,7
High income	85,4	86,8	86	85,6	52,2	97,5	81,2	62,8	89,8	81,5

After constructing the decision matrices, the required calculations were carried out utilizing the max/min benefit cost normalization processes to produce normalized decision matrix shown in Table 3.

Table 3. GRA Normalized decision matrix

wi	0,0609	0,1157	0,0832	0,0901	0,1103	0,1276	0,1153	0,0780	0,1135	0,1055
Region	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**
	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Africa	0,0519	0,0465	0,0805	0,0279	0,0707	0,0910	0,1531	0,0324	0,0287	0,1007
Northern Africa	0,2649	0,1837	0,4244	0,1522	0,0917	0,2993	0,4031	0,1765	0,1350	0,5405
Sub-Saharan Africa	0,0039	0,0227	0,0000	0,0000	0,0647	0,0000	0,1060	0,0000	0,0000	0,0000
Americas	0,6610	0,5544	0,4831	0,6977	0,2376	0,8516	0,6636	0,4353	0,4182	0,8575
Latin America and the Caribbean	0,5571	0,3741	0,2503	0,5466	0,1789	0,6933	0,4463	0,4250	0,2867	0,7764
Northern America	0,8455	0,9762	0,9619	0,9646	0,4346	1,0000	1,0000	0,4544	0,6344	1,0000
Arab States	0,3455	0,0782	0,0511	0,0054	0,1218	0,0524	0,7435	0,3691	0,1063	0,4840
Asia and the Pacific	0,3987	0,1077	0,4178	0,1597	0,2015	0,6696	0,2369	0,2676	0,3202	0,5307
South-Eastern Asia and the Pacific	0,6247	0,0714	0,5343	0,2894	0,3549	0,8541	0,3691	0,3971	0,4946	0,7666
Southern Asia	0,1221	0,1406	0,2840	0,0011	0,0000	0,2419	0,0000	0,1074	0,0860	0,2432
Europe and Central Asia	0,9156	0,8367	0,8281	0,8499	0,7624	0,9589	0,9005	0,8426	0,5125	0,8206
Central and Western Asia	0,6948	0,4467	0,5136	0,3612	0,2120	0,9651	0,6636	0,5250	0,3716	0,7199
Eastern Europe	0,9247	1,0000	0,8041	1,0000	1,0000	0,9401	0,9594	0,7956	0,5329	0,7224
Northern, Southern and Western Europe	1,0000	0,9943	1,0000	0,9528	0,9113	0,9676	0,9437	1,0000	0,5388	0,9287
World	0,4351	0,2029	0,4070	0,2872	0,2707	0,7195	0,3757	0,3206	0,3154	0,5356
Low income	0,0000	0,0000	0,0326	0,0204	0,0030	0,0424	0,0458	0,0103	0,0060	0,0319
Lower-middle income	0,1494	0,1406	0,2807	0,0493	0,0737	0,2344	0,1008	0,1191	0,2509	0,2801

Upper-middle income	0,6571	0,1599	0,4897	0,3623	0,2541	0,8915	0,3874	0,4015	0,7742	0,8084
High income	0,9351	0,8878	0,8542	0,8457	0,7759	0,9688	0,9751	0,8191	1,0000	0,9263
Reference Value	1	1	1	1	1	1	1	1	1	1

The maximum (Δmax) and minimum (Δmin) values for each criteria were determined in the matrix constructed in the previous process. A matrix was constructed by taking the absolute value of the difference (Δi (j)) between the alternative value in the normalized matrix and the greatest value (reference value) in the appropriate column.

Table 4. Distances and Absolute Value Matrix

Region	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Africa	0,948	0,954	0,919	0,972	0,929	0,909	0,847	0,968	0,971	0,899
Northern Africa	0,735	0,816	0,576	0,848	0,908	0,701	0,597	0,824	0,865	0,459
Sub-Saharan Africa	0,996	0,977	1,000	1,000	0,935	1,000	0,894	1,000	1,000	1,000
Americas	0,339	0,446	0,517	0,302	0,762	0,148	0,336	0,565	0,582	0,143
Latin America and the Caribbean	0,443	0,626	0,750	0,453	0,821	0,307	0,554	0,575	0,713	0,224
Northern America	0,155	0,024	0,038	0,035	0,565	0,000	0,000	0,546	0,366	0,000
Arab States	0,655	0,922	0,949	0,995	0,878	0,948	0,257	0,631	0,894	0,516
Asia and the Pacific	0,601	0,892	0,582	0,840	0,798	0,330	0,763	0,732	0,680	0,469
South-Eastern Asia and the Pacific	0,375	0,929	0,466	0,711	0,645	0,146	0,631	0,603	0,505	0,233
Southern Asia	0,878	0,859	0,716	0,999	1,000	0,758	1,000	0,893	0,914	0,757
Europe and Central Asia	0,084	0,163	0,172	0,150	0,238	0,041	0,099	0,157	0,487	0,179
Central and Western Asia	0,305	0,553	0,486	0,639	0,788	0,035	0,336	0,475	0,628	0,280
Eastern Europe	0,075	0,000	0,196	0,000	0,000	0,060	0,041	0,204	0,467	0,278
Northern, Southern and Western Europe	0,000	0,006	0,000	0,047	0,089	0,032	0,056	0,000	0,461	0,071
World	0,565	0,797	0,593	0,713	0,729	0,281	0,624	0,679	0,685	0,464
Low income	1,000	1,000	0,967	0,980	0,997	0,958	0,954	0,990	0,994	0,968
Lower-middle income	0,851	0,859	0,719	0,951	0,926	0,766	0,899	0,881	0,749	0,720
Upper-middle income	0,343	0,840	0,510	0,638	0,746	0,108	0,613	0,599	0,226	0,192
High income	0,065	0,112	0,146	0,154	0,224	0,031	0,025	0,181	0,000	0,074
Δ_{max}	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Δ_{min}	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
ξ	**0,5**									

Table 5 presents the computed values of the Gray Relational Coefficient (ξ= 0,5) as a matrix of Gray Relational Coefficient Matrix (Kj) values.

Table 5. Gray Relational Coefficient Matrix (Kj)

Region	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Africa	0,345	0,344	0,352	0,340	0,350	0,355	0,371	0,341	0,340	0,357
Northern Africa	0,405	0,380	0,465	0,371	0,355	0,416	0,456	0,378	0,366	0,521
Sub-Saharan Africa	0,334	0,338	0,333	0,333	0,348	0,333	0,359	0,333	0,333	0,333
Americas	0,596	0,529	0,492	0,623	0,396	0,771	0,598	0,470	0,462	0,778
Latin America and the Caribbean	0,530	0,444	0,400	0,524	0,378	0,620	0,475	0,465	0,412	0,691
Northern America	0,764	0,955	0,929	0,934	0,469	1,000	1,000	0,478	0,578	1,000

Arab States	0,433	0,352	0,345	0,335	0,363	0,345	0,661	0,442	0,359	0,492
Asia and the Pacific	0,454	0,359	0,462	0,373	0,385	0,602	0,396	0,406	0,424	0,516
South-Eastern Asia and the Pacific	0,571	0,350	0,518	0,413	0,437	0,774	0,442	0,453	0,497	0,682
Southern Asia	0,363	0,368	0,411	0,334	0,333	0,397	0,333	0,359	0,354	0,398
Europe and Central Asia	0,856	0,754	0,744	0,769	0,678	0,924	0,834	0,761	0,506	0,736
Central and Western Asia	0,621	0,475	0,507	0,439	0,388	0,935	0,598	0,513	0,443	0,641
Eastern Europe	0,869	1,000	0,719	1,000	1,000	0,893	0,925	0,710	0,517	0,643
Northern, Southern and Western Europe	1,000	0,989	1,000	0,914	0,849	0,939	0,899	1,000	0,520	0,875
World	0,470	0,385	0,457	0,412	0,407	0,641	0,445	0,424	0,422	0,518
Low income	0,333	0,333	0,341	0,338	0,334	0,343	0,344	0,336	0,335	0,341
Lower-middle income	0,370	0,368	0,410	0,345	0,351	0,395	0,357	0,362	0,400	0,410
Upper-middle income	0,593	0,373	0,495	0,439	0,401	0,822	0,449	0,455	0,689	0,723
High income	0,885	0,817	0,774	0,764	0,691	0,941	0,953	0,734	1,000	0,872

The values of the Gray Relational Degrees matrix are shown in Table 6.

Table 6. Gray relational degrees and grades (GRG)

Region	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	GRG
wi	0,0609	0,1157	0,0832	0,0901	0,1103	0,1276	0,1153	0,0780	0,1135	0,1055	
Africa	0,021	0,040	0,029	0,031	0,039	0,045	0,043	0,027	0,039	0,038	0,350
Northern Africa	0,025	0,044	0,039	0,033	0,039	0,053	0,053	0,029	0,042	0,055	0,412
Sub-Saharan Africa	0,020	0,039	0,028	0,030	0,038	0,043	0,041	0,026	0,038	0,035	0,339
Americas	0,036	0,061	0,041	0,056	0,044	0,098	0,069	0,037	0,052	0,082	0,577
Latin America and the Caribbean	0,032	0,051	0,033	0,047	0,042	0,079	0,055	0,036	0,047	0,073	0,496
Northern America	0,046	0,110	0,077	0,084	0,052	0,128	0,115	0,037	0,066	0,106	0,821
Arab States	0,026	0,041	0,029	0,030	0,040	0,044	0,076	0,035	0,041	0,052	0,413
Asia and the Pacific	0,028	0,042	0,038	0,034	0,042	0,077	0,046	0,032	0,048	0,054	0,440
South-Eastern Asia and the Pacific	0,035	0,040	0,043	0,037	0,048	0,099	0,051	0,035	0,056	0,072	0,517
Southern Asia	0,022	0,043	0,034	0,030	0,037	0,051	0,038	0,028	0,040	0,042	0,365
Europe and Central Asia	0,052	0,087	0,062	0,069	0,075	0,118	0,096	0,059	0,057	0,078	0,754
Central and Western Asia	0,038	0,055	0,042	0,040	0,043	0,119	0,069	0,040	0,050	0,068	0,563
Eastern Europe	0,053	0,116	0,060	0,090	0,110	0,114	0,107	0,055	0,059	0,068	0,831

Northern, Southern and Western Europe	0,061	0,114	0,083	0,082	0,094	0,120	0,104	0,078	0,059	0,092	0,887
World	0,029	0,045	0,038	0,037	0,045	0,082	0,051	0,033	0,048	0,055	0,462
Low income	0,020	0,039	0,028	0,030	0,037	0,044	0,040	0,026	0,038	0,036	0,338
Lower-middle income	0,023	0,043	0,034	0,031	0,039	0,050	0,041	0,028	0,045	0,043	0,377
Upper-middle income	0,036	0,043	0,041	0,040	0,044	0,105	0,052	0,036	0,078	0,076	0,551
High income	0,054	0,094	0,064	0,069	0,076	0,120	0,110	0,057	0,114	0,092	0,850

The Gray Relational Grades (GRGs) are ranked in Table 7.

Table 7. Gray Relational Grades (GRG) of Regions

Gray Relational Grades (GRG)	Region
0,88726	Northern, Southern and Western Europe
0,85040	High income
0,83119	Eastern Europe
0,82134	Northern America
0,75373	**Europe and Central Asia**
0,57668	**Americas**
0,56333	Central and Western Asia
0,55090	Upper-middle income
0,51716	South-Eastern Asia and the Pacific
0,49567	Latin America and the Caribbean
0,46190	**World**
0,44032	**Asia and the Pacific**
0,41329	**Arab States**
0,41153	Northern Africa
0,37743	Lower-middle income
0,36490	Southern Asia
0,35021	**Africa**
0,33856	Sub-Saharan Africa
0,33798	Low income

4. Conclusion and discussion

A reorganized social protection system connected to care policies that can assist people manage changes and grab new possibilities are essential for an inclusive recovery and a decent transition of our economies towards a more digital, greener, fairer, and human-centred future of employment. Social protection systems act as a change tool, aiding in the advancement of decent, productive, freely chosen jobs and creating facilitative conditions

for sustainable businesses while caring for individuals who have been left behind. Put differently, social security is crucial for a labor market focused on people to emerge.

General social protection systems should adapt to new circumstances in order to fulfill its crucial supporting role, particularly with regard to ensuring that all sorts of workers are adequately covered. In this context, establishing a social protection floor that guarantees everyone has access to healthcare and a basic level of financial security is a primary priority. Establishing these basic protections for social security is necessary for a revolutionary approach that puts the person at the center of government.

The COVID-19 pandemic has brought into sharp relief the vulnerability of those who are not adequately protected from the social and economic consequences of the disease. Governments over the world have launched social protection measures in an effort to secure citizens' access to healthcare, stable jobs, and sufficient incomes in the wake of the crisis. Many short-term fixes have run out, and amount of money received have frequently been insufficient to provide a minimum standard of living. As a result, many people have remained at risk since these methods have not offered sufficient assistance for a complete recovery.

The aims of the study are to raise knowledge of the structure of regional and global social protection systems and to add to the literature on technique by utilizing the CRITIC based GRA method, one of the MCDM approaches. The 2020-2022 International Labour Organization social protection indicators were also employed to analyze and compare the regions and income groups. Since the Gray relational analysis method has not been utilized to analyze social protection statistics in a worldwide in terms of geographical regions before to this research, it offers a novel approach to the current literature.

The ten indicators from the ILO Social Protection Database 2022 Main Report included in the research have not been analyzed using MCDM or any other approach. Therefore, this is one of the study's objectives and its contribution to the current literature. A review of the literature reveals that generally a subset of indicators has been commonly utilized to evaluate social protection management techniques. This research was designed and conducted with these factors in mind. According to the CRITIC weighting method results, elderly persons, children, and individuals with work-related injuries are the most influential factors in determining the social protection evaluations. Other important indicators include, respectively, labour force covered by pension scheme (active contributors), unemployment, SDG 3.8.1 - universal health coverage, people with severe disabilities, mothers with newborns, vulnerable people covered by social assistance, SDG indicator 1.3.1 - population covered by at least one social protection benefit, and SDG

indicator 3.8.1 - universal health coverage (excluding health). Considering the extent of each social protection indicator, this is one of the few studies that evaluate regions and income groups in terms of the assistance they offer to various social groups. Also, the CRITIC weights of the indicators for seniors, children, workers in case of job accident, labour force covered by pension system (active contributors), and unemployed are pretty close.

The regions of Northern, Southern, and Western Europe have the highest values in interregional comparisons. Conversely, Sub-Saharan Africa and Low income are ordered at the bottom of the ranking. This outcome is mostly due to the fact that they are able to devote a smaller budget to relevant infrastructures than other regions. As income groups of regions and groups and income per capita rise, social assistance programs seem to become more inclusive and satisfying. Therefore, whereas Europe and the America are well ahead of other areas in this respect, Africa may be regarded to have the worst circumstances. When Northern, Southern, and Western Europe, High Income, Eastern Europe, and Northern America are compared based on their GRA ratings, there is no clear superiority between them, and their values are quite near. North America, on the other hand, has much higher GRA ratings and indicator values than other areas in the Americas.

In order to better comprehend the significance of social protection management on a global and regional scale, it is important to highlight certain considerable facts and conclusions from the ILO World Social Protection Database 2022 in terms of the indicators used in the research. The mean coverage ratios in Europe and Central Asia (83.9%) and the Americas (64.3%) are higher than the worldwide average, but Asia and the Pacific (44.1%), the Arab States (40.0%), and Africa (17.4%) have considerable coverage insufficiency compared to the global standard. It has been shown that severe lack of investment in social protection is linked to inclusion, comprehensiveness, and adequacy gaps in social protection systems, especially in Africa, the Arab States, and Asia. On average, countries allocate 12.9% of their GDP on social security (not including healthcare), yet this average hides enormous disparities. In comparison, upper-middle-income nations spend 8%, lower-middle-income countries spend 2%.5%, and low-income countries spend 15 times as much as high-income countries (1.1 per cent). A growing number of nations are putting in place social protection systems, yet there are still huge holes in coverage, comprehensiveness, and appropriateness. According to the Sustainable Development Goal indicator 1.3.1, just 46.9% of the world's population receives some kind of social protection, leaving an estimated 53.1%, 4.1 billion people, completely vulnerable. Since the start of the COVID19 crisis, the funding gap in social protection has expanded by almost 30%. This refers to the amount of money needed to correct gaps in the coverage, comprehensiveness, and sufficiency of social protection in order to guarantee a basic level of support for everybody. Lower-middle-income

countries would be required to invest an additional US $362.9 billion per year and upper-middle-income countries would be required to invest an additional US$750.8 billion per year, equivalent to 5.1 and 3.1 per cent of GDP respectively for the two groups, while low-income countries would need to invest an additional US $77.9 billion, equivalent to 15.9 per cent of GDP. Social protection spending data for children from 133 countries shows that, on average, 1.1 percent of GDP is allocated to child payments. Once again, there are significant regional differences, with the percentage falling to 0.1% in low-income nations and rising to 1.2% in high-income ones.

The current period is the moment for contemporary and sustained efforts to realize the objectives of 2030 Agenda. Central to a future focused on people is the realization of the right to social security for all, the eradication and prevention of poverty, the reduction of multiple and intersecting inequalities, the enhancement of human potential and productivity, the promotion of solidarity and fairness, and the revitalization of the social contract. Thus, achieving that better future will need significant investments in social safety programs.

Women in informal labor, migrant workers, and the forcibly displaced confront many forms of discrimination and are particularly at risk due to the absence of protections. Social insurance, tax-financed systems, or a mix of the two, must be rapidly extended to the uninsured as a means of lowering their vulnerability and fostering good employment. The human right to social security cannot be fulfilled unless we find a way to progressively provide comprehensive social protection against all possible dangers and uncertainties. Only 30.6% of people of working age have access to legally mandated social security programs that provide all available benefits.

Robust and comprehensive social protection benefits are crucial for attaining the Sustainable Development Goals. The extension of social protection to persons in the informal sector and the facilitation of their transfer to the formal economy is crucial for addressing decent work deficiencies and reducing the strain on non-contributory social protection support. Also, in order to provide sufficient social security for all citizens, it is necessary to address inequities and insecurities in the labor market, such as the salary and employment difference between men and women. Those with a sporadic work history or low income may be able to get a sufficient benefit via the use of basic benefit requirements or caring payments.

It is impossible to put rights of children into practice without social protection measures. In addition to ensuring that all children are given the opportunity to grow to their fullest potential, the social protection systems also help families meet their basic needs for food, shelter, and medical care.

The widespread effects of the COVID19 pandemic demonstrated the

need of unemployment insurance programs in guaranteeing a stable income for employees and their families. Unemployment insurance and other employment protection programs may assist reduce the negative effects of shutdowns on businesses and their employees.

Access to quality employment and, by extension, sufficient unemployment insurance, is particularly difficult for young people, individuals with disabilities, elderly people, women, the long-term jobless, and those engaged in flexible work arrangements. Even more work is needed to update unemployment protection programs to encompass employees in all industries and better coordinate with job services. For effective protection against unemployment, it's also important to strengthen social discussion and implement policies for the transition to the formal sector.

One of the most effective ways for nations to secure redistribution and eradicate different injustices in societies is via pension systems, which are both the expression and product of social solidarity when they are supported sustainably with proper consideration to social fairness and equality. Also, protecting employees in the informal sector from accident on the job is still a significant concern.

Greater allocation of resources toward social protection systems is not a far idea for the long term, but a necessary need right now. Investments in nationally defined social protection action plans need to be prioritized to meet SDG targets 1.3 and 3.8, and realize the promise for high human development with high growth. When a country lacks the necessary fiscal and economic infrastructure, rapid growth calls for international coordination and local funds transfer.

There has been considerable success in expanding health care coverage, with over 2/3 of the world's population being covered. However, those in the lowest income group and those living in rural regions have unique obstacles when it comes to affording the healthcare they need. While there has been a growth in people covered, appropriateness has received less focus in certain areas. The COVID19 situation brought to light the insufficiency of benefits and the necessity to reduce OOP costs. It's essential to fund the expansion of accessible healthcare options. The COVID19 pandemic has shed new light on the need of funding healthcare and enhancing inter-system cooperation. In addition to these, the pandemic has showed the difficulties of keeping, and satisfying highly well trained and skilled health staff and doctors.

Consequently, the objective of this study is to contribute methodologically and content to the literature and to assist policy makers in establishing action plans. It is expected that the results of future research using the same or other approaches with up to date data would be compared to those of this study.

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CHAPTER 8

ANOMALY DETECTION WITH MULTIPLE REGRESSION USING DUMMY VARIABLES: CASE OF NET WORKING CAPITAL TURNOVER RATIO

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1. INTRODUCTION

The main aim of a company is to survive and every surviving company wants to maximize its profits by growing economically. Financial statements are one of the key indicators of financial health of company, showing not only company's current situation, but also growth and also potential to grow. Financial statements are the main documents to see the actual situation of a company.

Financial statements provide crucial information about firm, including its position and performance (Monea, 2019: 64). This information is very important for all stakeholders of a company. Managers use financial statements to measure their performance. Investors use financial statements to make their investment decisions. Auditors use these statements to control the company's operations. In this point of view financial statements are the main output of an accounting period and input of financial analysis and decision making process (Monea, 2019: 68).

In the process of assessing financial statements, the most used method is ratio analysis. In the literature financial ratios are classified in 5 groups namely, liquidity ratios, solvency ratios, activity ratios, profitability ratios and operating ratios (Singh & Schmidgall, 2002: 203).

Liquidity ratios are focused on the company's ability to meet short-term obligations and debts. Current ratio, quick ratio, working capital ratios are mostly used types of liquidity ratios in ratio analysis.

Solvency ratios gives signals about ability of company to meet long-term financial obligations and debts. Debt-to-equity, debt-to-assets, operating cash-flow to total liabilities ratios are the examples of solvency ratios.

Activity ratios measures the effectiveness and efficiency of company in the use of enterprise's assets. In other words, activity ratios which are also called asset utilization ratios, measure ability of company assets to generate revenues (Monea et. al. 2010: 1). Total assets turnover, fixed assets turnover, inventory turnover, average collection period are main ratios which can be classified as activity ratios.

Profitability ratios shows company's efficiency in generating profits from its operations and investments. These ratios are the indicators of financial health and effective profit-making (Lesakova, 2007: 1). Profit margin, return on total assets (ROA), return on equity (ROE), gross margin are the examples of ratios which can be considered as profitability ratios.

Operating ratios are focused on management's efficiency on operations of the company. Number of days payable/receivable, total asset turnover are examples of operating ratios.

Although some ratios are considered better as they increase or de-

crease, evaluating ratio values by comparing previous values or market averages is the best way to decide about the performance of the firm.

From the point of view of auditors, financial statements are the main documents to examine. On the other hand, these statements and their extensions can cause a heavy workload especially in big companies. Auditors and forensic accountants uses and develops some investigative techniques for verifying sources of anomalies which are mostly manual and depend on human expert knowledge (Shinde, 2022: 1). There are some methods that auditors use in these situations one of which is anomaly detection. Anomaly detection, which can be called also outlier detection or novel detection, is used for classifying data to find misstatement or unexpected situations (Stibor et. al., 2005: 263). We will use multiple regression with dummy variable for this process.

In this study, we focus on one of the liquidity ratios, net working capital turnover ratio. This ratio (NWCTO) is a comparison between sales and net working capital, showing how effectively net working capital is used in terms of turnover (Lubis et. al., 2018: 272). Aim of this study is to model net working capital turnover for a certain period, which can help stakeholders and auditors to determine the anomalies in financial statements.

This study is organized in 4 sections. In the first part of the study, net working capital turnover ratio is introduced and a brief literature review is given about the ratio. In the next section, information about the data used and the methodology can be found. In the third section, results of analysis are presented and in the final section, conclusion part exists.

2. NET WORKING CAPITAL TURNOVER RATIO

Liquidity, which is described as the ability of a company to convert its assets to cash (Malik et. al., 2016: 70), is one of the most important aspects of company financials. Since mismanagement of liquidity can lead to bankruptcy, companies should carefully manage their cash flow and liquidity situations. Especially in 2008 global economic crisis, which is seen as an important milestone in world economy evolution, importance of liquidity management was clarified. Economists generally emphasized that the world economy faced a liquidity problem and it evolved into a global economic crisis (Costea & Hostiuc, 2009: 254).

Since financial statements are the main documents showing the actual condition, liquidity should also be followed by them. Current ratio and net working capital are the mostly used liquidity ratios. While current ratio shows the proportion of current assets to short-term liabilities, net working capital shows the difference between current assets and short-term liabilities. The formula of net working capital is as below:

Net working capital = Current assets – Short-term liabilities (1)

On the contrary of some ratios, it is impossible to say that the higher net working capital, the better. Banos-Caballero et. al. (2012: 518) support that net working capital management is crucial since it affects a firm's profitability, risk and eventually value of the firm. Although it is argued as more aggressive working capital management, which means holding low working capital, results in higher profit including higher risk simultaneously, subsequent studies show that working capital has an inverted u-shaped relation on performance of the firm (Banos-Caballero et. al., 2014: 332). This means there should be an optimal point for any company, which can be change according to the firm characteristics.

When companies hold higher net working capital, they can miss investment opportunities or sales by not making new investments or not buying raw materials. On the other hand, if companies hold lower net working capital by using cash on sales or investment, they can face difficulties in payments especially in short-term. Since the latter is a nightmare for companies with a possible end of bankruptcy, they want to avoid this situation as far as possible. In this point, to find the optimal level of working capital, another ratio shows up namely net working capital turnover ratio.

Net working capital turnover ratio shows the efficiency of the working capital held for a certain period by connecting net working capital with sales (Lubis et. al., 2018). In other words, net working capital turnover ratio shows the number of sales which can be obtained for each unit of working capital (Sutanto & Pribadi, 2012: 294). The formula of net working capital turnover ratio is as follows (Akdağ & İskenderoğlu, 2018: 19).

Net Working Capital Turnover = Net Sales / Average Net Working Capital (2)

Here, average net working capital refers to average of current period's and last period's net working capital values. As seen from the formula, the relationship is conducted between sales and working capital (Wijaya & Alvin, 2021: 245). There are various studies involving net working capital turnover ratio because it can be interpreted as the best way of determining the effectiveness of net working capital (Apan & İslamoğlu, 2018: 554).

In the literature, this ratio is mostly used for its effect on profitability or firm value and scholars try to find the relationship between the results and working capital turnover level. Yousaf & Bris (2021: 53) supports that net working capital turnover ratio has a positive impact on financial health of companies. They study the effect of the net working capital turnover ratio on bankruptcy risk in Czech companies and come to a finding that the higher ratio the better.

Nelly and Toni (2020: 1848) investigate the effect of net working capital turnover rate on profitability for food and beverage companies in Indonesia Stock Exchange and reach the result of partial effect of it.

Rico and Rahman (2018) try to determine the link between corporate governance, net working capital turnover rate and ROE (return on equity). According to the results of the study, corporate governance has a significant positive effect on net working capital turnover and net working capital turnover rate has a significant positive effect on ROE. Also NWCT is determined as a mediator number of joint meetings of board of commissioners' relation to ROE.

Warrad (2013: 119) examines the literature about the impact of net working capital turnover on profitability. Warrad indicates that there are studies showing positive impact of turnover ratio, and also there are studies showing negative impact at the same time. The study also supports that there is a significant impact on the profitability of the company however direction of impact changes according to the sector in which the company operates.

Dash and Ravipati (2009) propose a goal programming model for working capital management. They support that net working capital turnover ratio should be streamlined to profitability.

Previous studies show that net working capital turnover ratio is rigidly connected to profitability of company. In addition to this, there are very limited studies about the control of net working capital turnover ratio or modeling with quantitative techniques. In this study, we will try to model the ratio according to quarterly financial statements in order to find anomalies in the ratio values.

3. DATA AND METHODOLOGY

In this study, quarterly net working capital turnover ratio of a logistics company is modeled by multiple regression analysis with dummy variable for the period between 2014-2020. Multiple regression models are used to determine the effects of two or more independent variables on a dependent variable (Nwankwo & Oyeka, 2013: 43). However, all variables should enter the equation as continuous variable in the use of regression analysis. If dependent variable is categorical, logistic regression models should be used. On the other hand, when independent variable is categorical, to say more specifically if independent variable has subgroups, dummy variables are used in multiple regression analysis (Modupe, 2012: 49). In other words, multiple regression with dummy variables is used to determine the relationship between a quantitative dependent variable and one or more qualitative independent variables. Thus, categorical variables can be included to the

model by the means of dummy variable (Schepers, 2016: 677). When a variable has categories, dummy variables are used on behalf of them.

Dummy variables show the presence or absence of a category or and attribute of variable (Usman et. al., 2015: 7441). For instance, if the regression model includes a categorical variable with 2 categories like gender, a dummy variable can be used as 0 for man, 1 for woman or vice versa. If categorical variable has more than 2 categories, then k-1 dummy variables should be used for k categories (Skrivanek, 2009: 2).

In coding, the observation takes 1 value for the subgroup which it is in, if it is in the last category all dummy variables take the value of 0. Let category has 3 categories, 2 dummy variables are necessary. Let these variables be d_1 and d_2. If observation is in first category, the dummy variable d_1 takes 1 and d_2 takes 0. If observation is in third category, both d_1 and d_2 take 0. In this way, necessary number of dummy variables is equal to number of categories minus one.

Dummy variables were firstly introduced to find the systematic differences which are originated from categories/classes (Brown, 1968: 515). The greatest advantage of using dummy variables is that it reveals both the direction and effect of all categories for a variable and also great predictive power by increasing R^2 (Miller & Erickson, 1974: 426).

The regression model with dummy variable has the following assumptions, which are almost same with multiple regression (Alkharusi, 2012: 203).

1) Errors are independent and normally distributed.
2) All group means lie on a straight line.
3) Errors are not correlated with independent variables.

In this study, data belonging to an international transportation company working in İstanbul/Turkey is used. The company works as forwarder. The industry, in which the firm works, what is done by firm is important for the analysis like all ratio analysis done. As mentioned before, ratios should evaluate by comparing previous years and sectoral averages.

Since firm works as forwarder, the firm does not have much fixed assets. Besides, payment terms are extremely short. Although firms work with long terms of payment, forwarders generally work cash in the line. Since, the firm has to keep cash available all the time, it is expected that working capital turnover ratio can be low for this firm. Besides changes through time is important for our analysis.

For this study, data in years between 2014 – 2020 are used. Firm's net sales, end of period working capital, average working capital and working capital turnover ratio for each quarterly period are as follows in Table 1.

Table 1. Relevant accounts of firm

YEAR	QUARTER	NET SALES	WORKING CAPITAL	AVERAGE WORKING CAPITAL	NET WORKING CAPITAL TURNOVER RATIO
2014	1	51.899.714,83	16.634.806,88	15.243.368,82	3,405
2014	2	109.805.702,85	16.199.191,06	16.416.998,97	6,689
2014	3	170.601.327,45	17.305.743,61	16.752.467,34	10,184
2014	4	233.691.247,55	16.057.178,56	16.681.461,09	14,009
2015	1	69.261.629,20	18.085.334,82	17.071.256,69	4,057
2015	2	146.206.711,73	19.890.825,3	18.988.080,06	7,700
2015	3	230.545.937,87	18.966.549,55	19.428.687,43	11,866
2015	4	315.946.180,54	20.415.217,31	19.690.883,43	16,045
2016	1	76.783.344,78	24.346.768,64	22.380.992,98	3,431
2016	2	168.827.662,30	27.658.573,6	26.002.671,12	6,493
2016	3	261.644.655,53	31.880.029,11	29.769.301,36	8,789
2016	4	357.529.590,33	30.423.510,85	31.151.769,98	11,477
2017	1	96.415.969,01	37.170.218,59	33.796.864,72	2,853
2017	2	209.052.396,33	36.432.662,87	36.801.440,73	5,681
2017	3	333.079.117,23	42.483.992,66	39.458.327,77	8,441
2017	4	457.289.644,51	43.711.676,15	43.097.834,41	10,611
2018	1	136.302.704,37	45.943.252,21	44.827.464,18	3,041
2018	2	276.082.097,07	49.296.622,69	47.619.937,45	5,798
2018	3	413.787.051,21	53.909.506,66	51.603.064,68	8,019
2018	4	566.756.320,17	62.512.304,83	58.210.905,75	9,736
2019	1	138.673.678,70	62.337.657,15	62.424.980,99	2,221
2019	2	289.173.281,92	73.530.054,23	67.933.855,69	4,257
2019	3	445.531.739,29	80.657.328,38	77.093.691,31	5,779
2019	4	609.176.768,58	64.634.803,12	72.646.065,75	8,386
2020	1	164.884.531,63	79.737.714,9	72.186.259,01	2,284
2020	2	326.409.399,23	86.126.420,95	82.932.067,93	3,936
2020	3	477.675.521,43	81.808.520,02	83.967.470,49	5,689
2020	4	657.377.636,58	62.776.733,13	72.292.626,58	9,093

Aim of this study is to model the trend of working capital turnover ratio with multiple regression including dummy variables. Therefore, we give periods numbers as 1 to 28 to see the time effect (trend), and dummy variables to see the quarter effect. From this point, model is as follows:

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 \quad (3)$$

x_1: time period; 1, 2, 3, … ,28.

x_2: quarter 1 (dummy); if actual quarter is 1, 1; if not, 0.

x_3: quarter 2 (dummy); if actual quarter is 2, 1; if not, 0.

x_4: quarter 3 (dummy); if actual quarter is 3, 1; if not, 0.

With this coding system, all periods are shown below:

Table 2. Coding for Multiple Regression Analysis

YEAR	QUARTER	PERIOD (t)	Q 1	Q 2	Q 3	YEAR	Q	PERIOD (t)	Q1	Q 2	Q 3
2014	1	1	1	0	0	2017	3	15	0	0	1
2014	2	2	0	1	0	2017	4	16	0	0	0
2014	3	3	0	0	1	2018	1	17	1	0	0
2014	4	4	0	0	0	2018	2	18	0	1	0
2015	1	5	1	0	0	2018	3	19	0	0	1
2015	2	6	0	1	0	2018	4	20	0	0	0
2015	3	7	0	0	1	2019	1	21	1	0	0
2015	4	8	0	0	0	2019	2	22	0	1	0
2016	1	9	1	0	0	2019	3	23	0	0	1
2016	2	10	0	1	0	2019	4	24	0	0	0
2016	3	11	0	0	1	2020	1	25	1	0	0
2016	4	12	0	0	0	2020	2	26	0	1	0
2017	1	13	1	0	0	2020	3	27	0	0	1
2017	2	14	0	1	0	2020	4	28	0	0	0

As seen in Table 2 time period is coded (x_1) from 1 to 28 independently from the year. This variable is added to the model to add the time effect. The variables x_2, x_3, and x_4 show that period belongs to a certain period of the year and if the period is 4th quarter of the year all x_2, x_3, x_4 variables took the value of 0 which means that period is not the 1st 2nd or 3rd quarter of the year. As mentioned before we used 3 dummy variables for 4 quarter of a year.

4. FINDINGS

Multiple regression with dummy variables is applied to the data. Results are given below:

Table 3. Results of Regression Analysis

R	0,957
R^2	0,915
St. Error of Estimate	1,14

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	324,033	4	81,008	62,292	0,0001
Residual	29,910	23	1,300		
Total	353,944	27			

Model	Coefficient	St. Error	t	Sig	Lower Bound (%95)	Upper Bound (%95)
Constant	14,250	0,610	23,378	0,0001	12,989	15,511
time	-0,182	0,027	-6,755	0,0001	-0,238	-0,126
Quarter 1	-8,843	0,615	-14,382	0,0001	-10,115	-7,571
Quarter 2	-5,908	0,612	-9,655	0,0001	-7,174	-4,642
Quarter 3	-3,125	0,610	-5,121	0,0001	-4,387	-1,863

According to the results of analysis, regression model is;

$$y= 14{,}250 - 0{,}182\ x_1 - 8{,}843\ x_2 - 5{,}908\ x_3 - 3{,}125\ x_4 \quad (4)$$

R^2 of model is 0,915 which means model can explain the 91,5 % of changes in the dependent variable. Actual values of net working capital turnover rate and predicted values are given in figure 1.

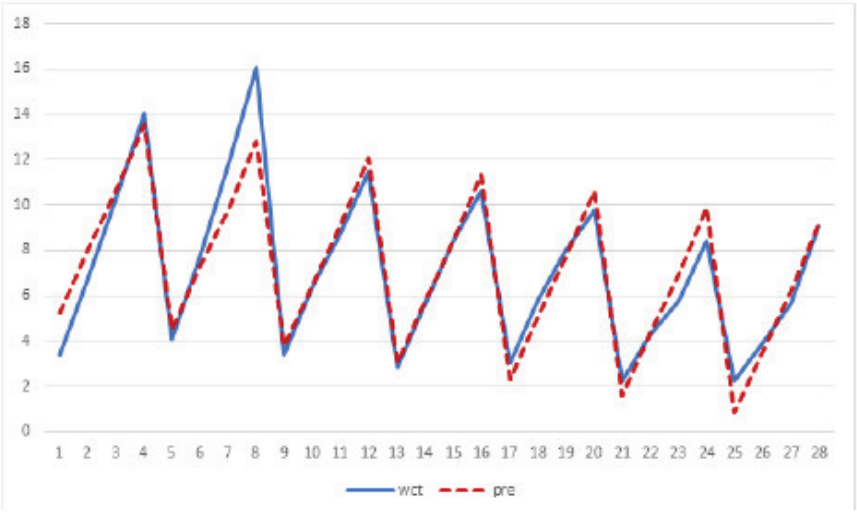

Figure 1. Actual values and predicted values of net working capital turnover ratio

However, the year 2015 (periods 5-8 in Figure 1) remains outside of this generalization and is one of the points where there is inconsistency (anomaly) according to the model. In 2015, the firm bought a fixed asset by using liquid assets and this situation caused and upward anomaly in the net working capital turnover ratio.

In this period while sales of the firm increasing by % 35 compared to the previous year, current assets decreased thanks to the purchase of fixed asset. This transaction caused the net working capital turnover ratio to be high according to the expected value for the periods 6-8 (between second and fourth quarters of 2015).

2019 is the second year which includes anomaly according to the model. In this year the firm sold its fixed asset, and also started a project about system software which makes an extra cost. Sales in this year increased by 7% compared to the previous year. While the increase in net sales was higher in previous years, it remained low this year compared to previous periods. This two processes had a downward effect on the net working capital turnover ratio. These effects can be seen in periods 23 and 24 in the Figure 1.

As explained above, net working capital turnover ratio can be modeled successfully in the course of time for a certain period, and if there are anomalies according to the model these periods should be investigated. Since net working capital turnover ratio concerns about current assets, short-term liabilities and sales at the same time, control of these three accounts can be provided with the control of this ratio. This can be a convenient way for not only auditors but also creditors and investors.

5. CONCLUSION

Ratio analysis is the mostly used method to assess financial statements which show the actual position and performance of companies. Financial ratios are important for every stakeholder of firms. Beyond being an output of an accounting period for the firm, ratios are the input of investment and decision-making process.

After the global economic crisis in 2008, importance of cash flow management is understood better. According to most economists, liquidity problems of big corporates sparkled the trouble which lead to a big global economic crisis. That's why companies are more careful about liquidity management after all.

Current ratio and net working capital are the main liquidity ratios. In this study, we used net working capital turnover ratio which not only shows the working capital situation but also links it with sales. In other words, net working capital turnover ratio shows the efficiency of working capital held by the company.

In this study we modelled net working capital turnover ratio of a firm for 7 years (28 quarters). Since the ratio calculated with the accounts taken from both balance sheet and income statement, values of it follow a yearly cycle.

According to the results, the firm, which is investigated in this study, has a decreasing trend for net working capital ratio. This situation can be explained by the growth on net working capital is bigger than sales growth.

It is seen from analysis that net working capital turnover ratio can

be successfully modelled with multiple regression with dummy variables since R^2 of the model is 0,915 which means model meets changes in the ratio at 91,5 percent. By this way, anomalies according to the model can be investigated taking the account of problems about liquidity or sales decreases. Thus, investors or auditors can focus on these periods for their decision.

This process shows us multiple regression with dummy variables can be used in quarterly ratio analysis, in addition to yearly trend analysis. We used only for net working capital turnover ratio, other ratios can be modeled by this method for further studies.

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CHAPTER 9

A SYSTEMATIC REVIEW OF THE LITERATURE ON THE ANTECEDENTS OF CONSUMER VULNERABILITY AND A CLASSIFICATION ATTEMPT

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Introduction

One of the earliest and most widely accepted attempts to conceptualize consumer vulnerability has been put forward by Baker et al. (2005). According to the authors, "Consumer vulnerability is a state of powerlessness that arises from an imbalance in marketplace interactions or the consumption of marketing messages and products. It occurs when control is not in an individual's hands, creating a dependence on external factors (e.g., marketers) to create fairness in the marketplace. The actual vulnerability arises from the interaction of individual states, individual characteristics, and external conditions within a context where consumption goals may be hindered, and the experience affects personal and social perceptions of self" (Baker et al., 2005, p. 134). Studies on consumers who experience vulnerability have frequently noted how difficult it is to define vulnerability while also acknowledging that doing so is essential to identifying vulnerable populations and, ultimately, helping them. Despite this, there is still a lack of a precise, concise, and modern definition of vulnerable customers (Hill & Sharma, 2020).

In addition to the lack of studies describing and conceptualizing consumer vulnerability, research exploring the antecedents of the concept is still scarce. Therefore, this study attempts for the first time to review the studies examining the antecedents of consumer vulnerability, summarize how the antecedents affect the emergence of the concept and classify them systematically according to their nature. A bird's eye view of the factors that reveal consumer vulnerability is presented, grouped, and summarized in the study. This bird's-eye view can give researchers an insight to see undiscovered precursors more easily and find areas to explore. In addition, practitioners can gain insight into the strategies they will develop and the measures they can take to prevent consumer vulnerability.

The next section of the study presents the methodology, followed by the classification and explanation of the antecedents of consumer vulnerability. Afterward, the study was concluded by giving the discussion and conclusion part.

Methodology

In this study, the literature on consumer vulnerability published until August 2022 was reviewed in all accessible academic databases such as Web of Science, Scopus, Ebsco, ScienceDirect, JSTOR, and Google Scholar. The purpose of the review was to identify the studies investigating the antecedents of consumer vulnerability. Therefore, keywords such as "consumer vulnerability" and "antecedents of consumer vulnerability" were used for the search. In the next step, all the studies that could be found were examined to identify the studies investigating the antecedents

of the concept. Based on the review, it was concluded that 40 studies have investigated the antecedents of consumer vulnerability. Then, these studies were examined in detail using the content analysis method to classify the antecedents of consumer vulnerability according to their nature.

O'Connor et al. (2019) focused only on financial vulnerability and classified the factors that cause financial vulnerability as objective and subjective factors. According to the authors, the consumer's internal variables, which cannot be evaluated independently, are called subjective factors (e.g., awareness and confidence). External to the customer are objective factors, like the facts that the consumer may report or that may be acquired from a third party (e.g., savings and credit history). Perceptions versus facts are the key distinction between subjective and objective aspects. In contrast to subjective factors, which are based on an individual's evaluation of personal feelings, views, and perceptions, objective factors are evaluated by facts gathered independently of an individual's thoughts, opinions, and perceptions. For instance, whereas subjective age is dependent on how young or old one feels, objective age is determined by the year of birth (O'Connor et al., 2019). This conceptual approach forms the basis of the classification attempt in this study. Based on this approach, the antecedents of consumer vulnerability were classified into two main groups: objective (observable) antecedents and subjective (perceived) antecedents.

Antecedents Of Consumer Vulnerability

Objective (Observable) Antecedents of Consumer Vulnerability

Many studies on consumer vulnerability focused on objective or observable antecedents. When the studies were examined in detail, it was seen that all of them except one could be included in three main sub-groups: studies focusing on consumer disabilities and health concerns, studies on demographic variables, and studies examining the objective antecedents of consumers' financial vulnerability. The only study that could not be included in any of these sub-groups is by Baker et al. (2007) and it investigates natural disasters such as tornados, tsunamis, or hurricanes as antecedents of vulnerability. Authors claim that consumers lose their beloved ones, their financial assets, or wealth because of such natural disasters and become vulnerable, and such a vulnerability is experienced by many people as a shared experience. The study aims to shed light on how people give a collective response, and the society is transformed by vulnerability.

Disabilities and Health Concerns

The first sub-group of studies on consumer vulnerability investigates consumers' disabilities and other health concerns. Munoz-Mazon et al. (2021) examined the vulnerability of a special group of consumers with celiac disease (CD) and non-celiac gluten sensitivity (NCGS) from a tour-

ism services perspective. The study revealed that food is a very critical part of a trip for these groups of consumers, and they perceive a high-level risk due to their vulnerability. Thus, they spend much more time on information searches before their trips and tend to use personal and online sources of information.

Beudaert and Nau (2021) investigated consumer vulnerability from the perspective of time. Data were collected from 51 people with motor or hearing disabilities through interviews and the findings revealed the effects of time on consumer vulnerability. First, disabled people were found to be slow in their actions, to become tired quickly, and thus, to feel having little time for consumption. Moreover, the study showed that they face problems in synchronizing their time with other people's and society's time, and that makes them vulnerable during consumption.

Small et al. (2020) investigated the vulnerability of individuals with disabilities from a social marketing perspective. The authors claimed that individuals with disabilities and their carers experience vulnerability in many ways, and their vulnerability originates from the nature of the disability and deterioration in their social relationships due to being disabled. Moreover, conflicting interests of the people living with a disability and their carers, and the complexity of some policies applied by the government contribute to the vulnerability of people living with a disability.

Pavia and Mason (2014) reviewed some specific examples and identified three aspects of capability to reorganize, period, and steadiness of the core contest to understand the situations that result in vulnerability. Based on these dimensions, the situations were categorized as straightforward resolvable, complex resolvable, straightforward unresolvable, and complex, dynamic unresolvable. The authors also examined how the somatic, mental, and behavioral impairments affect the market preferences and elasticity, and concluded that the marketplaces all over the world have become more complex and this complexity makes impaired people more vulnerable.

Benet and Kraft (2019) explored consumer vulnerability in the context of addiction and questioned the impact of tanning addiction on vulnerability. The authors claimed that individuals addicted to tanning should be more motivated to gain attractiveness and gain social approval for their appearance. They should also tend to conform to the social norms of appearance imposed by the media. This should make them more psychologically vulnerable and less physically vulnerable. The findings supported the authors' claims, and according to the results, tanning addiction increased consumers' psychological vulnerability but decreased their physical vulnerability.

In a qualitative study, Eskytė (2019) investigated the contribution of consumer information to vulnerability. The author collected data through

in-depth interviews with 38 people with mobility, hearing, cognitive, or multiple disabilities to gain insight into whether a major cause of a consumer's vulnerability is deterioration. The results showed that the structure of the markets and the practices of companies prioritize consumers without disabilities, externalizing consumers with disabilities and thus increasing their vulnerability. From a consumer information perspective, the findings revealed that businesses' information provision practices only attach importance to non-disabled consumers by excluding disabled people and that consumers with disabilities do not have access to adequate information about options, opportunities, or where they can find products. This situation negatively affects people with disabilities to perceive shopping as a leisure activity, socialize while shopping, or participate in the shopping process.

Mansfield and Pinto (2008) questioned a financial issue, credit card information, as a source of vulnerability for individuals with developmental disabilities, who are a special group of people with impairments. According to the authors, these individuals face many problems in daily routines because of their incapacity in learning, understanding, and living independently, which makes it harder for them to participate in routine purchasing activities. As a result, they are vulnerable in many cases, including financial issues. The findings of the study demonstrated that developmentally disabled individuals have a very limited understanding of what a credit card is, how the process of the credit card system goes, and the consequences of unpaid debts, despite owning a credit card. Because it is not possible to increase their understanding, the authors suggested that these people should be protected from the possible vulnerabilities created by card issuers, by an advocate who works on their behalf.

Another qualitative study by Falchetti et al. (2016) on people with impairments searched for the effect of blindness on consumer vulnerability. The in-depth interview results of 16 participants showed that blindness caused vulnerability, and the level of vulnerability faced by blind people changed depending on two groups of factors: internal and external factors. Participants highlighted emotional health, tolerance, confidence, depression and anxiety indicators, and intolerance about their impairment as internal causes. External variables contributing to blind people's vulnerability included consumption that facilitates societal assistance, the social environment, and features of the markets such as physical access, product and service knowledge, and staff service quality.

Demographics and Other Personal Variables

Studies in this subgroup investigated demographic variables such as age, gender, income level, and some other personal variables as anteced-

ents of consumer vulnerability. Among those, a significant pile of studies has investigated age as an antecedent of vulnerability. For instance, Ford et al. (2019) explored the effect of aging on food consumption and how the reduction of food consumption contributes to the vulnerability of elderly individuals. The data from 20 elder people gathered by the interviews demonstrated that as age increases, the amount of food consumption decreases, resulting in an increased perception of dissatisfaction because of food wastage. These feelings often were translated into a perception of vulnerability that occurs as a negative result of the aging process. According to the authors, the availability of smaller and more convenient food portions in markets contributes to reduced waste, easier achievement of consumption targets, and less perceived vulnerability by consumers. Roy and Sanyal (2017) also approached vulnerability from an age perspective. The authors gathered data through interviews with 50 elderly individuals to offer a better insight of consumer vulnerability for old people. They created a conceptual model that consists of five dimensions: physical, financial, social, technological, and service vulnerability. Furthermore, the authors revealed significant relationships between consumer vulnerability and elements including the cost of the search, how well the choice was made, how much was consumed, and overall pleasure. Berg (2015) assumed that older people are relatively more vulnerable. The author analyzed the interviews with 2100 individuals and concluded that this assumption is wrong. Even though older adults have several diminished abilities that may make them vulnerable, they appeared to be less prone than other age groups to make poor market judgments. Older generations also consume in a far more ecologically responsible manner than younger generations. Individual vulnerability factors seemed to be a lack of financial understanding and time. The findings also show that individuals with poor calculating abilities, as well as those who live in homes with little financial means, are more prone than others to make financially unwise shopping decisions. Griffiths and Harmon (2011) investigated the vulnerability of older people on the subject of informed consent. According to the authors, understanding the elements that influence aging customers' decision to transfer control to a service provider is key to resolving the challenge of obtaining valid informed consent from them. They stated that consumer vulnerability is increased by factors including cognitive disability, financial difficulties, and sensory alterations and these changes may make it difficult for an aged consumer to understand informed consent completely. Thus, consumers who are aging have a great desire for their service providers to be trustworthy because greater vulnerability might have a detrimental influence on acquiescence to informed consent, and the dedication–confidence relationship between the service provider and the customer is crucial. As a result, service providers must ensure that proper criteria are established to assist reduce the vulnerability that aging customers face.

Melnikas and Smaliukiene (2007) investigated a special kind of vulnerability, that is pharmaceutical consumer vulnerability. The effects of demographic variables such as age and gender on pharmaceutical consumer vulnerability were revealed by the findings. For instance, pharmaceutical consumer vulnerability was found to be significantly higher for the age group of 46-65 than others. Moreover, pharmaceutical consumer vulnerability of women caused by misleading promotional information was at a higher degree than men.

Ássimos et al. (2021) examined the consumer vulnerability of individuals between the ages of 18 and 24 concerning food consumption. The results showed that the vulnerability of young people also varies with their demographical characteristics such as sex, family income, and education. Besides, nutritional interest and seven vulnerability dimensions (product knowledge, promotion/advertising, social compression, refund procedures, marketing, psychological strain, capacity for differentiation, and aptitude for acquisition), sex, education, income, and body mass index were found to have significant relationships.

Adkins and Jae (2010) scrutinized the interactions between consumer vulnerability, consumer empowerment, immigration, and acculturation, and specifically questioned the impact of limited English proficiency on consumers' vulnerability. The authors argued that understanding the vulnerabilities of immigrants with limited English proficiency requires understanding their acculturation processes, and they used the acculturation processes to construct general system diagrams that depict the vulnerability of consumers with limited English proficiency.

In addition, gender identity, another important demographic variable, has been argued by McKeage et al. (2018) to be an important variable in shaping consumer vulnerability. It is thought that gender identity creates the link between social and marketing norms and determines how consumers use marketing offers while realizing their gender identity and how this restricts them. In addition, consumers use gender identity to question the market's ability to identify people and groups. Therefore, gender identity plays an important role in the emergence of many cases of vulnerability.

According to Stewart and Yap (2020), contrary to popular belief, low literacy does not inherently imply market vulnerability. Many people have developed adaptive coping mechanisms that are jeopardized when well-intentioned measures constrain their independence of preference, impair their independence, and propagate the illiteracy shame. As a result, while policies begun from a class-based viewpoint are effective in helping low-literate customers who are judged most vulnerable, they do so at the expense of those who are less susceptible. Similarly, policy interventions

based on a state-centric approach are effective in strengthening the most vulnerable members of this group, but only at the expense of those who are regularly harmed.

According to Laufer and Gillespie (2004), females criticize a firm for a product damage problem to a greater extent than men, for the reason that they feel more vulnerable in case of a comparable disaster taking place. In contrast, the study by Fowler et al. (2016) revealed that male models consider themselves as vulnerable as a result of being subservient to other members of the advertising profession, including stylists, makeup artists, administrators, customers, and female models. Even as the shifting quality of 'masculinity' throughout the world has opened many doors for male models, the authors discovered that the advertisement business's rules necessitate a significant transformation of the models' masculine understanding of oneself.

The effects of demographic variables on financial vulnerability have been a subject of many studies. For instance, Sabri et al. (2021)578 useable responses were collected and data were analyzed using partial least square structural equation modeling. The empirical results revealed that i studied the factors shaping financial vulnerability. A questionnaire-based survey was conducted, and in total, 578 useful replies were gathered. The results showed that financial literacy affected financial behavior favorably, whereas financial behavior influenced financial vulnerability adversely. Furthermore, gender moderates the association between financial behavior and financial vulnerability, whereas financial behavior mediates the relationship between financial literacy and financial vulnerability. De Clercq et al. (2011) concentrated on endogenous and exogenous financial vulnerability factors. Endogenous predictors of consumer financial vulnerability discovered include over-indebtedness, poor monetary forecasting, and customers overspending their income. Negative economic conditions, age, and demographic group are examples of exogenous variables. According to Daud (2019), demographic factors such as income level, marital status, age, degree of education, and financial behavior affect financial vulnerability. Financially vulnerable individuals are younger, less educated, and engage in financial misbehavior. Another study investigated financial vulnerability from the viewpoint of stakeholders and claimed that stakeholders blame information inadequacy and misbehaviors to be the foundation of consumer vulnerability (Overton & Fox O'Mahony, 2018)it promised to adopt a new approach to its "consumer protection" objectives. This shift included articulating a new conception of consumer vulnerability, beyond narrow, individualistic, conceptions of vulnerability based on (limited. Wang and Tian (2014) focused on the vulnerability related to financial services but examined the vulnerability caused by being a rural migrant. According to

the authors, the policies and rules implemented by governments, and the resulting structural barriers, limit the ability of rural migrants to access financial products. The authors stated that governments should take decisions and create policies by seeing the issue from the perspective of rural migrants, even though this study is on financial services, it may be possible to eliminate other areas of vulnerability with such an approach.

Subjective (Perceived) Antecedents of Consumer Vulnerability

Dutta (2012) experimentally investigated the influence of consumers' belief in their pricing expertise in influencing the efficiency of low-price indicators concerning market prices. His initial experiment looked at the impact of customer trust in deciding on the value of low-cost messages. He also tested respondents' trustworthiness and skepticism of low-cost messages. The influence of judgment participation on ratings of confident responders of assurances associated with high offer prices was explored in the second experiment. As a result, consumers fall for low-price signals followed by expensive offers. In addition, the study examined the market pricing for product models in a variety of product types and discovered that low-price assurances are usually associated with prices that are significantly higher than the lowest accessible price (Dutta, 2012).

Del Bucchia et al. (2021) coined the term "hidden vulnerability" as a new term. According to the authors, consumers perceive empowerment when they communicate with brands through technology-enabled systems. However, through these processes, consumers may face a latent vulnerability hidden in technological infrastructures.

Another study (Hampson, Gong, & Xie, 2021)evidence of the usefulness of consumer confidence indices is mixed. To contribute to this debate, we examine the psychological mechanisms through which consumer confidence does (and does not examined the impact of consumer confidence on perceived financial vulnerability. The authors defined consumer confidence on two dimensions: national consumer confidence and personal consumer confidence. The data from 1.090 participants was used to test the conceptual model via structural equation modeling. The findings demonstrated the effects of national consumer confidence on personal consumer confidence, and its impact on perceived financial vulnerability. Moreover, the external locus of control promotes national consumer confidence.

Glavas et al. (2020) examined the resources related to consumer vulnerability by evaluating the reports of projects funded by the Australian government to support 31.498 poor families in the energy retail industry. The authors put forth three resource bundles that boost the vulnerability of consumers: 1) The connections-resource-bundle represents customers who are looking for social connections and engagement, unfamiliar with the

sector or retail procedures, and, owing to cultural and linguistic difficulties, are neither experienced nor educated about how things go on or how to resolve issues, 2) The convenience-resource-bundle depicts customers who desire quick and easy retail service alternatives due to time constraints in their life, 3) The security-resource-bundle symbolizes customers who are often experienced in years and, as a result of life obstacles, are fairly competent at being frugal and tolerant of greater degrees of discomfort.

Hoffman et al. (2021) studied financial self-efficacy and consideration of future consequences as the antecedents of financial vulnerability. The authors gathered data from 237 participants in an online survey. They claimed that being financially vulnerable stems from facing the risk factors and found that financial self-efficacy and consideration of future consequences diminish the probability of being vulnerable in financial situations and prevent consumers from switching to a higher level of vulnerability.

Robertson et al.'s (2021)and how this influences women's evaluations and intentions. Design/methodology/approach The conceptual framework was tested using quantitative data collected via an online survey of Australian women who have undergone IVF treatment. Hayes' PROCESS macro was used to analyse the data. Findings The results indicate that women's persistent goal-striving alongside their perceived personal sacrifices influence the association between their need for parenthood and their experienced vulnerability. Institutional factors such as IVF clinic technical and interpersonal quality influence these consumers' IVF experience evaluations and word-of-mouth (WoM research aims to empirically analyze the elements that encourage and lessen the perceived vulnerability of women experiencing the transformational service of in-vitro fertilization (IVF), as well as how this affects women's assessments and intents. The findings suggest that women's continuous goal setting, as well as their perceived personal sacrifices, have an impact on the link between their desire for children and their susceptibility. Consumers' IVF experience evaluations and word-of-mouth (WoM) intentions are influenced by institutional variables such as IVF clinic technical and interpersonal quality.

Through field data gathered in Brazil, research by Cordeiro et al. (2019) gives fresh information on the role of gift giving in sustaining a moral economy. The authors highlighted how credits or money may be a heartfelt present that strengthens social relationships while maintaining a moral economy and how changes in the logic of gift giving can create or worsen a self-fulfilling cycle of financial vulnerability. The findings showed both the bright and dark sides of gift giving and its role in boosting or attenuating the financial vulnerability of individuals.

Tanner et al. (2020) investigated vulnerability in terms of access to health services. The study focuses on customers' subjective views of ac-

cess to better understand how subjectively experienced service availability and ease of access interact to shape consumers' access impressions. The authors claimed that PAHS (perceived access to health services) provides insight into the links between access, perceived health vulnerability, and overall health.

Magli et al. (2021) also researched financial vulnerability using data gathered from 428 B40 households. According to the results, internal locus of control and financial knowledge harm financial vulnerability, whereas financial stress has a favorable impact. Only the impact of internal locus of control on financial vulnerability was shown to be completely mediated by financial behavior. Internals must engage in appropriate financial activities to reduce their financial vulnerability.

Batat and Tanner (2021) studied the way adolescents describe their consumption subcultures, the elements boosting their vulnerabilities, and the actors playing a role in experiencing these vulnerabilities. The authors defined the indicators of adolescent consumption subculture as psychographic and psychological factors related to the adolescence stage, transgression, belongingness and socialization, self-esteem and self-concept, self-construction, and digital culture. They also identified structural and experiential drivers such as market/social agents, experiences, social class, and parenting styles and choice drivers such as anti-adult culture, risk availability, and market/social agents.

Saatcioglu and Corus (2016) coined the term "spatial vulnerability," which emphasizes the link between the social production and use of space, social inclusion/exclusion, and, as a result, various geographical disadvantages. According to the authors, spatial vulnerability is a multidimensional state characterized by helplessness, loss of control, and reliance that results from ideological contradictions within the social space.

Guo and Main (2012) found that consumers are more susceptible to a less prototypical persuasion effort than a more traditional one when they are motivated by the defense. As a result, customers are prepared to pay a greater premium for a salesperson who employs a less stereotyped persuasive technique. Consequently, one important component that influences trustworthiness assessments is the stereotypicality of a persuasive attempt. The authors also showed that accuracy motives can reduce the benefit of a less stereotyped persuasive attempt. To put it another way, accuracy motives can shield customers from stereotyped persuasive tactics.

According to Rinaldo (2012), in some cases, advertising limitations may hinder consumer freedom and independence. Consumers may become vulnerable in the marketplace if advertising exposure is limited, which would otherwise supply useful market information. Thus, advertising

should be recognized as a fundamental means of distributing information regarding the marketplace in current and future legislation. Restricted possession of the information related to the market may create vulnerability across multiple consumer groups unless policymakers consider consuming as a fundamental activity in the lives of modern individuals.

Another study on financial vulnerability was conducted with the participation of 590 civil servants in Malaysia (Poh, Sabri, Rahim, & Wijekoon, 2021). The financial vulnerability was shown to be positively connected with factors such as financial attitude and self-efficacy, except for financial literacy. According to the analysis, financial management methods were the strongest predictor. Furthermore, financial management methods were found to significantly mediate the associations between factors and financial vulnerability in a mediation study (Poh et al., 2021).

Discussion and Conclusion

In this study, the literature on consumer vulnerability was scanned through all accessible academic databases such as Web of Science, Scopus, Ebsco, ScienceDirect, JSTOR, and Google Scholar. Studies on the subject were reviewed one by one and the studies on the antecedents of consumer vulnerability were identified. After this stage, the identified studies were examined in depth using the content analysis method, and the antecedents of consumer vulnerability were attempted to be classified systematically. While making this classification, the conceptual approach used by O'Connor et al. (2019) to classify the antecedents of financial vulnerability was adopted.

As a result, the antecedents of consumer vulnerability are classified under two main groups. These groups were named as objective antecedents and subjective antecedents of consumer vulnerability, and subgroups were formed under these main groups. The main characteristic of objective antecedents is that they can be determined in the same way, free from personal judgment, without the need for interpretation, both by the person himself and by a third-party observer. In this respect, objective antecedents are factors that can be measured and observed with concrete tools, free from individual feelings, thoughts, and attitudes. Subjective antecedents, on the contrary, are factors that are shaped by personal feelings, thoughts, and attitudes and can be perceived and interpreted differently by different individuals.

In this context, there will likely be very serious differences in the processes of keeping these antecedents under control and preventing the emergence of consumer vulnerability as much as possible. The main reason for this is that objective antecedents are observed and perceived in the same way by all individuals, and thus they can be kept under control somewhat

easier compared to subjective antecedents. On the other hand, since subjective antecedents are perceived and interpreted differently by individuals with different characteristics, it does not seem likely to control them by using simple mechanisms. Developing and implementing measures for subjective antecedents may therefore require more complex processes than for objective antecedents.

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CHAPTER 10

SOME REMARKS ABOUT THE ILKHANID RULER GEIKHATU'S COINS

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Coin, valid in trade, has been used since the early ages as a very convenient means of exchange in transportation, protection and storage, as well as to prevent the devaluation in the exchange method. Coins, which have gained meanings more than just a means of payment over time, are objects as documents that provide political, economic, religious, artistic information about the society they belong to and convey the historical development with the inscriptions and descriptions on them. Moreover, in addition to the aspects of them mentioned above, coins play an important role in the perception of the past and help to build a common history with other historical materials and cultures.

The Ilkhanid coins are categorized in the category of the Islamic coins. The Islamic coins are well known for featuring more inscriptions rather than images on them compared to their counterparts in the world. Thus, the names of the ruler and the dynasty, the titles of the minting authorization, religious expressions, political and monetary phrases constitute more of the coins than its counterparts. The Ilkhanid coins with their patterns and calligraphic elements have a distinguished place among the Islamic coins.

When the Mongols came to the Islamic world, they encountered new images and new concepts. The Mongolian dominated Iran, Iraq, Georgia, Armenia and Anatolia were highly developed countries in terms of culture, trade, production, handicrafts and coin minting. In addition to this, the Ilkhanid coins, which were influenced by the Arab and Persian civilisatins and adorned with Mongolian traditions, emerged and had been in circulation for more than a century[1].

The Ilkhanid coins, perhaps the most beautiful coins minted in the field of Islamic coins, are the subject of current studies in the field. While evaluating the coins belonging to Ilkhan Geikhatu among the Ilkhanid coins, it is almost imposibble to examine the coins available in all museums and personal collections, this study does not include personal collections and data about it available in all museums. As a proof of our contention, there are nearly three thousand Ilkhanid coins in only one museum in Türkiye, so it would be a herculean task to analyse all the coins available in all museums in Türkiye. Therefore, we will evaluate the coins we have or have reached. However, the new Ilkhanid coins are included in museums and auctions year after year, and undoubtedly, new coins will continue to be included in the stock in the future. Furthermore, studying and publishing more coins will contribute a lot to the numismatists but also to historians of all kinds and it should be interest to them. On the other hand, it would be wrong to contend that the coins we examined include all the Geikhatu coins and their types. This does not seem possible. In this respect, it is worth citing

1 Nyamaa 2005: 107-108.

some works about the Ilkhanid coins and it will be useful for those who are interested in this field. Among the studies done on the Ilkhanid coins, especially Ömer Diler's detailed study, the Ilkhanids[2], seems to have satisfactorily filled an important gap in this field. In this respect, we could cite another sigfnificant work entitled: *Ak Akçe. Moğol ve İlhanlı Sikkeleri*[3] by Tuncay Aykut. It is worth mentioning Bahram Alaedini's*, Sikkahha-yi Iran. Dawrah-i İlhanan-ı Moḡol (Persian Coins Mongol Ilkhanid Period*) [4] which was done outside T*ü*rkiye. In addition to these works, we should also state that there are many theses and articles about it.

After his military successes, Chinggis Khan (d. 1227) established a great empire stretching from China to Iran. Subsequently, the empire was further expanded by his successors, making it the largest empire in the known world with adjacent borders. Naturally, the Mongols did not attempt to establish a common monetary system in this wide geography and generally chose to leave their subjects to freely use their own monetary systems. Despite this, we witness that the Mongols minted coins with Chinggis and the coin system was in circulation with an immediate effect[5]. During the rule of Chinggis Khan's son, Ögedei, (1229-1241), banknotes were printed to develop trade and facilitate traders' business. Banknotes, originally used in China, was used on a large scale during the reign of Kublai Khan (1260-1294)[6].

Ögedei continued the Mongolian conquests and appointed noyans in the east and west. Although the noyans successfully expanded the Mongolian lands, this was not at the desired level. The regency of Töregene Khatun (1241-1246) and the short two-year reign of her son, Güyüg, (1246-1248) did not achieve the desired success. Finally, in 1251, Möngke (1251-1259), from the Tolui dynasty, who was the great Mongolian Khan, resumed the Mongolian expansion with his brothers, Hülegü and Kublai. The most significant and striking aim of the Mongolian military campaign, which started with the aim of establishing a world empire, was to seize the trade route between the Pacific Ocean and the Mediterranean with its booty. When Kublai moved to complete the conquest of China with his army, the other brother, Hülagu, was tasked with capturing the lands from Amu Darya (Oxus) to the Nile, namely the Islamic world, with one-fifth of all Mongolian armies. While Kublai completed the conquest of China and laid the foundations of the Yuan dynasty, Hülegü soon established his dominance in Iran and Azerbaijan. Afterwards, Hülegü, who wanted to go south, was stopped by the Mamluks in the Battle of Ain Jalut in September

2 Diler 2006.
3 Aykut - Ayın 1992.
4 Alaedini 1395.
5 For some examples. See, Nyamaa 2005: 29-33, 155-157.
6 Jahn 1942: 296-297.

1260. Both Hülegü and his later successors failed to achieve lasting success against the Mamluks, and the expansion in this direction came to an end[7]. However, the Mamluks were not the only enemy of the Ilkhanates. They constantly fought the Golden Horde, who were their fellow men, over Azerbaijan and the Caucaus and struggled recklessly against the Chaghadayid Khanate over the Khurasan region. These battles continued till their collapse.

The Mongolian westward advance produce economic as well as political consequences. Thanks to the Mongolian military campaigns, military expenditures brought Central Asian silver to the Middle East. This silver stock led to the revival of silver coins in Syria and Iraq in the thirteenth century[8]. Moreover, in the middle of the same century, with the expansion of intercultural exchange following the Mongolian conquests, Asia experienced significant and enormous prosperity and rapid economic growth. In other words, growing trade increased the demand for newly minted coins and states made the necessary supply to meet the demand.

Upon his arrival in the Middle East, Hülegü minted coins in the name of Möngke Khan in 1254 and 1255 with the title of qa'an al-a'zam in Baghdad and Mosul (Mawsil). Meanwhile, he used the title of "khan" for himself on the same coins before he received the title of "Ilkhan"[9]. Finally, Hülegü declared his state in 1256, and he, thereafter, eliminated the Batinids and the Abbasid Caliphate and consolidated the Mongol domination over Azerbaijan and Iran. Hülegü[10] obtaining a great treasure with the booty and taxes collected minted gold coins as well as silver coins. Normally, the sates did not prefer gold coins much because the gold coin was symbol of power. However, since its establishment in the Ilkhanid State, gold coins were minted together with Hülegü, though they are rare today.

Möngke's name[11] was on the coins of the Abagha (1265-1282) period, though he was not alive, and from time to time those coins were minted without any specific name except qa'an /hakan[12]. We could cite reason for it that there could be the struggle for the throne between Kublai and his brother Arigh Boke which lated until 1264. What is striking is that the Ayyubid character on the coins of this period draws our attention[13] as it was during the Hulaga period. Although Abagha was a Buddhist, he mint-

7 Spuler 2011: 44-68.

8 Haider 1998: 238-239; Heidemann 2010: 167-168; Sahillioğlu 1994: 371.

9 Aykut 1992c: 44.

10 Rashīd al-Dīn 1957a: 65. He melted this treasure into balish and built a high building on a mountain called Tele on the shore of Lake Urmia and preserved it there. See, the same page.

11 Aykut 1992c: 52.

12 Aykut 1992c: 53-54.

13 For examples. See, Aykut 1992c: 55-56.

ed coins with a cross and Christian formula on one side of the coins[14]. We could infer that Abagha's Byzantine wife, Maria Paleologos (Despina Khatun)[15], had influence on her husband. On the other hand, during that period the Ilkhanid envoys sometimes claimed that their rulers were going to convert to Christianity, though it was not true, in order to get the alliance of the Crusaders and Europeans against their arch enemy the Mamluks[16]. Such coins could have been minted for this purpose.

Ahmad Tegüder (1282-1284) preferred to hand over the administration of the country to his mother, Qutui Khatun, during his two-year short reign. Unlike the previous ones, he used the title of sultan on his coins[17].

Arghun (1284-1291) eliminated his uncle Ahmad Tegüder and seized the throne during his rule and minted coins with animal figures. During this period, the ruler did not personally take over the administration and it caused the conflicts of interest among the rulers to come to the fore. The severe financial policies adopted by Buqa Jalayir, who played the most important share in Arghun's accession to the throne, and his uncompromising attitude to the other amirs, resulted in his liquidation in 1289. The Mongolian amirs, who thought that they would get some relief in spending with the abolition of Buqa Jalayir, but they faced much more severe economic conditions as a result of the tight financial measures of the Jewish vizier Sa'du'd-Dawla[18].

When Arghun died at a young age, after drinking the potions to prolong his life, it was expected that his son Ghazan, who was in the Khurasan region, would succeed him. But just before Arghun passed away, the amirs staged a rebellion and massacred their rivals, because they found Arghun's son's accession to the throne dangerous for them[19]. Therefore, they invited the Mongolian military governor Geikhatu through an ambassador, the brother of Arghun, who was far from the conflicts in Iran and had been in Anatolia since 1285, to ascend to the throne[20]. After the invitation, Geikhatu set out and was welcomed by the İlkhanid ladies, princes and amirs in Alatagh in July 1291 and throne ceremonies were held[21]. However, Turkmen groups, who regarded Geikhatu's departure from Anatolia as an opportunity for them, took action and Karamanids even besieged

14 Diler 2006: 279, A- 127.
15 Pachymérés 2019: 110; Bar Hebraeus 1987: 585.
16 Kirişoğlu 2018b: 43-46.
17 Aykut 1992c: 58-60.
18 Spuler 2011: 94-96; Uyar 2009: 7-12.
19 Rashid al-Din 1957b: 78; Rashīd al-Dīn 1957a: 226; Aksarâyî 1944: 160; Banākatī 1348: 446; Bar Hebraeus 1987: 637; Faṣīḥ Khvāfī 1339: 364.
20 Waṣṣāf 1372: 157; Rashīd al-Dīn 1957b: 80; Khwānd-Amīr 1362: 134; Mīr Khwānd 1339: 363; Ibn al-Fuwaṭī 1351: 280; Āštiāni 1365: 245-246; Spuler 2011: 75-76.
21 Waṣṣāf 1372: 158; Mīr Khwānd 1339: 265; Ward 1983: 343; Khwandamir 1994: 135.

Konya. Thereupon, Geikhatu returned to Anatolia and suppressed the rebellion violently[22]. Then, Geikhatu came to Alatagh again in June,1292 and made appointments to the top positions. He appointed Sadr al-Din Ahmad Zanjani as the vizier and asked members of the dynasty, noyans and state officials to obey his orders[23]. Geikhatu remained in power after the revolt of the prince Baidu until his assassination in March 1295[24]. Most sources agree that he was the most incompetent ruler among the Ilkhanid rulers

Perhaps the most striking of the interesting events of the Geikhatu period was the printing of banknote. Earlier, we stated that banknote was first put into circulation in the Mongol land in 1236, during the reign of Ögedei Khan. This banknote named Chao in Chinese was widely used in the Kublai Khanate later on. In the Geikhatu period, it was printed for a short time by imitating Chinese example in order to rescue the collapsed financial system[25].

In today's economics, banknote is a symbol representing gold or money. It intellectually and symbolically represents the amount of gold of the same value with the numbers on it. Banknote is considered a symbol of value as long as it represents gold that has a real value[26]. However, Geikhatu's collection of all silver and gold in the treasury and making the issued banknote unrequited made this attempt unsuccessful.

Despite the number of mints reaching two hundred in the Ilkhanid period due to the lands taken under the rule[27], ilkhan yarlıg issued a law for the printing of banknote in places such as 'Iraq- i 'Ajam (Persian Iraq), 'Iraq- i 'Arab, Diyar Bakr, Diyar Rabi'a, Mosul, Mayyafariqin, Azerbaijan, Khurasan, Kirman[28]. However, as much as known, banknote could be printed in Tabriz[29] and Shiraz[30], but not in other places[31], or because the banknote was suddenly withdrawn from circulation, there was no time to print it[32]. The printing of the banknote was withdrawn from its circulation of just a few months after a major failure, due to poor planning, lack of infrastructure, a short preparation period, lack of a sustainable wide technological infrastructure and the public's lack of trust in the state[33].

22 Anon. 1952: 59-63.
23 Rashīd al-Dīn 1957a: 236; Waṣṣāf 1372: 159-160.
24 Rashīd al-Dīn 1957a: 242, 244: Kirişoğlu 2018a: 73-83.
25 For more information. See, Jahn 1942: 269-309.
26 Karl Marx 2003: 214.
27 Pamuk 1992: 19.
28 Waṣṣāf 1372: 165; Mīr Khwānd 1339: 370; Khwandamir 1994: 137; Āštiāni 1365: 249; Jahn 1942: 294; Petrushevsky - Jahn - Smith 1366: 90-91.
29 Rashīd al-Dīn 1957a: 239-240; Petrushevsky - Jahn - Smith 1366: 89.
30 Waṣṣāf 1372: 167; Jahn 1942: 294.
31 Waṣṣāf 1372: 167.
32 Jahn 1942: 293; Petrushevsky - Jahn - Smith 1366: 90-91.
33 Waṣṣāf 1372: 167; Mīr Khwānd 1339: 371; Jahn 1942: 308; Petrushevsky - Jahn - Smith 1366: 103.

Since the Mongols established dominance in a very wide geography that included many nations and tribes since Chinggis Khan, they did not attempt to establish a common monetary system that covered the entire empire, and they even found it more practical to follow the traditions of the places they took control. Although the coinage was an important symbol in terms of legitimacy in the lands they ruled, the Ilkhanids, having been established in the Near East, did not pay much attention to this issue. Therefore, we see that local dynasties minted coins in their own names in the Ilkhanid lands[34]. Thus, local administrators in Georgia, Mardin and Anatolia, especially in Fars and Kirman, minted money in their own name in Iran[35]. Thus, irregular monetary systems, different from each other in terms of meter and scale, emerged in the lands dominated by the Ilkhanids. Different coins in meter and scale, minted in many different languages, were in circulation. This situation continued until Ghazan Khan took the right to mint coins from the affiliated states and established a new monetary union. Fundamental reforms about the Ilkhanid coin regime were put into force in the period of Ghazan Khan. For this reason, Geikhatu coins are the last representative of the first period of the Ilkhanid coins, if we do not take into account the coins that Baidu minted during his short rule which did not even last eight months.

During the Mongol era, dirham, miskal, tenke, dinar, balish and division units were used in gold and silver calculations[36]. In the financial accounts of the state, the division, that is, ten thousand, was used as the largest unit, and the budget and other calculations were calculate according to this ratio[37].

When we examine the coins used by the Ilkhanids and the ratio of the coins to each other, we see that the most mentioned coin is the dinar. The monetary system of the Iranian Mongols was based on this currency, known as the dinar. Furthermore, we witness that the dinar was decisive in determining the value of other coins. 1 gold dinar was equal to 6 silver dirhams. 1 gold miskal was equal to 4 silver dirhams. In addition, there was a significant influx of gold as gold was paid a higher price[38] in India. That's why the Ilkhanid rulers constantly focused on silver coin and tried to keep gold in the country by making skillful manipulations on silver coin from time to time[39]. However, a satisfactory success was not achieved by keeping the gold coin in the country, and the silver dirham dominated the government treasury and circulation. The gold coin dinar remained a sec-

34 Özgüdenli 2009: 274.
35 Rashid al-Din 1940: 282.
36 Yuvalı 1994: 158.
37 Karabulut - Apak- Erol 2018: 375-388. See, also. El-Mazenderani 2013.
38 In India there was a 1:10 relationship between gold dinars and silver dirhams. Smith - Plunkett 1968: 278.
39 Rashīd al-Dīn 1957b: 284-285; Smith 1969: 20.

ondary currency. In fact, the financial crises in the Arghun and Geikhatu periods caused the disappearance of gold, and it re-emerged after the reforms made by Ghazan[40]. However, in the Ilkhanid monetary system, was always dominant, even though it was used less than silver[41].

Back to the Geikhatu period, the subject of our study, after the accession of Geikhatu to the throne, these policies were tried to be implemented again by taking the strict financial policies of Amir Buqa[42] and Saʿd al-Dawla, especially in the tax field, during the Arghun Khan period. Geikhatu, in H. 690/AD. 1291, during the mourning period for Arghun, he urgently summoned Arghun's old team from Nishapur and had the financial council re-established according to Buqa's system. The most important aim of the team, which re-enacted the reforms it had implemented before Arghun's H. 687/AD. 1288-89, was to print money in every region. For this reason, each state soon had the minting of silver coins and a coin production program began in different parts of the country. Moreover, the divan reorganized the metal distribution in the coin, streamlined quality control, and slightly increased the average weight of silver pieces. Furthermore, the divan revived the special coins used for foreign trade, besides paying attention to copper money once again. Finally, the divan's minting of large amounts of gold coins for the first time provided advantages and also showed its effect in trade. By doing all this, we can say that the government initiated a new monetary revolution[43].The purpose of this program was to issue more and better quality coins.

The main priority of Geikhatu's financial department was to reintroduce silver coin[44] which was the basic currency. For this purpose, state officials reactivated the capital cities of each state. These were the north of Khurasan, ʻIraq- i ʻAjam, ʻIraq- i ʻArab, Fars, Kashan, Baghdad and Shiraz. Secondly, the unification of the southern states, which had been inactive for four years, was mandatory. After the coinage started in each state, a new emphasis was placed on religion by minting the Ilkhans's Buddhist throne name "Irinjin Turji". In addition to this, the government trying to establish stability in minting money aimed to provide a standard in currency by converting coin designs into the accepted templates[45]. Thanks to all these measures, there were improvements in the economic system, albeit

40 Togan 1931: 2.

41 Aykut 1992a: 27.

42 He is the amir of Ilkhanate, who played an important role in the accession of Argun Khan to the throne and later ruled the country for more than five years as he wished. After Argun Khan fell out of favor, he attempted to rebel and was caught and murdered in Zilhijce 687/January 1289. Sümer 1991: 355-356.

43 Kolbas 2006: 278.

44 Although it is the subject of the Late Ilkhanid period, See, Ilkhanid silver money system. Smith 1969: 16-41. Moreover, another article by the same author is complementary in understanding this subject. Smith - Plunkett 1968: 275-297.

45 Kolbas 2006: 278-279.

in a short time, but the decline in the balance of money which began in Abagha and got along in the periods of Ahmad Tegüder and Arghun, continued after a short time in the period of Geikhatu. Despite all the issued the yarlıgs[46] regarding the minting of the coins with 10 and 9 carat silver were not complied with the standards, since the state shaped around the Ilkhan's personality did not have sufficient power and supervision. Due to the lack of care in the production and supervision of coins, the situation sometimes got out of control that coins not exceeding two-dinar silver carats in 10 dinars, the rest of which could even be minted in copper, were encountered in Anatolia[47]. Of all the coin-minting regions during the Ilkhanate period, the western Anatolian province was the most chaotic. The principalities that emerged in Western Anatolia had the opportunity to develop under the loose administration of the Seljuk administration[48]. The deterioration in the coin, not only in the metric but also in the scale, showed. itself by spreading to the economy within a few years[49].

From the Geikhatu coins we have, we see that he minted coins every year during his reign[50]. Today, we can make some evaluations with the unearthing of some of the Geikhatu coins, which were very rare until recently.

When we make a formal analysis of Geikhatu coins, they do not differ from the previous Ilkhanid coins. Apart from the Arabic alphabet written in Kufic style, the Uyghur alphabet[51] was also used in the coins[52]. As it is known, the Uyghur alphabet, which was adopted by Mongolian in the last years of Chinggis Khan, was used in the private correspondence of the state[53]. This activity amining to continue the cultural and political relations with Mongolia was abandoned by the last Ilkhanids and the formations that emerged after the ilkhanids.

Moreover, the names and titles of the ruler were included on the coins, along with the place of the mint, as well as religious and political expressions. On the obverse side[54] of Geikhatu's coins, *"La İlahe İllallah Muhammedin Rasulullah"*, which is the phrase of tawhid representing Muslim subjects, was written since Hülegü Khan and the general religious

46 Rashid al-Din 1940: 491; Rashīd al-Dīn 1957a: 491.

47 Rashid al-Din 1940: 282.

48 Blair 1982: 218.

49 Spuler 2011: 328.

50 For he samples of these coins. See, Aykut 1992b: 133-134; Diler 2006: 327-333; Alaedini 1395: 89-98.

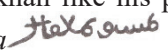
51 On the use of the Uighur alphabet on the Ilkhanid coins. See, Tabātabā'ī 1301.

52 In addition to the Arabic and Uyghur alphabets specific to the Ghazan period, the P'ags-pa script developed by the Tibetan scholar Aphags-Pa was used on the coins. Özgüdenli 2009: 280-282.

53 Spuler 2011: 490-491; Grousset 2011: 229.

54 It is not certain what is the obverse or reverse of the coin. It can be accepted that the name of the ruler on the coin could be obverse.

policies were adhered to[55]. Sometimes, in addition to this, there was the phrase *"Sallallahu Alaihi wa Sallam"* expressing salawat on the Prophet of Islam. This practice became customary for later rulers. On the reverse of his coins, Geikhatu generally preferred the Buddhist nickname Irinjin Turji (Arincin Turci)  [56] rather than his name[57]. However, we also see that he used both his nickname and his name together on only a few coins[58]. The writing of Irinjin Turji, of Tibetan origin, with the Arabic alphabet led to the emergence of slightly different writing styles. While writing the second word of the nickname, Turji, the letters te (ت) and dal (د) from the Arabic alphabet were used, so two different spellings emerged as turji (ىجروت) and durji (ىجرود).

Apart from Irinjin Turji, we also observe that Geikhatu used traditional Turkish-Mongol titles or their similar equivalents in Islamic geography, or used titles composed of both. Geikhatu, who first used the title of Ilkhan like his predecessors, also used the titles of *Hakan*[59], *Hâkanu Arîba*  (Representative of the Great Kaan, Regent) [60], Ilkhan al-mu'azzam (Extraordinary/Great Ilkhan)[61]. Apart from this, the titles of Padishah-I Jahan (Ruler of the World/Universe)[62] and Khudawand- 'Alam (Lord of the Realm)[63] were used for Geikhatu in the coins minted in Kirman by Padishah Khatun[64], one of Geikhatu's wives.

55 On a dinar printed in Ghazni on behalf of Genghis Khan, we come across the name of the Abbasid caliph, Al- Nasir li-Din Allah, together with the phrase tawhid. Therefore, this formula does not only belong to the Ilkhanate. Nyamaa 2005: 155. See also. Aykut 1992c: 43.

56 The word means diamond jewellery, very precious pearl. Khwandamir 1994: 632, footnote. 71; Spuler 2011: 99; Howorth 1888, 357. Apart from these meanings, Karl Jahn also added the meaning of the precious scepter to the word. Jahn 1942: 297. The famous orientalist Hammer, on the other hand, mistook this word for Turkish and translated it as "İrdükte Dursun", that is, if it came to pass, it should stop. Hammer 1974: 405; ʿAbbās Eqbāl Āštiāni, wrote this nickname as İrincin Turji (ىجروت نيجنريا). Āštiāni 1365: 249. See also. Shabānkāra'ī 1363: 246, footnote 6. In Banākatī's work, Geikhatu's nickname is mentioned as İrinjin Duzhi (ىخزود نيجنريا). Banākatī 1348: 447.

57 Diler 2006: 327-333, Gy- 226, Gy- 231, Gy- 232, Gy- 233, Gy- 234, Gy- 235, Gy- 236, Gy- 237, Gy- 238, Gy- 239, Gy- 240, Gy- 242, Gy- 242, Gy- 244, Gy- 247 coins classified by number; Alaedini 1395: 89-90, 93-98. Geikhatu also had the Buddhist nickname written on the banknotes he printed. Waṣṣāf 1372: 166.

58 Diler 2006: 327-328, Gy- 226, Gy- 227, Gy- 228, Gy- 229; Alaedini 1395: 89-90.

59 Diler 2006: 331, Gy- 240 numbered coin.

60 Diler 2006: 327-333, Gy- 226, Gy- 227, Gy- 228, Gy- 229, Gy- 231, Gy- 232, Gy- 233, Gy- 234, Gy- 235, Gy- 236, Gy- 237, Gy- 238, Gy- 240, Gy- 242, Gy- 244, Gy- 247 numbered coins.

61 Diler 2006: 328, Gy- 230 numbered coin.

62 Diler 2006: 332-333, Gy- 245, Gy- 246; Alaedini 1395: 91.

63 Diler 2006: 332-333, Gy- 246; Alaedini 1395: 92.

64 Padishah Khatun, the brother of the Kirman ruler Qutb al-din Muhammad, was married to Abagha Khan in accordance with the Mongol tradition of taking the daughters of subject rulers, and after the death of Abagha Khan's mother, Yesünjin Khatun, her ordos was given to Padishah Khatun**.** Arghun's brother, Geikhatu, who took the throne after his death, also married his stepmother, Padishah Khatun, as a result of the traditions

The Ilkhanid rulers minted the coins with the name the great khan, qa'an in the east with the and mostly with the nickname al-a'zam[65]. The phrase qa'an al-a'zam, which we also see on the coins of Geikhatu, is the manifestation of the sincere loyalty to the great khan. The title of qa'an al-a'zam, which had been used as an indication of nationality since the establishment of the Ilkhanate, was used for himself by Ghazan[66], who ascended the Ilkhanid throne for the first time. This usage also meant the political break with the Great Mongol Khanate of the Ilkhanate State. The Ilkhanate State remained sincerely loyal to the Great Mongol Khan in the east until the Ghazan Khan era and they reflected their loyalty by minting coins.

We also see that Geikhatu used the rising Sun and the hunting bird (falcon) figure[67], which were a common usage during the Arghun period. Especially during the Ghazan era, we frequently observe the lion figures[68] on the coins which were used as deocarative elements in the Ilkhanid period.

Unfortunately, there is no study or book that covers all Ilkhanid dirhams and gives the distribution of materials in the dirhams. However, M. A. Seifeddini's study on the material distribution in the Ilkhanid dirhams gives us satisfactory data which help us to obtain comprehensive knowledge about it. Accordingly, we see that the rate of silver in dirhams in the Hülegü period was 95.5%, which is a very high level. After the Hülegü period, we witness that this rate decreased because of the diminished control

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that was shocking according to Islamic Sharia but it was considered a normal act by the Mongols. Padishah Khatun did not delay in asking her new husband for Kirman, the throne of her ancestors, and took the throne as the sixth ruler of the Qutlugh-Khanid dynasty (1292-1295) with the nickname Safwat al-dunya wa al-din. One of the first acts of Padishah Khatun was to capture and imprison her half-brother Suyurghatmish. After his brother tried to escape, he had him murdered by strangulation. During the reign of Padishah Khatun, she minted gold and silver coins in her own name. (For some samples of these coins. See, Diler 2006: 332-333). During the reign of Geikhatu, the future of Padishah Khatun, who was the ruler of Kirman, changed with Baidu's ascension to the Ilkhanate throne. After Suyurghatmish's widow, Kurdujin, who was descended from Hülegü, wanted Baidu's revenge for her husband and Baidu accepted this, and an expedition was made on Kirman. Padishah Khatun, who could not find the strength in herself to resist Baidu, surrendered. Padishah Khatun murdered by Baidu was a historical figure who could impress Mongolian princes with her poetry rather than her beauty. Rashīd al-Dīn 1957a: 96, 140, 231; Waṣṣāf 1372: 115, 161, 177-181; Rashīd al-Dīn (n.d): 144a; Anon., 2006: CXXXIII; Banākatī 1348: 447; Faṣīḥ Khvāfī 1339: s. 366-368; Üçok 1993: 120-139; Mernissi 2006: 100-102; Āštiāni 1365: 406-407; Spuler 2011: 173, 218, 278; Lane 2006: 245-248; Lane 2003: 98-99, 103, 110, 114-115, 117-118, 121-122, 134, 137; Beyânî 2015: 9. For examples of his poems. See, Āštiāni 1365: 407; Lane 2006: 246, 248; Hammer 1974: 400; Beyânî 2015: 10.

65 Spuler 2011: 295.

66 For some examples of these coins. See, Diler, 2006: 363-364, 366, 371, Ga-290, Ga- 291, Ga- 292, Ga- 293, Ga-294, Ga- 295, Ga- 300, Ga- 322, Ga- 323; Alaedini: 1395: 116; Aykut 1992c: 74.

67 Alaedini 1395: 72-81, 89-90, 107, 156; Diler 2006: 307, Ar- 172, 311, Ar-187, Ar-188, 314, Ar-199, 327, 331, Gy- 229, Gy- 242.

68 Alaedini 1395: 86-87; Diler 2006: 330-331, Gy- 238, Gy- 241.

over the mints as the intense struggle with the fellow Golden Horde and the Mamluks during the Abagha rule. From time to time, the silver rate in the coins decreased to around 90.41%, 86.05%, 80.12%. This decrease in the value of money continued during the time of Ahmad Tegüder and the silver rate in the dirham decreased to 77.88%. With the measures taken during the Arghun period, some positive improvements were observed in the value of coin and the silver rate increased to 85.05% to 86.05%[69]. It is most likely that Arghun's edicts about keeping the money's value played an important role[70]. In sum, we could state that the rate of the silver in the Ilkhanid coins from Hülegü to Geikhatu was between 75.70% and 95.5%. This rate was 82.78% in the Geikhatu period[71].

Materials such as chlorine, calcium, chromium, manganese, iron, zinc, arsenic, silver, gold, lead, iron, nickel were found in the coins according to the the metallurgical analyses carried out on the Ilkhanid dirhams with the Pixe (Particle Induced X-ray Emission) Method[72]. We could contend that the extracted gold and silver mines were not sufficiently purified.

Thanks to Diler's work, we have considerable information about the weights and diameters of Geikhatu coins. In this respect, we detect that the data about the coins belonging to the Geikhatu period were as follows: dinars, weight 2.74-5.18 gr. and in the range of 21-24 mm. diameter; dirhams 2.46-3.50 gr. and 17-22 mm. diameter; copper coins 2.35-4.60 gr. and 18-28 mm diameter[73]. Moreover, we see that local administrators in the Ilkhanid lands sometimes did not stick to the standards of the coins minted for the Ilkhan. What we infer from it is that the following rates are striking: Kirmanid dynasty (Qutlugh-Khanids) dinar 5.50 gr., 24 mm. diameter and 6.58 gr. with and 23 mm. diameter dirham[74].

Flat circle used in the coins was the most common practice. The dot border around the circle was used for decoration. On the other side of the coin, we see that "Tawhid" was written in the square form and the place and year of printing were written around that square. Other geometric ornaments were as follows: four-corner round form in a circle, six-cornered six-sided form, eight-cornered octagonal form, two intertwined triangle forms and we observe that these geometric ornaments were surrounded by writing. Furthermore, these writings varied as Kalima-i Tawhid, the place of minting, the year of minting, and quotations from the twenty-sixth verses of the Qur'an's Al-i Imran Surah and the thirty-third verses of the Surah At-Tawba.

69 Seifeddini 1968: 98.
70 Rashid al-Din 1940: 282.
71 Seifeddini 1968: 98.
72 Neyetani - Salehi - Mousavi - Hajivaliei - Noubari 2014: 29-34; Sodaei - Kashani 2013: 105-109.
73 Diler 2006: 327-332.
74 Diler 2006: 332, Gy- 244, Gy- 235.

The examination of the geographical distribution of Geikhatu coins shows us that they were minted in twenty one diferent locations from Tabriz, Hamadan, Kashan, Isfahan, Yazd, Tus, Kirman, Shiraz, Abu Ishak, Baghdad, Nishapur, Cacarm, Sabzawar, Jurjan, Sultaniya, Ardabil, Irbil, Mosul, Jazira, Mardin, to Tbilisi. With the reforms made during the Ghazan period, the number of coinage places increased and reached approximately to 200 during the reign of Abu Sa'id. Therefore, the Ilkhanid coins were the most abundant coins in the Islamic world. Among the Ilkhanid coins, today we have the largest coin samples belonging to Ghazan, Öljeitü (Muhammad Khudabanda), and Abu Sa'id.

We sometimes come across common designs in the Geikhatu coins, though not all of them have. Considering the wide geography of the Ilkhanate state, from Khurasan in the east to Anatolia in the west, from Georgia in the north to Persia in the south, the only explanation for the common coin designs was the distribution of patterns from a central source. It is likely that Tabriz was the most productive mint[75]. The common designs on Geikhatu coins minted in various cities indicate that Tabriz was the center for it[76].

We could claim that the Ilkhanids obtained their precious metals from the mines in Central Asia and from the central regions of Eastern Anatolia, Armenia which were under their rule[77]. Moreover, the European silver[78] was transported to Iran by the Trabzon-Tabriz caravan route through Italian traders as well as Armenian traders under Mongolian rule. And Toqta[79]'s desire to find a peaceful solution with the Ilkhanate, who ascended to the throne of the Golden Horde at the same time as Geikhatu, led to peace treaty in March 1294. After the treaty, the Caucasian Road was opened to merchants and their goods, and Arran returned to its old days[80]. The peace treaty enabled the Golden Horde dirham[81] to reach Tabriz. There was a lively and prosperous trade between the Persian Gulf ports and India. India provided spices, essences (fragrance), indigo and other materials to the world markets. Despite its rich income from this trade, India did its best to prevent the precious metals in its possession from exporting to other

75 Blair 1982: s. 214.

76 Diler 2006: 328 Gy-231, s. 329 Gy-234

77 Haider 1998: 238.

78 On this subject, see also the ratios between Ilkhanid and European silver. Martinez 1999: 118-206; Martinez 2001: 65-139.

79 The ruler of the Golden Horde, who reigned between 1291 and 1312.

80 Yakubovskiy 1976: 49-50; Waṣṣāf 1372: 29; Rashīd al-Dīn 1957a: 238-239; Hammer 1840: 269; Jackson 2002: 345; Boyle 1968: 374; Kamalov 2003: 74.

81 The Mongolian Peace Treaty opened the way to trans-Asia, Italian traders used the ports in the north of the Black Sea via Constantinapolis in the last quarter of the 13th century to transport a significant amount of silver, mostly in bullion. In the 1280s, the inns of the Golden Horde began to produce coins called aspri/aspers. Spufford 1988: 146-147.

countries. Despite this, the import of horse[82] and Levantine textiles caused a small amount of Indian gold and silver to leave the country. The Genoese, who had ships in the Indian Ocean, tried to turn their traditional rivalry with the Venetians to their advantage by directing the Indian trade from the Red Sea to the Persian Gulf with the help of the Ilkhanate[83].

According to the coinage regime, the value of money is real, not nominal. Religion, nationality, or origin of the coins did not matter, as each coin itself expressed a value, so it was possible to find almost all the currencies of all countries in the Mediterranean basin. The coins of the western states or eastern states were available[84].

We have less information on the mines where the precious metals were extracted to mint the Ilkhanid coins. Despite lack of enough information about the mines, the works of Hamd-Allah Mustawfi Qazwini and al-'Umari (el-Ömeri), written in the first half of the 14th century, shed some light on these mines. Furthermore, Hamd-Allah Mustawfi Qazwini mentiones about a gold mine called Kuh-i Zar (Gold Mountain) near Damghan during the late Ilkhanid period and he states[85] that there was no other gold mine in Iran apart from this gold mine. It is almost impossible to think that a single mine could meet all the needs, however, the questions is: how did the Ilkhanids provide the gold supply? It still remains as a big enigma. However, the fact that we could infer that they were on the Silk Road and at the end of the spice route, so it is quite possible that traders brought the gold here. The explanations of Hamd-Allah Mustawfi Qazwini about the location of the silver mines give us more information.

The author states the locations of the silver mines as follows:

- Mine in Damavand[86],
- Mine in Kirman (Kerman) Jiruft Mountains[87],
- Mine called Silverhill on Dihistan heights/hills[88],
- Simkuh (Silver Hill) mine[89] between Fars and Jawashir (Kirman city)[90],
- Lulu mine in Central Anatolia. Hamd-Allah Mustawfi Qazwini claims that this mine, which was very rich in silver production, did not

82 During the reign of Fars atabeg Abu Bakr (1226-1260), ten thousand horses were sent to India every year. Āštiāni 1374: 398.
83 Haider 1998: 239-240.
84 Güçlüay 2001: 300.
85 Mustawfī 1919: 186, 193.
86 Mustawfī 1919: 197.
87 Mustawfī 1919: 189.
88 Mustawfī 1919: 193.
89 See also. İbn Havkal 2014: 244-245.
90 Mustawfī 1919: 193.

even exist in Iran[91]. The first Mongolian coins were minted in Anatolia during the Hülegü period. The mines here were monopolized and operated by the Mongols.

- The Tabarak mine[92] near Rayy was usually kept unprocessed[93].

Al-'Umari states that there were silver mines in Bayburt (Bahart) and Gümiş[94] (Kümiş/Gümüşhacı-köy)[95] apart from Lulu (Lülüve/Lulua) [96] mentioned by Hamd-Allah Mustawfi Qazwini and silver continued to be extracted from these mines until the withdrawal of the Mongols from Anatolia[97].

Apart from the information provided by Hamd-Allah Mustawfi Qazwini and al-'Umari about the mines, there are some works written in previous centuries stating that there were gold and silver mines in Iran and they were in operation for centuries. On the other hand, we do not have certain information whether they were operated under the rule of Ilkhanids. However, it is worth mentioning about them to make the readers understand our study.

There were Zagros mines located in the Ganzak region in northwest Iran. It is known that very pure red gold obtained by the use of mercury or washing, and impure yellow gold mixed with copper sulfate (bluestone) were extracted from the Zagros mines. There were gold and silver mines in the settlement areas of Kuhistan, et-Teymeret al-Sugra and et-Teymeret al-Kubra in the province of Jibal. In addition to it, large amounts of gold were mined in provinces and cities such as Khurasan, Khuzestan, Sicistan, Qum, Shiz (Azerbaijan), Demindan (Kirman)[98]. The silver mine was extracted from the settlements of Kiman's Demindan, Khurasan's Buttem, Nukan, Jibal's al-Gamidan, Kuhistan, et-Teymeret al-Sugra, et-Teymeret al-Kubra. Moreover, we could statethat Qum, Shiz, Fars had a small amount of silver in Yazd cities[99].

91 Mustawfī 1919: 193.

92 Gold was also mined from here. Ḥamd-Allāh Mustawfī Qazwīnī states that the extraction costs of the mine here were much costlier than the earnings. Mustawfī 1919: 193-194.

93 Mustawfī 1919: 193-194.

94 For also. See, **İbn Battûta, 2004: 417, 452**.

95 İlhan Erdem refers to this place as Maden-i Gümüş Pazar near Amasya. Erdem 1995: 477. See also. Artuk, İ - Artuk C. 1971: 378. Compare Ebü'l-Fidâ 2017: 305. In addition, Ahmet Altıntaş calls it Gümüş Pazar in his article "Yemiş Pazari". Altıntaş 2002: 390.

96 Niğde Ulukışla.

97 El-Ömerî 2014: 145, 154, 158.

98 Bakır 1997: 522-523.

99 Bakır 1997: 529.

Conclusion

Once the Ilkhanate came to the Middle East, they encountered new traditions and beliefs. The Mongols, who adopted these traditions and beliefs over time, perhaps the most quickly adopted behavior was the issue of coinage. The Ilkhanid rulers minting coins in their own names since Hülegü Khan adopted the Islamic tradition and used the Arabic alphabet in the coins, as well as their own language and the Uyghur alphabet they adopted. It was Hülegü who first shaped the Ilkhanid coin, and the coins first had human and animal depictions as well as geometric ornaments over time. After the Mamluks stopped Hülegü in the Middle East, the Mongolian expansion in this direction came to an end, so they were deprived of the booty, which was a very important source of income for them.

Consequently, Abagha and the amirs turned their attention to domestic politics that caused conflict among the state bureaucrats and finally the fight for the throne. This situation came to the fore even more during the Arghun and Geikhatu periods. Arghun's leaving the administration to Buqa Jalayir and then to Saʿd al-Dawla and Geikhatu's entrusting all state affairs to his vizier Sadr al- Din Ahmad Zanjani further fueled the existing conflicts. We see that the political instability in the Arghun and Geikhatu eras affected the economy considerably, and gold coins were withdrawn from the market. Geikhatu tried to reform the banknote system proposed to him by his vizier to find a solution to the impasse of the Ilkhanid financial system, but it ended up with a big failure.

We can contend that Geikhatu coins were the last representative of the Ilkhanid coins before the Ghazan reform came into effect, because they were examined in terms of paleography, ornamentation, order and style, because during his short reign, Baidu did not have the opportunity to intervene in money affairs. After his accession to the throne, Geikhatu issued yarlıgs to increase the weight of the coins and the percentage of silver in them. The aim was to create a stable and reliable monetary system for the revival of trade and economic activities. However, his overconfidence in his vizier Sadruddin, spending his time with drinking and entertainment instead of dealing with the internal and external events, and not using his authority to control the administrative activities led to an economic crisis. This economic depression also had a great negative impact on money, which was the common denominator of all economic transactions. In addition to the fluctuations in the weight of the units of the coins, contrary to the wishes, they were minted as bimetallic rather than monometallic. Besides the failure in the separation of the mines, sometimes worthless metals were added to the silver dirhams for economic reasons.

It does not seem possible to determine whether the gold and silver

extracted from the mines in the Ilkhanid lands, especially in Iran, met the domestic need. If it did not meet the domestic need, it seems reasonable to think that foreign coins and silver and gold ingots obtained from the countries in the Mediterranean basin and the Silk Road and Spice Road trade were melted[100] and used for this purpose. On the other hand, there was gold flow in the opposite direction to India, as it paid higher price for gold in India, and it created profitable arbitrage for traders. The failure of Geikhatu's failure in the administration and economy brought the Ilkhanate State to the brink of collapse. Ghazan Khan, who came to the throne after Geikhatu, had to make reforms in almost every field of life to solve the chronic problems. Due to these reforms, the life of the Ilkhanate State prolonged a bit longer. The Ilkhanid coins had a truly exceptional position in the Islamic world with their diversity of composition. These achievements in rich composition of the coins were imitated by the Anatolian principalities.

100 Mints paid one miskal for 100 miskals for this transaction. El-Mazenderani 2013: 137-138.

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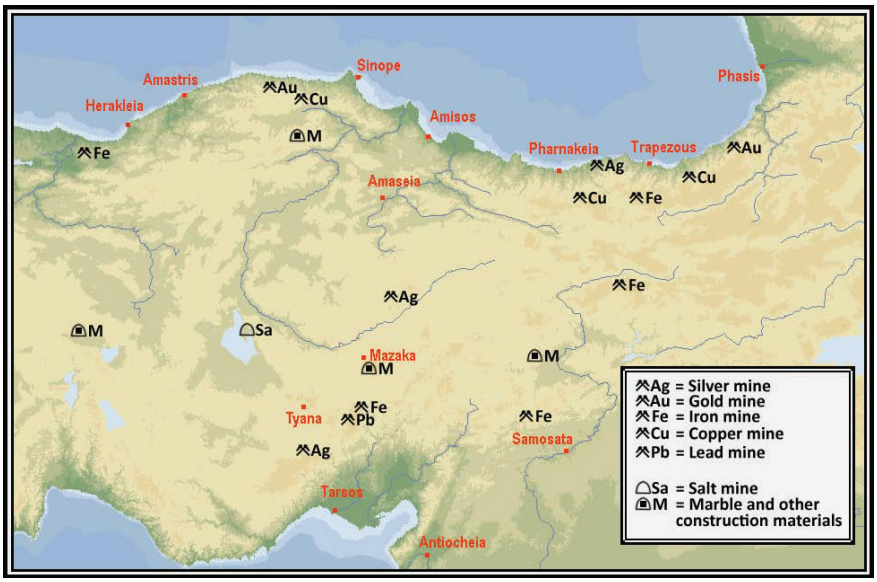

Figure 1. Eastern Anatolian mining areas in the Antiquity. Ghita 2010: 45.

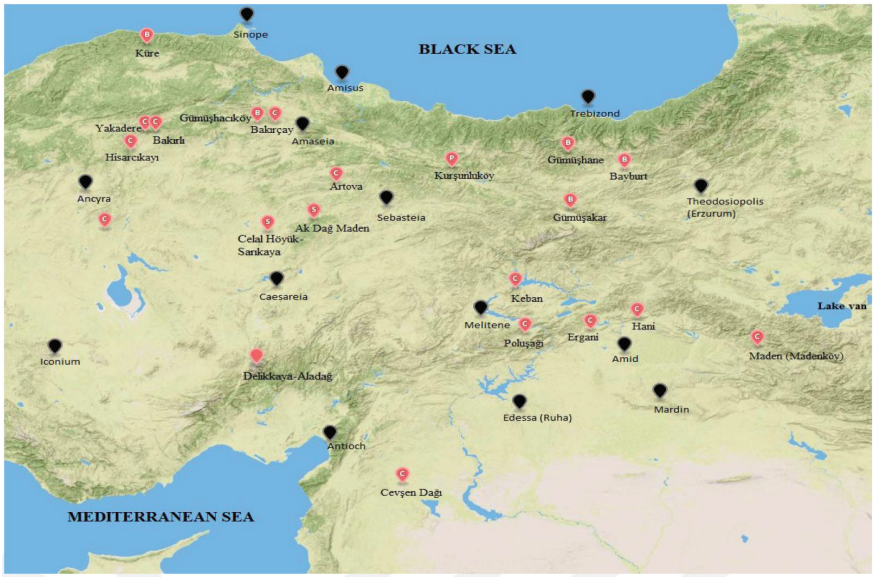

Figure 2. Mines in the East Anatolia in the twelfth-thirteenth centuries. C (Copper); S (Silver); B (Both Copper and Silver), P (Lead). Mıynat 2017: 73.

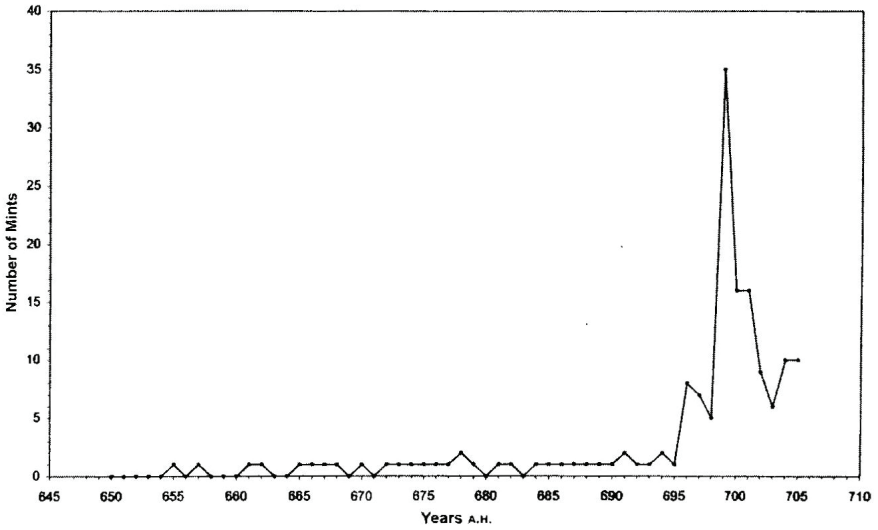

Figure 3. Minting silver coins for either the Seljuks of Rum or the Ilkhanids from the early thirteenth century to the early fourteenth century in Anatolia. Lindner 2010: 91.

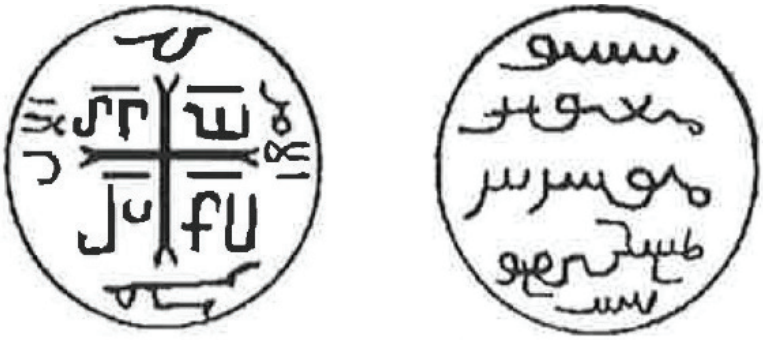

Figure 4. AE, **Mint** ?, **Date** ?, **Diam.** 21 mm., **wt.** 3 gr., Diler 2006: 279, A- 127.

Obv. D(e)r/A(sdouatz)/H(isu)s/K(ri)s(tos) …. /al-ab …. /(al-)Quds / al-amir

Rev. Hakanu / Ariba / Abagayn / Deled-keguluk / Sen

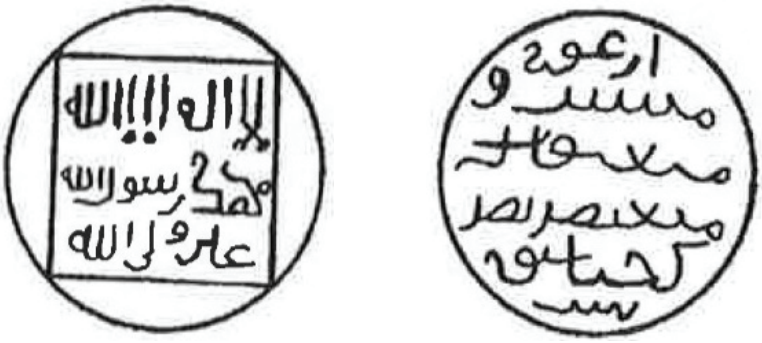

Figure 5. AR, **Mint** ?, **Date** ?, **Diam.** 18 mm., **wt.** 2.45 gr., Diler 2006: 314, Ar- 200[1].

Obv. l lā ilāh illā Allāh /
Muḥammad rāsul Allāh /
‘Alī wali Allāh

Rev. Arghūn /
Hakanu /
Ariba /
Argunun /
Gaykhātū /
sen

Figure 6. AR, **Mint** Mardin, **Date** 693, **Diam.** 22 mm., **wt.** 2.47 gr., Museum of Anatolian Civilizations Inventory No: 68-3-83/1.

Obv. lā ilāh illā /
Allāh Muḥammad /
rāsul Allāh
ḍuriba bi-Mārdīn/
sana thalāth /tis‘in /
wa-sittami‘a

Rev. Hakanu /
Ariba / Arincin Turci /
Deledkeguluk /
Irīnjīn Tūrjī

Figure 7. AR, **Mint** Mardin, **Date** 691, **Diam.** 23mm., **wt.** 2.25 gr., Museum of Anatolian Civilizations Inventory No: 37.32.86/8.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

ḍuriba bi-Mārdīn ?

Fi sana uḥdā / tis‘in /

wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī

Figure 8. AR, **Mint** Mardin, **Date** 69X, **Diam.** 21 mm., **wt.** 2.35 gr., Museum of Anatolian Civilizations Inventory No: 37.32.86/12.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

ḍuriba bi-Mārdīn ?

…. / …. /

wa-sit wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī

Figure 9. AR, **Mint** ?, **Date** 693, **Diam.** 22 mm., **wt.** 2.15 gr., Museum of Anatolian Civilizations Inventory No: 66-21-86/5.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

ḍarb …. /

fi sana thalāth /tis‘in /

wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Dūrjī

Figure 10. AR, **Mint** Mardin, **Date** 691, **Diam.** 22 mm., **wt.** 2.35 gr., Museum of Anatolian Civilizations Inventory No: 66.21.86/20.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

Duribe Mārdīn

Fi sana uḥdā / tis‘in /

wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī

Figure 11. AR, **Mint** Mardin, **Date** 69X, **Diam.** 21 mm., **wt.** 2.30 gr., Museum of Anatolian Civilizations Inventory No: 93.18.86/10.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

Duribe Mārdīn

fi sana …. / …. /

wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī

Figure 12. AR, **Mint** ?**, Date** ?, **Diam.** ? mm., **wt.** ? gr., Museum of Anatolian Civilizations Inventory No: 93.18.86/12.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī

Figure 13. AR., **Mint** Baghdad, **Date** 691, **Diam.** 21 mm., **wt.** 2.45 gr., Museum of Anatolian Civilizations Inventory No: 128-80-87/32.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

ḍarb Bag̲hdād

Fi sana uḥdā / tis'in /

wa-sittami'a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī

Figure 14. AR., **Mint** Shiraz, **Date** 69X, **Diam.** 21 mm., **wt.** 2.30 gr., Alaedini 1395: 89.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

Shiraz

sana …. /tis'in /

wa-sittami'a

Rev. Hakanu Ariba /

Arincin Turci /

in Deledkeguluk /

Gaykhātū /

Figure 15. AR., **Mint** Kirman, **Date** ?, **Diam.** 18.3 mm., **wt.** 2.50 gr., Alaedini 1395: 91.

Obv. lā ilāh illā /

Allāh Muḥammad /

rāsul Allāh

ḍarb Kirmān

Rev. Gaykhātū /

Pādishāh-ı /

Jahān khudāwandd-i /

'ālam Pādishāh /

Khātūn

Figure 16. AU?, **Mint** Kirman, **Date** ?, **Diam.** ? mm., **wt.** 5.85 gr. **Alaedini 1395:** 92.

Obv. al-ḥamd li-llāh /

lā ilāh illā Allāh /

Muḥammad rāsul Allāh /

ṣallā Allāh 'alayhi /

wa-sallama

Qur'an IX, 33.

Rev. Gaykhātū

Pādishāh-ı jahān /

Khudāwand-i 'ālam /

Pādishāh Khātūn /

Mulka mulkushah/

ḍuriba hadha

al-dīnār? bi-Kirmān

Figure 17. AR., **Mint** Tabriz, **Date** 691, **Diam.** 21.2 mm., **wt.** 2.45 gr., **Alaedini 1395:** 93.

Obv. lā ilāh illā Allāh /

Muḥammad rāsul Allāh /

ḍarb Tabrīz / sana uḥdā / /tis‘in /

wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī /

Figure 18. AR., **Mint** Tabriz, **Date** 692, **Diam.** 22 mm., **wt.** 2.29 gr., Alaedini 1395: 94.

Obv. lā ilāh illā Allāh /

Muḥammad rāsul Allāh /

ḍarb Tabrīz / sana ithnaīn / /tis‘in /

wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī /

Figure 19. AR., **Mint** Hamadan, **Date** 693, **Diam.** 21.8 mm., **wt.** 2.20 gr. Alaedini 1395: 95.

Obv. lā ilāh illā Allāh /

Muḥammad rāsul Allāh /

ḍarb Hamadān / sana thalāth /

ḍarb Hamadān /

tis‘in wa-sittami‘a

Rev. Hakanu /

Ariba / Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī /

Figure 20. AR., **Mint** Hamadan, **Date** 693, **Diam.** 16 mm., **wt.** 1.13 gr. ½ Dirham, Alaedini 1395: 96.

Obv. lā ilāh illā Allāh /

Muḥammad rāsul Allāh /

ḍarb Hamadān / sana thalāth / ḍarb Hamadān tis‘in wa-sittami‘a

Rev. Hakanu /

Ariba /

Arincin Turci /

Deledkeguluk /

Irīnjīn Tūrjī

Figure 21. AR., **Mint** Jurjan, **Date** 69X, **Diam.** 17.2 mm., **wt.** 2.31 gr., Alaedini 1395: 97.

Obv. lā ilāh illā Allāh /

Muḥammad rāsul Allāh /

Pādishāhzade Ghāzān /

ḍarb Jurjān /

…. / wa-sittami‘a

Rev. Irīnjīn Tūrjī

Figure 22. AR., **Mint** Sabzawar, **Date** ?, **Diam.** 14.8 mm., **wt.** 1.12 gr. ½ Dirham, Alaedini 1395: 98.

Obv. al-dirham /

Nusrat /

Sabzawār

Rev. Irīnjīn Tūrjī /

lā ilāh illā Allāh /

Muḥammad rāsul Allāh /

Mini glossary

‘ālam Pādishāh :	Emperor of the world.
AE :	Copper.
Al-a‘zam :	Most mighty /the supreme.
al-ḥamd li-llāh :	Thanks to God.
al-mu‘aẓẓam :	supreme the manificent the great.
AR :	Siver.
AU :	Gold
ḍarb :	Minting, mint.
Deledkeguluk sen :	Struck coin.
Diam. :	Diameter.
ḍuriba :	Struck (minting).
ḍuriba hadha al-dīnār :	This gold coin was minted.
Hakanu :	The Great Khan, supreme ruler of the empire.
İrenci Turji (Irīnjīn Tūrjī) :	Precious pearl, very preious jewel.
Jahān :	The world, universe.
khān-ı ā‘ẓam :	Great Khan.
Khātūn :	Noble Lady, empress, queen.
Khudāwand ‘ālam :	Lord of the universe.
lā ilāh illā Allāh / Muḥammad rāsul Allāh / :	There is no God but Allah, Muhammad is the messenger of God.
Obv. :	Obverse.
Pādishāhzade :	Prince, Son of a King.
pādishāh jahān :	King of the universe.
Rev. :	Reverse.
Safwat al-dunya wa al-din :	Purity of the earthly World and of the faith.
ṣallā Allāh ‘alayhi wa-sallama :	God bless him and gave him peace.
Sana :	Year.
wt. :	Weight.

(Footnotes)

1 The coin that Geikhatu minted in the name of his brother Ilkhan Arghun when he was the governor of Anatolia.

CHAPTER 11

A BIBLIOMETRIC ANALYSIS OF POSTGRADUATE THESES ON AMBIDEXTERITY IN TURKEY

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INTRODUCTION

The Oxford English Dictionary states that "Ambi" is a prefix that refers to both of two, and "dexter" is right (Oxford Learner's Dictionaries, 2022). The adjective ambidextrous implies "ability to utilize either the left or right hand well." When someone has the capacity to utilize both hands at once, they are said to be ambidextrous. Organizational theorists adopted this skill as a metaphor for a particular organizational ability (Bodwell and Chermack, 2010; Lubatkin et al., 2006). Robert Duncan (1976) utilized the idea of organizational ambidexterity for the first time and brought it to the literature in his research titled "The Ambidextrous Organization: Designing Dual Structures for Innovation." For long-term success, Duncan proposed that organizations should take into account dual structures. By highlighting the requirement for harmony between exploration and exploitation strategies - two essential facets of ambidexterity - in 1991, James G. March contributed significantly to the organizational ambidexterity literature.

"The terms "ambidextrous organization" and "organizational ambidexterity" were defined from a variety of viewpoints. For example, from the organizational design perspective, Tushman and O'Reilly (1996) defined it as *"The ability to simultaneously pursue both incremental and discontinuous innovation and change that result from hosting multiple contradictory structures, processes, and cultures within the same firm."* According to Cegarra-Navarro and Dewhurst (2007) ambidexterity can be described as *"an organization's context to achieve alignment and adaptability simultaneously within the organizational learning processes"* from the organizational learning perspective. In terms of innovation management, ambidexterity is "*the ability to excel at conflicting modes of innovation*" (Andriopoulos and Lewis, 2010). According to strategic management approach, ambidextrous organizations have "*the capability of exploiting existing competencies as well as exploring new opportunities with equal dexterity*" (Lubatkin et al., 2006).

Organizational ambidexterity is a topic of research that has received a lot of attention in academic papers in other countries (Cantarello et al., 2012; O'Reilly and Tushman, 2013). However, it can be said that the concept is still relatively new in Turkish literature. Only limited research was done in Turkey (Bakan and Sezer, 2017; Cingöz and Akdoan, 2015). Therefore, this study seeks to identify the current research tendencies and areas of interest in postgraduate theses concerning ambidexterity by bibliometric analysis. It is also anticipated that this study will contribute to future research by providing a general framework for existing studies in the higher education.

The sections of this study are organized as follows: bibliometric studies about the theses are summarized in the literature review section. In the next section, the methodology of the study is detailed. Then, the findings were presented in tables with frequency and percentage analyses. In the last part, the conclusion and discussion of the study are presented.

LITERATURE REVIEW

In the literature, different studies are published in different research fields using techniques such as content analysis, bibliometric analysis, document review, and meta-analysis. Such publications are considered beneficial in terms of providing researchers with a comprehensive understanding of a particular research topic and facilitating their work. For researchers, it helps to identify the most studied subjects in the field, as well as the issues that have not been adequately studied. In addition, thanks to these methods, researchers can contribute more to the related research field by focusing on topics that reveal different aspects of currently popular topics or that have not been adequately researched. Moreover, studies on these methods are frequently preferred in the literature, making the related research field dynamic (Haydaroğlu, 2022).

There are many studies on postgraduate theses focusing on a wide variety of fields such as *art* (Demirbatar, 2001; Karkın, 2011; Tebiş and Okay, 2013; Toptaş, 2013) , *education* (Yıldız, 2004; Oruç and Ulusoy, 2008; Karadağ, 2009), *health* (Sevinç et al., 2003; Gül et al., 2015; Şantaş, 2017; Şahin and Ocak, 2019; Haydaroğlu, 2022), *management* (Benligiray, 2009; Armutlu and Sağlam Arı, 2010; Aktan, 2014; Duygulu and Sezgin, 2015; Özen Kutanis et al., 2015; Bal and Karakuş, 2018; Vardarlıer and İncesu, 2021; Bayrakçı, 2022), *marketing* (Bozyiğit and Yaşa, 2012; Bakır, 2013; Bayam and Tayfun, 2018), *tourism* (Güçlü Nergiz, 2014; Demirbulat and Dinç, 2017; Alimanoğlu and Çolakoğlu, 2021) etc. These studies use YÖK (Council of Higher Education) National Thesis Center as a database. Similar to this study's scope, some studies covering organization and management fields are presented in Table 1.

Table 1: Literature Review for Postgraduate Theses Examined by Bibliometric or Content Analysis Methods

Year	Author(s)	Years Covered	Thesis Type	Main Subject
2009	Benligiray	1983–2008	Master and Doctorate	Human Resource Management
2010	Armutlu and Sağlam Arı	1986-2008	Master and Doctorate	Management Fashions
2014	Aktan	2003 – 2013	Master and Doctorate	Strategic Planning
2014	Baş et al.	2002-2012	Master and Doctorate	Intellectual Capital
2014	Güçlü Nergiz	1990-2013	Master and Doctorate	Tourism
2015	Duygulu and Sezgin	1984-2014	Doctorate	Organizational Behavior
2015	Özen Kutanis et al.	- 2014	Master and Doctorate	Organization Culture
2015	Mendeş Pekdemir et al.	2005-2014	Master and Doctorate	Business Management and Organization Department
2015	Yarlıkaş	2002-2014	Master and Doctorate	Management Information Systems
2016	Çelik	2000-2015	Doctorate	Innovation
2016	Şahin and Topal	2000-2015	Doctorate	Supply Chain
2017	Arıcıoğlu et al.	1993-2016	Master and Doctorate	Family Business
2017	Coşkun and Tabak	1995-2015	Master and Doctorate	Organizational Behavior
2017	Saatçıoğlu et al.	1999 -2017	Master and Doctorate	Knowledge Management
2018	Bal and Karakuş	2003-2017	Master and Doctorate	Diversity Management
2018	Vatansever Bayraktar and Girgin	2005-2018	Master and Doctorate	Organizational Commitment in the Field of Education Sciences
2019	Göktaş Kulualp and Yıldırım Kalem	1995-2018	Master and Doctorate	Culture And Cultural Differences
2019	Yeksan and Gümüş	2014-2019	Master	Organizational Commitment
2020	Arıkan Saltık and Alimanoğlu	1995-2018	Master and Doctorate	Organizational Behavior Studies in Tourism
2020	Altıntaş and Şener	2000-2019	Master and Doctorate	Organizational Justice
2020	Erer and Şahin	1998 - 2019	Master and Doctorate	Innovation
2020	Özyurt and Özgen	2008-2020	Master and Doctorate	Organizational Commitment Theses in Health Institutions
2021	Aslan	2007-2021	Master and Doctorate	Work-Life Balance
2021	Vardarlıer and İncesu	2010-2019	Master and Doctorate	Organizational Justice and Organizational Cynicism
2021	Korkmazer and Pirol	2000-2020	Master and Doctorate	Organizational Justice in Healthcare Professionals)
2022	Bayrakçı	2021	Master and Doctorate	Organizational Behavior

METHODOLOGY

Bibliometric approaches, or "analysis," are an essential component of research assessment methodology in scientific and practical disciplines. Bibliometric methods have been applied to provide a quantitative examination of written publications. Utilizing content analysis or citation analysis, bibliometric approaches are frequently used to extract and manipulate data. These techniques take advantage of considerably from computerized data processing, and there has been a significant rise in the number of such publications (Ellegaard and Wallin, 2015).

Postgraduate theses in Turkey related to ambidexterity were examined with bibliometric analysis according to predetermined parameters. The research scope includes theses accessible in the YÖK (Council of Higher Education) National Thesis Center. For this purpose, in order to reach theses from the YÖK National Thesis Center website, "ambidexterity" as a keyword has been searched, and theses in the social sciences group are included (see Table 2). The analyses were carried out on 26 postgraduate theses, including 9 master's and 17 doctorate theses. The obtained data were categorized by the Microsoft Office Excel program.

The theses, accessed within the sample framework of the research, were analyzed according to their type, publication year, language, university, research subject, research method, data collection method, sample, scales used, and variables investigated. The results of the analyses were presented in detailed tables.

Table 2: Number and Distribution of Postgraduate Theses

Keyword (Date of Search: 13.08.2022)	Open Access Theses		Non-accessible Theses	
	Master's Degree	Doctorate Degree	Master's Degree	Doctorate Degree
Ambidexterity	9	17	0	0
TOTAL	**26**		**0**	

FINDINGS

Table 3 shows that the highest numbers of postgraduate theses were completed in 2020. This year, five doctorate theses were completed, four of which are in Turkish and one in English. Among the theses included in the analysis, the first thesis was completed in 2012 in Turkish. It has been observed that the theses have been conducted regularly every year since 2012. It is noteworthy that the number of theses has increased in recent years. Approximately 35 percent of the theses were completed in 2020 and 2021. Table 3 illustrates that Turkish is the most frequently used in the doctorate degree theses.

Table 3: Distribution of Postgraduate Theses According to Year and Language

Year	Master's Degree			Doctorate Degree			TOTAL	%
	Language		M.Sc. Total	Language		PhD Total		
	Turkish	English		Turkish	English			
2012	-	-	**-**	1	-	**1**	**1**	**3,85**
2013	-	-	**-**	1	-	**1**	**1**	**3,85**
2014	-	1	**1**	1	1	**2**	**3**	**11,54**
2015	-	-	**-**	1	-	**1**	**1**	**3,85**

Year	Master's Degree			Doctorate Degree			TOTAL	%
	Language		M.Sc. Total	Language		PhD Total		
2016	2	-	**2**	-	-	**-**	**2**	**7,69**
2017	-	-	**-**	1	1	**2**	**2**	**7,69**
2018	-	2	**2**	1	-	**1**	**3**	**11,54**
2019	1	1	**2**	-	1	**1**	**3**	**11,54**
2020	-	-	**-**	4	1	**5**	**5**	**19,23**
2021	1	1	**2**	2	-	**2**	**4**	**15,38**
2022	-	-	**-**	1	-	**1**	**1**	**3,85**
Total	**4**	**5**	**9**	**13**	**4**	**17**	**26**	**100**

Table 4 displays the universities where the ambidexterity studies were conducted in Turkey. Gebze Technical University and Selçuk University are the universities where the highest number of postgraduate theses are completed. Gebze Technical University and Selçuk University are followed by Yeditepe University, Beykent University, İstanbul Ticaret University and Marmara University. The highest number of master theses (2 theses) on ambidexterity has been completed at Marmara University, and the highest number of doctorate theses has been completed at Gebze Technical University.

Table 4: Distribution of Postgraduate Theses by University

University	Master's Degree Number of Thesis	Doctorate Degree Number of Thesis	TOTAL
Gebze Technical University	-	3	**3**
Selçuk University	1	2	**3**
Yeditepe University	-	2	**2**
Beykent University	-	2	**2**
İstanbul Ticaret University	-	2	**2**
Marmara University	2	-	**2**
Anadolu University	-	1	**1**
Ankara University	-	1	**1**
Balıkesir University	-	1	**1**
Bolu Abant İzzet Baysal University	1	-	**1**
Dokuz Eylül University	1	-	**1**
İstanbul University	-	1	**1**
İstanbul Arel University	-	1	**1**
İstanbul Bilgi University	1	-	**1**
Kahramanmaraş Sütçü İmam University	1	-	**1**
Karabük University	1	-	**1**
Nişantaşı University	-	1	**1**
Middle East Technical University	1	-	**1**

According to the institutes of theses, it is evident that social science was the institute where the majority of the ambidexterity theses (84,62%) were completed. The rest of the theses (15,38%) were conducted at the institute of graduate studies. As seen in Table 5, the vast majority of the the-

ses were conducted in the department of business administration (88,46%) and followed by the department of tourism management and psychology.

Table 5: Distribution of Postgraduate Theses According to Institute and Department

	Master's Degree	Doctorate Degree	TOTAL
	Number of Thesis	Number of Thesis	
Graduate School of Social Sciences	8	14	**22**
School of Graduate Studies / Institute of Graduate Studies	1	3	**4**
Department of Business Administration	8	15	**23**
Department of Tourism Management	-	2	**2**
Department of Psychology	1	-	**1**

Business administration ranks at the top regarding research subjects involved in ambidexterity theses. The other research subjects are tourism and banking (see Table 6).

Table 6: Distribution of Postgraduate Theses by Research Subject

Research Subject	Master's Degree	Doctorate Degree	TOTAL
	Number of Thesis	Number of Thesis	
Business Administration	9	14	**22**
Tourism	-	2	**2**
Banking	-	1	**1**

Table 7 presents the number of research methods used in the theses. It is seen that almost all the master's and doctorate theses have used quantitative methods in their research. However, only one master's study has used the qualitative research method. Survey (96,15%) and interview (3,85%) methods were used for data collection.

Table 7: Distribution of Postgraduate Theses According to Research and Data Collection Methods

Research Method	Master's Degree	Doctoral Degree	TOTAL
	Number of Thesis	Number of Thesis	
Quantitative	8	17	**25**
Qualitative	1	-	**1**
Mixed	-	-	**-**
Data Collection Method	**Number of Thesis**	**Number of Thesis**	
Survey	8	17	**25**
Interview	1	-	**1**

In the ambidexterity postgraduate theses, there are various sample sectors and fields of application. When the theses are analyzed in terms of their research samples, it is seen that the researchers mostly investigate

the concept of ambidexterity in the small and medium-sized enterprises (SMEs) and manufacturing and service sectors. The research samples of the theses are detailed in Table 8.

Table 8: Distribution of Postgraduate Theses According to Sample Sector

Research Sample	Master's Degree	Doctorate Degree	TOTAL
	Number of Thesis	Number of Thesis	
SMEs	-	3	**3**
Companies from different sectors	2	1	**3**
Manufacturing and service sector	-	3	**3**
Technoparks & Technology development zones	1	1	**2**
Family businesses	-	2	**2**
Communication	1	-	**1**
Companies registered at Borsa Istanbul	-	1	**1**
University / Academician	-	1	**1**
Chemicals sector	1	-	**1**
Food sector	1	-	**1**
Information and technology sector	-	1	**1**
Banking	-	1	**1**
Hotel	-	1	**1**
Public institution	1	-	**1**
Manufacturing, transportation & storage, and trade sector	1	-	**1**
Construction	1	-	**1**
Hospitals (medical tourism services)	-	1	**1**
Industrial Enterprises	-	1	**1**

Table 9 presents the frequencies of the scales used in the theses. The most preferred scale is the "Ambidextrous Orientation" of Lubatkin et al. (2006). Some of the theses stated that they used the Turkish translation version of this scale which is translated by the study of Akdoğan et al. (2009) and the doctorate thesis of Attar (2014). The other scales used in the theses are presented in the table below.

Table 9: Frequencies of Scales used in the Postgraduate Theses

Questionnaire / Scales Used	Master's Degree	Doctorate Degree	TOTAL
Lubatkin et al. (2006)	2	5	**13**
Lubatkin et al. (2006) / *Turkish translation and validation by Akdoğan et al. (2009)*	-	2	
Lubatkin et al. (2006) / *Turkish translation and validation by Attar (2014)*	-	4	
Jansen et al. (2006) (2008)	2	3	**5**

Questionnaire / Scales Used	Master's Degree	Doctorate Degree	TOTAL
Instrument development based on the various scales in the literature *(Tushman and Anderson, 1986; Bhoovaraghavan et al., 1996; Markides, 1997; Şanal, 2011; Spanos and Lioukas, 2001; He and Wong, 2004; Gibson and Birkinshaw, 2004; Subramaniam and Youndt, 2005; Lubatkin et al., 2006; Jansen et al., 2006; Morgan and Berthon, 2008; Cao et al. 2009)*	1	2	**3**
Clercq et al. (2013) Contextual ambidexterity	2	-	**2**
Mom et al. (2007) Contextual ambidexterity	1	-	**1**
Bodwell (2011) Organizational ambidexterity	-	1	**1**
Kortmann (2014) Structural ambidexterity	1	-	**1**
Not expressed	1	1	**2**

The scales of Lubatkin et al. (2006), Jansen et al. (2006), He and Wong (2004), Bodwell (2011), Kortmann (2014), and Cao et al. (2009) include two dimensions named exploration and exploitation. These two dimensions constitute structural ambidexterity. The contextual ambidexterity includes Alignment and Adaptability dimensions which are included in the scales of Gibson and Birkinshaw (2004) and Clercq et al. (2013).

Table 10: Dimensions of Scales Used in the Theses

Author(s)	Dimensions
Lubatkin et al. (2006)	**AMBIDEXTROUS ORIENTATION** – Exploratory orientation (6 items) – Exploitative orientation (6 items)
Jansen et al. (2006) (2008)	**STRUCTURAL AMBIDEXTERITY** – Exploratory innovation (6 items) – Exploitative innovation (6 items)
He and Wong (2004)	**STRUCTURAL AMBIDEXTERITY** – Explorative innovation strategy (4 items) – Exploitative innovation strategy (4 items)
Mom et al. (2007)	– Managers' exploration activities (5 items) – Managers' exploitation activities (6 items)
Bodwell (2011)	**STRUCTURAL AMBIDEXTERITY** – Exploration variable (8 items) – Exploitation variable (8 items)
Kortmann (2014)	**STRUCTURAL AMBIDEXTERITY** – Exploitative innovation (4 items) – Exploratory innovation (4 items)

Cao et al. (2009) *based on He and Wong (2004)*	**STRUCTURAL AMBIDEXTERITY** – Exploration (4 items) – Exploitation (4 items)
Gibson and Birkinshaw (2004)	**CONTEXTUAL AMBIDEXTERITY** – Alignment (3 items) – Adaptability (3 items)
Clercq et al. (2013) *based on Gibson and Birkinshaw (2004)*	**CONTEXTUAL AMBIDEXTERITY** – Alignment (3 items) – Adaptability (3 items)

The frequencies of the variables associated with ambidexterity are detailed in Table 11.

Table 11: Frequencies of Variables Investigated in the Postgraduate Theses

Variables		M.Sc	PhD	Master's Degree	Doctorate Degree
Organizational Ambidexterity	Organizational ambidexterity	7	12	10	17
	Ambidexterity	1	2		
	Ambidexterity innovation efforts	-	1		
	Innovation ambidexterity	-	1		
	Leadership ambidexterity	1	-		
	Strategic ambidexterity	-	1		
	Contextual ambidexterity	1	-		
Performance	Business / Firm / Organizational performance	2	3	5	10
	Firm innovation performance	-	2		
	Financial Performance	-	4		
	Non-financial Performance	1	-		
	Performance management	1	-		
	Market performance	-	1		
	Performance goal orientation	1	-		
Leadership	Leadership/behaviors	-	2	3	9
	Authentic Leadership	-	2		
	Transactional Leadership	-	2		
	Transformational Leadership	2	2		
	Strategic leadership	1	-		
	Top management team behavioral integration	-	1		
Learning Organization	Learning organization approach	-	1	-	5
	Learning organization	-	1		
	Organizational learning	-	2		
	Organizational memory	-	1		
Organizational capitals	Social capital	1	-	2	2
	Psychological capital	1	-		
	Intellectual capital	-	2		
Organizational agility - strategic agility				1	2

Variables	M.Sc	PhD	Master's Degree	Doctorate Degree
Competitive advantage			-	2
Corporate entrepreneurship - Entrepreneurial orientation			1	1
Organizational culture			1	1
Generic strategies, Competitive Strategies			1	1
Organizational structure, Hybrid organizational structure			1	1
Strategic information system			1	-
Strategic management			-	1
Strategic flexibility			1	-
Climate for Creativity			-	1
Board creativity, board diversity, board member creativity, board context (environment)			-	1
Digital transformation			-	1
Information sharing			1	-
Knowledge management			-	1
Market orientation			-	1
Market dynamism			-	1
Organizational change management			1	-
Organizational justice			-	1
Organizational adaptation			-	1
Whistleblowing act, intention to leave			-	1
Innovation			-	1
Internationalism			-	1
Price competition			-	1
Organizational support			-	1
Environmental hostility			-	1
Family effect (family power, family culture, family experience)			-	1

As the main variable, ambidexterity was investigated under the concepts of organizational ambidexterity, ambidexterity innovation efforts, innovation ambidexterity, leadership ambidexterity, strategic ambidexterity, and contextual ambidexterity. It was most frequently associated with the performance and leadership variables. The performance variable was examined under organizational performance, firm innovation performance, financial performance, non-financial performance, performance management, market performance, and performance goal orientation. In addition, leadership was investigated in the studies as an antecedent of ambidexterity. Transformational leadership was mostly examined, and it is followed by transactional leadership, authentic leadership, and strategic leadership. Learning organization variables are investigated under the learning organization approach, organizational learning, and organizational memory concepts.

Other variables that are associated with ambidexterity are as follows: social capital, psychological capital, intellectual capital, organizational agility / strategic agility, competitive advantage, corporate entrepreneurship / entrepreneurial orientation, organizational culture, generic strate-

gies, competitive strategies, and organizational structure. The variables examined only in one thesis are presented in Table 11.

CONCLUSION

In the context of the study, postgraduate theses on ambidexterity in the YÖK National Thesis Center database were examined by the bibliometric analysis method. This study aims to present a scientific roadmap to higher education students and researchers interested in the subject by collecting the contents of the theses on ambidexterity within a single research framework.

As previously mentioned, although the subject of ambidexterity has attracted great interest in foreign literature, it has been a limited research area in terms of publications in Turkey. For this reason, it can be said that the number of thesis studies accessed is quite limited. Considering the distribution of theses according to their type, it is observed that the research interest in the subject is concentrated at the doctorate level. While the Turkish language has a significant weight in doctoral studies, it is almost equal to English in master's theses.

While the first thesis study was carried out in 2012, the highest number of thesis studies were carried out in 2020, and the number of theses started to increase in the last two years. Gebze Technical University and Selçuk University are the universities with the most research on the subject. Graduate School of Social Sciences is the institute with the highest number of theses. While the subject mostly attracts the attention of business administration students, it can be said that limited studies have been carried out in the tourism management and psychology departments. Nearly all the theses focused on empirical studies by conducting survey research, one of the quantitative research methods. From this point of view, it is possible to state that there is a lack of qualitative study on the topic of ambidexterity. Empirical studies mostly preferred to use the scales of foreign authors and the translations of these scales by Turkish authors. Studies were mostly carried out in the samples of SMEs, companies from different sectors, manufacturing and service sector, technoparks and technology development zones, and family businesses.

The research model of theses mostly explored the relationships between ambidexterity and other variables. To summarize the findings of the theses, while leadership was considered the precursor of ambidexterity, performance was mostly tested as a consequence. The findings of the theses revealed that there is a positive relation between leadership (especially transformational) and organizational ambidexterity. Also, organizational culture is found to be a critical factor of organizational ambidexterity. Organizational memory and learning organization both have a significant

impact on organizational ambidexterity. While most studies supported the positive relationship between ambidexterity and firm performance, there were also studies that found no relationship between them. A positive and significant effect of organizational ambidexterity on both the financial and growth performance of the firm is supported in different studies. In one study, it was observed that the exploitation innovation strategy was more effective on financial performance, while the exploratory innovation strategy was found to be more effective on innovation performance. Moreover, the exploitation sub-dimension of organizational ambidexterity has been found to have a strong and positive association with all dimensions of organizational agility. It is revelated that all dimensions of organizational ambidexterity strongly affect strategic flexibility. Contextual ambidexterity is associated with all aspects of corporate entrepreneurship.

In conclusion, it is thought that revealing the focal points of ambidexterity theses can guide and show the gaps in the research topic to students and researchers, and thus this study can contribute to the literature.

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CHAPTER 12

A PERFORMANCE COMPARISON OF HYBRID BLACK HOLE ALGORITHM WITH POPULAR META-HEURISTICS IN TRAVELING SALESMAN PROBLEM

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1. INTRODUCTION

Combinatorial optimization is a general reseach field in operations research and computer science. Addition to that, solving combinatorial problems using modern meta-heuristics is a part of engineering and science in the scientific literature (Chen & Chien, 2011; Ezugwu, Adewumi & Frîncu, 2017; Zhou, Zhu, Hu, Deng, Song, Qui & Pan, 2019). Almost all heuristics are generally problem-specific approaches that bring acceptable or near-optimal solutions to mathematical problems (Riera-Ledesma & Salazar-González, 2005; Sumathi, Viswanatha Reddy & Purusotham, 2020). However, meta-heuristics have been implemented effectively to the common optimization problems, such as routing (Euchi, Zidi & Laouamer, 2020), logistics (Deng, Chen, He, Liu, Yin & Guo, 2012), scheduling (Silva, & Klement, 2017), timetabling (Azimi, 2004), assignment (Salazar-Aguilar, Boyer, Nigenda, & Martinez-Salazar, 2019), inventory allocation (Wanke, Alvarenga, Correa, Hadi-Vencheh & Azad, 2017), etc. There exist enough number of meta-heuristics developed and applied in recent years, such as simulated annealing (Geng, Zhihua, Yang, Shi & Zhao, 2011), tabu search (Qinghua, Yang & Zhipeng, 2015), genetic algorithm (Baker & Ayechew, 2003), ant colony optimization (Yu, You & Liu, 2021), gravitational search algorithm (Rashedi, Nezamabadi-pour & Saryazdi, 2009), firefly algorithm (Altherwi, 2020), artificial bee colony algorithm (Szeto, Yongzhong & Ho, 2011), ray optimization (Kaveh & Khayatazad, 2012), black-hole algorithm (Hatamlou, 2012, 2018), water-wave optimization (Zheng, 2015), and worm optimization algorithm (Arnaout, 2017).

Meta-heuristics search for optimal solutions, but they often find solutions that are mostly far from optimal at 3%-5%. Even though the fundamental parameters have been frequently used in the optimization process and the literature (Demiral, M. F. 2021, Hatamlou, 2018; Ibrahim & Ali, 2016), the accuracy of the solution depends on the parameter values of meta-heuristics. The accurate parameter changes as data size, iteration number, and neighborhood structure change. However, in principle, the most appropriate parameter and solution strategy should be used with the investigated problem. Improved meta-heuristics generally give better solutions than pure meta-heuristics. The pure ones may be randomized or start with a constructive heuristic. Randomized solutions demonstrate lower performance than starting with constructive heuristics (NN, k-NN). Besides, hybridizing with local searches (3-opt, k-opt), and other heuristics, such as the Clarke-Wright algorithm gives better solutions.

Starting or hybridizing with a heuristic provides more diversification and intensification, searches for unexplored areas, and would hopefully find novel solutions in the space. Improving and hybridizing meta-heuristics are convenient ways for discrete and global optimization. They gener-

ally give better solutions than other algorithms. The common application areas of combinatorial problems and algorithms are mathematical optimization, industrial engineering, computer science, production and planning, transportation and logistics, inventory planning, and other fields of science and engineering.

The black hole algorithm stimulates the moving behavior of stars towards the black hole in the solution space. BH is a practical and convenient way for operations research problems due to its simple algorithm structure, less computation time, and randomized event-horizon system. Although a modified black-hole algorithm is a good methodology for optimization problems, there exist plenty of research areas to improve the performance of BH (Abdulwahab, Noraziah, Alsewari & Salih, 2019; Pashaei & Aydin, 2017; Yepes, Martí & García, 2020)

The gravitational search algorithm (GSA) is another physics-inspired meta-heuristic that works through the universal law of Newton's gravity and mass interactions (Eldos & Al-Qasim, 2013; Mittal, Tripathi, Pandey & Pal, 2021). In BH-GSA, a new operator named as "black-hole" which is inspired by the astronomical phenomenon was proposed to prevent premature convergence and develop the diversification and intensification abilities of the algorithm (Doraghinejad & Nezamabadi-pour, 2014).

In this study, the proposed hybrid algorithm with appropriate parameter strategy are applied to measure the performance in solving the discrete problem (TSP). The traveling salesman problem belongs to the class of NP-hard for measuring the performance of the heuristic and meta-heuristic algorithms. The objective of the salesman is to find the optimal tour that covers all cities and return to the initial city.

The all of the full-text is organized as follows: In Sect. 2, the discrete problem is mentioned. In Sect. 3, the black-hole meta-heuristic is briefly explained. The experimental study is given in Sect. 4. At final, in Sect. 5, the summary and suggestions are discussed.

2. TRAVELING SALESMAN PROBLEM

The traveling salesman problem (TSP) is a main research field of operations research and popular optimization problem. Even if the problem is defined by the mathematical formula, the sub-tours arise from the LP (linear programming) computation without sub-tour elimination constraints. Almost all of the heuristic methods solve the problem near-optimally and at reasonable times, it requires longer computational times while the problem size is getting larger. In traveling salesman problems, the locations are dispersed in space randomly; so the main goal is to travel and minimize total distance, and time, or maximize the utility of the salesman under the

side constraints, such as budget, capacity, fuel, and others. TSP can often be investigated as data type: small, medium, and large scale. Besides, it has been examined as distance matrix type: symmetric and asymmetric matrices. Due to different distances between cities $(d_{ij} \neq d_{ji})$, the asymmetric type is rather difficult to solve than the symmetric type $(d_{ij} = d_{ji})$. Moreover, in the past literature, TSP has been investigated in various types: euclidean TSP, double TSP, multiple TSP, capacitated routing problem, traveling purchaser problem, vehicle routing problem, etc. (Basu, 2012; Cheikhrouhou & Khoufi, 2021). If a salesman purchases some things along the tour, it specializes to the traveling purchaser problem (TPP). If multiple salesmen (m-TSP) travel with a specific capacity and pick up-delivery items, it is named as capacitated routing problem (CVRP).

Although it can be found feasible solutions to some combinatorial problems, is still waiting for a polynomial solution for the traveling salesman problem (TSP), routing, production scheduling, and multi-dimensional engineering problems. They still belong to NP-hard types. If a large size of data and various combinatorial problems are used, finding an optimal solution to the problem becomes more difficult and time-consuming. Thus, popular and more effective hybrid algorithms are the candidates for the solution of combinatorial optimization.

In the mathematical description of the problem, the cities, edges, sets, and vertices: N is the set of n cities, E is the set of the edges, and $Dist_{ij} = (d_{ij})$ shows the distances between cities (i and j). $T_k = \{r_1, r_2, \ldots, r_n, r_1\}$ is the candidate set of the tours for $k = 1,2,3, \ldots, m$. r_1 indicating the first vertex and r_n indicates the *nth* vertex of all the potential tours. Then, the mathematical model of the TSP problem is clearly given in Eq. 1.

$$\text{Min.} \sum_{l=1}^{n-1} (d_{v_i,v_{i+1}}) + d_{v_n,v_1} \tag{1}$$

The distance between cities is calculated by the euclidean formula using Eq.2. In Eq. 2, the , indicate the coordinates and the , and indicate the coordinates of the same nodes.

$$d_{t,j} = \sqrt{(x_t - x_j)^2 + (y_t - y_j)^2} \tag{2}$$

3. BLACK HOLE ALGORITHM

Black-Hole is a well-known optimization algorithm in the last decade. The black-hole algorithm has various implementations in continuous

and discrete problems. It is quite well due to less number of parameters than other meta-heuristic approaches. The black-hole algorithm (BH) has a unique parameter (Q) in discrete optimization related to objective function (FObj). This unique parameter changes in each dataset, in iteration number, and neighborhood structure. In this study, the experimental study has been done via TSP datasets which belongs to the TSP library, maximum iteration, and the neighborhood operator such as the minimum selection of reverse, swap-reverse, insertion, and swap operator. The optimal solutions and #of solutions are given as the best, mean, worst solutions, std. deviation, and CPU time. Besides, the optimal parameter values (Q) can be determined in general way when different datasets are used in the experimentational study. As a result, the optimally calculated Q values ought to be used in each case for the proposed BH algorithms.

BH algorithm is a multi-solution (population) algorithm, like other physics-inspired, swarm optimization, bio-inspired, and chemistry-inspired algorithms. Candidate solutions are the normal stars, and the best candidate is the black hole. The normal stars are moving toward the black hole, and there is a possibility of a star that is better (objective-fitness) than the black hole. This star replaces the black hole. Then, while moving stars toward the black hole, there is another possibility of a star dying, and another candidate solution participates in the population. At the last step of the algorithm, this new population is formed with new candidates.

The event horizon radius in the BH algorithm is calculated by the equation:

$$R = \frac{f_{BH}}{\sum_{i=1}^{N} f_i} \tag{3}$$

f_{BH} is the fitness of the Black Hole, and the denominator is the total number of stars. The ratio is the event horizon radius or the black hole radius.

The original position updating equation of each candidate is realized in Eq. 4.

$$x^i(t+1) = x^i(t) + rand * (x^{BH} - x^i(t)) \tag{4}$$

In the traveling salesman problem, update star locations via the selection of minimum multiple neighborhood operators in Eq. 5.

$$SMMOp = \min(swap, insertion, reversing, swap - reversing) \tag{5}$$

The new candidate solutions are accepted with the objectives found in Eq. 6.

$$NeighObj_{now}^{i,t} < Obj_{now}^{i,t}$$
$$Obj_{now}^{i,t} = NeighObj_{now}^{i,t} \quad (6)$$

The original event-horizon condition is calculated via Eq. 7.

$$|f_{BH} - f_i| < \frac{f_{BH}}{\sum_{i=1}^{N} f_i} \quad (7)$$

In this study, the event-horizon condition occurs for discrete problems (traveling salesman problem) via Eq. 7 in Eq. 8.

$$\frac{Q_{Data}}{|Obj_{BH} - Obj_i|} < \frac{f_{BH}}{\sum_{i=1}^{N} f_i} \quad (8)$$

The specific Q value is assigned to each dataset for the discrete problem. Therefore, the optimal Q_{Data} value should be selected for the accurate calculation of the TSP solution. If the event-horizon condition occurs, the old star dies, and the new star is born via random permutation of the star in Eq. 9.

$$NewSolution_{now}^{i,t} = [1, randperm(Data\_size)] \quad (9)$$

Otherwise, the new current solution is assigned as the previous value of the solution. In the light of the above Eqs. 1-9, the procedure of the pseudo-code of the Discrete Hybrid Meta-heuristic (DHBH2) is shown in Figure 1:

```
Black Hole Algorithm (BH)
Initialize the Population with a constructive heuristic (NN or k-NN)
Initialize Black Hole algorithm dataset specific parameter value (Q)
Compute Population objective function
and find the current black hole
While (Counter < Total Iteration Number)
For i =1: Population of stars
Update star locations using Eq. 5.
Optional: Apply an improvement heuristic (3-opt, k-opt, or
Clarke-Wright)
Exchange the star with a black hole via the fitness function
End For i
Decide the acceptance of new star locations using Eq. 6.
If (event horizon condition occurs using Eq. 8)
Replace it with a randomized star and create a new population
using Eq. 9
End If
Rank the Population of all stars and find the best candidate (BH) in
the star population
End While
State the final results (Final Statistics)
```

Figure 1. Pseudo-code of the Hybrid Black Hole Algorithm (DHBH2)

In this study, the Black-Hole algorithm is hybridized with a constructive heuristic (NN or k-NN), without improving a local search (3-opt, k-opt, or Clarke-Wright). The experimental results are represented in Section 4.

4. EXPERIMENTAL RESULTS

The 13 small and medium-scale datasets ranging from 29 to 195 nodes (cities) were selected from the TSPLIB library in the computation. In this section, all of the experimentations were run on Intel® Core™ i7 3520-M CPU 2.9 GHz speed with 8 GB RAM using Matlab. BH+NN (HA2) is compared with CA+NN (HA1), BH, CA, and GA to show the performance of the proposed hybrid algorithm. All the meta-heuristics were run 10 times independently using standard (adequate) parameters for all the datasets. The application has been implemented using 200-3000 iteration numbers for each dataset and an increasing number of data (29-195). The parameter setting in this study has been used as in many studies in the literature (Feng, Liu, Yu & Luo, 2019; Halim & Ismail, 2019; Lin, Lee & Hong, 2003; Yildirim & Karci, 2018). The BH and its hybrid (BH+NN) are implemented with optimal Q parameters in each dataset shown in Table 1. In GA, the crossover rate is 0.80, the mutation rate is 0.02. In GA, the crossover is a one-point reversing type, and the mutation is the one-point operator. In CA, the dimension of solution space (dim=10), the temperatures (T_{min}=0, T_{max} =100), initial endurance and supply (Init_End=1,

Init_Supp =1), visibility threshold (Vis=0.5), dying rate (dye_rate=0) are the adequate parameters. The population size is set to 100 for all the population-based meta-heuristics (GA, CA, BH, HA1, and HA2).

Table 1. *Optimal Q values for each TSP Dataset*

TSP	Q	TSP	Q	TSP	Q
wi29	350	eil76	4.5	bier127	800
dj38	80	pr76	1200	kroa150	200
eil51	3	rat99	14.5	rat195	25
berlin52	60	kroa100	300	pr226	1600
st70	6.5	eil101	6	a280	20

Table 2 shows the comparison of meta-heuristics between HA2, HA1, BH, CA, and GA In this table, the results are given as the statistical values of the summary results. As deduced from Table 2, it can be summarized that the solution quality of the hybrid algorithm HA2 (BH+NN) is better compared to HA1, BH, CA, and GA for 76.92% of all datasets, excluding wi29, dj38, and pr76. Besides, in Table 3, HA2 finds 30, HA1 finds 10, BH finds 9, GA finds 3 (+2), and CA finds never acceptable solutions among the 52 best results. In summary, Table 3 shows that the hybrid algorithm (HA2) outperforms HA1, BH, CA, and GA for 57.69% of all solutions. In the second comparison, it can be observed that the quality of the hybrid algorithm HA1 (CA+NN) is better compared to BH, CA, and GA for 61.54% of all datasets, excluding wi29, dj38, eil51, eil76, and pr76. BH is effective for 30.77% of all datasets (dj38, eil51, eil76, and pr76). Besides, in Table 4, HA1 finds 34, BH finds 15, GA finds 3 (+2), and CA finds never acceptable solutions among the 52 best results. In summary, Table 4 shows that the hybrid algorithm (HA1) outperforms BH, CA, and GA for 65.39% of all solutions. HA2 and HA1 have reasonable standard deviations among all the algorithms. A low value of the standard deviation indicates that the hybrid algorithm is a more stable approach to find acceptable results. Lastly, the hybrid algorithms solve the TSP problem in competitive times (8.82 and 10.06 secs.) in comparison to other test algorithms for small and medium-scale instances.

Table 2. *Computational results of meta-heuristics in traveling salesman problems*

TSP	Measure	GA	CA	BH	HA1	HA2
wi29	Best	27603	27620.8	27603	27944.1	27768.3
(27603)	Worst	27748.7	29670.8	28061.8	30204.1	28806.6
	Avg	27615.9	28610	27649.2	28759	28132.5
	Std.	46.65	631.31	145.11	709.56	277.99
	Time	15.14	20.72	10.79	3.89	3.28
	Number	1000	1000	1000	200	200
dj38	Best	6659.43	6887.47	6659.43	6764.22	6662.35
(6656)	Worst	7926.1	7647.93	6738.6	7406.94	6949.86
	Avg	7060.36	7248.86	6681.68	7098.69	6811.81
	Std.	416.55	304.43	27.16	243.4	97.65
	Time	20.75	18.8	11.62	3.41	3.28
	Number	1000	1000	1000	200	200
eil51	Best	476.27	475.69	454.2	470.67	448.88
(426)	Worst	509.01	553.21	482.91	494.09	478.87
	Avg	497.5	501.38	470.14	481.51	465.3
	Std.	8.62	23.91	7.67	8.23	9.77
	Time	46.54	20.61	13.16	4.42	3.09
	Number	1000	1000	1000	200	200
berlin52	Best	8263.94	8471.6	8151.88	7804.87	7800.2
(7542)	Worst	8821.69	9868.52	8576.64	8065.72	7912.87
	Avg	8530.64	9210.01	8321.31	7892.65	7849.81
	Std.	162.35	421.82	152	92.27	30.07
	Time	50.25	20.14	13.2	4.53	3.98
	Number	1000	1000	1000	200	200
st70	Best	922.91	910.16	829.34	766.51	747.7
(675)	Worst	1031.91	1129.62	882.38	794.7	778.91
	Avg	981.43	973.48	852.62	781.95	764.18
	Std.	33.95	62.89	19.69	8.66	8.43
	Time	71.8	23.33	15.14	4.65	4.25
	Number	1000	1000	1000	200	200
eil76	Best	625	662.62	608.08	613.07	608.95
(538)	Worst	683.12	703.93	638.12	626.98	626.35
	Avg	651.72	687.84	618.87	621.57	617.18
	Std.	17.63	13.2	9.64	4.82	5.76
	Time	136.86	47.97	30.98	8.08	6.16
	Number	2000	2000	2000	300	300
pr76	Best	123161	132808	120278	115871	119267
(108159)	Worst	135517	151902	128776	134550	128290
	Avg	128953	141700	124631	130790	125202
	Std.	4157.96	7006.28	2524.16	5595.77	2883.75
	Time	94.18	48.57	30.37	7.33	5.84
	Number	2000	2000	2000	300	300
rat99	Best	1425.09	1671.46	1549.93	1421.31	1368.3
(1211)	Worst	1601.11	1924.98	1691.29	1459.74	1407.09
	Avg	1478.83	1815.73	1615.84	1435.18	1388.26
	Std.	50.79	85.01	48.75	11.88	12.42
	Time	149.69	54.9	36.5	9.38	7.02
	Number	2000	2000	2000	300	300
kroa100	Best	26091.2	29918.2	25878	24372.1	23299.2
(21282)	Worst	33042.8	36144.3	28455.8	25110.8	24732.9
	Avg	30326.2	33030.8	27412.3	24747.1	24083.2
	Std.	2216	2526.35	821.63	285.55	480.73
	Time	246.75	83.56	54.12	14.48	12.33
	Number	3000	3000	3000	500	500
eil101	Best	781.15	781.41	740.56	698.05	708.01
(629)	Worst	861.99	884.79	776.56	749.67	724.17
	Avg	816.82	830.39	754.71	726.54	716.32
	Std.	29.56	30.82	12.33	17.31	4.41
	Time	246.48	82.83	53.98	14.62	12.84
	Number	3000	3000	3000	500	500
bier127	Best	150956	164011	151948	127929	128288
(118282)	Worst	185278	191167	163843	131437	129450
	Avg	162809	176275	157435	129693	128866
	Std.	9486.13	9885.46	3130.95	1180.92	388.97
	Time	344.54	94.63	64.54	16.32	14.84
	Number	3000	3000	3000	500	500
kroa150	Best	46114.4	44637.6	47375.7	30899.7	30557.3
(26524)	Worst	55136.8	58186.2	53254.3	31345.5	31458.8
	Avg	51257.2	51241.9	50073.9	31145.2	30921.6
	Std.	2686.53	4494.79	1962.81	160.03	257.7
	Time	443.26	104.05	74.16	18.16	16.74
	Number	3000	3000	3000	500	500
rat195	Best	3808.76	4696.13	4424.45	2650.18	2646.14
(2323)	Worst	4586.19	5265.62	4741.38	2759.78	2756.07
	Avg	4225.92	4964.61	4551.89	2707	2710.54
	Std.	271.91	187.6	101.34	37.28	41.04
	Time	480.39	126.12	88.3	21.51	21.01
	Number	3000	3000	3000	500	500

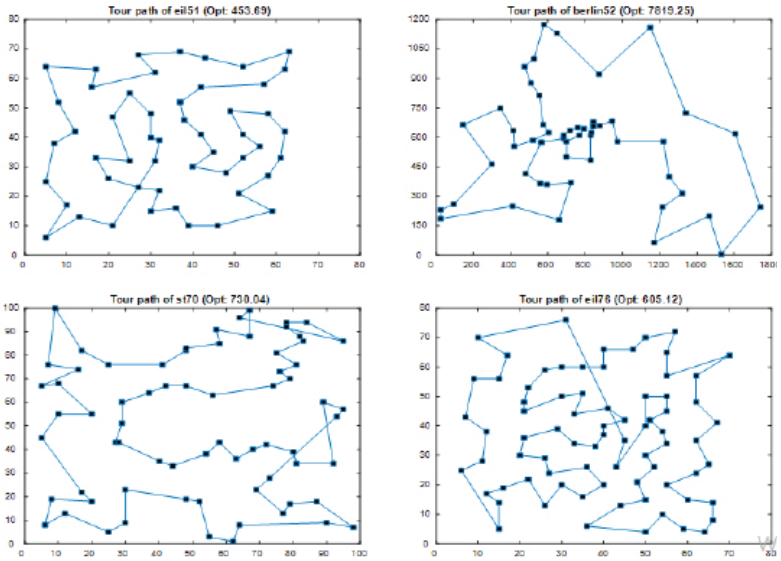
In general, the computational study shows that the proposed hybrid algorithm (HA2) is a robust and clear method for solving the symmetric traveling salesman problems. This hybrid algorithm would give better results and low standard deviations in short iteration numbers as compared to the other test algorithms. Figure 2 shows a set of solutions found by the proposed hybrid algorithm (HA2) on the small and medium-scale TSP instances.

Algorithm	Best	Worst	Average	Standard Deviation	Average CPU Time
HA2	7	10	9	4	8.82
HA1	3	1	1	5	10.06
BH	3	1	2	3	38.22
CA	-	-	-	-	57.40
GA	(2)	1	1	1	180.51

Table 3. *The #of best-average-worst solutions and average CPU time basis on HA2*

Table 4. *The #of best-average-worst solutions and average CPU time basis on HA1*

Algorithm	Best	Worst	Average	Standard Deviation	Average CPU Time
HA1	9	9	8	8	10.06
BH	4	3	4	4	38.22
CA	-	-	-	-	57.40
GA	(2)	1	1	1	180.51



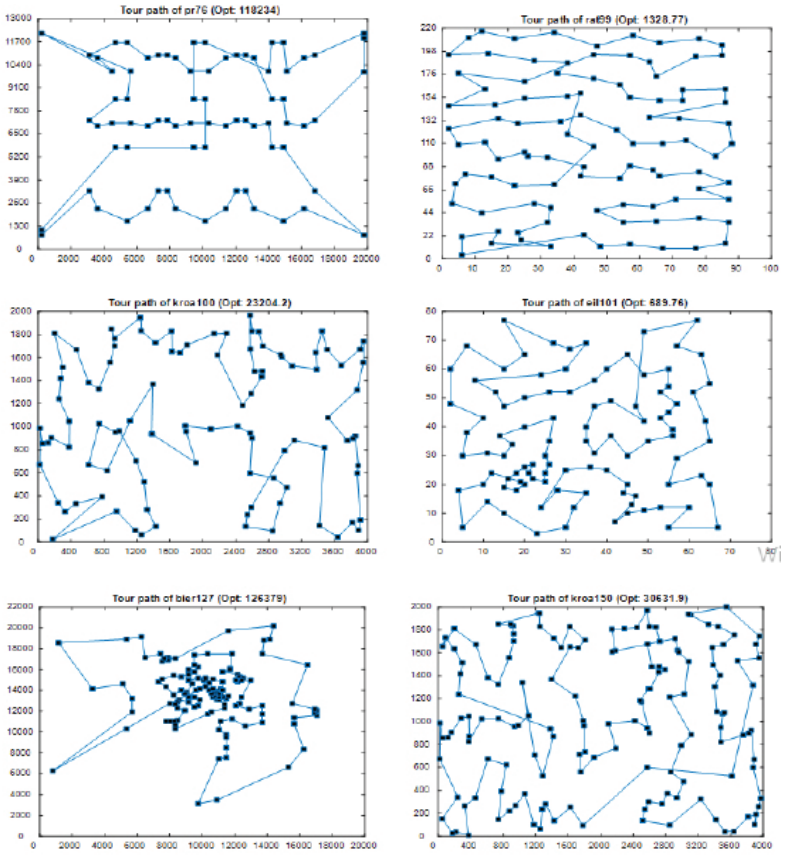


Figure 2. A set of solutions found by the proposed hybrid algorithm (HA2)

5. CONCLUSIONS AND FUTURE WORK

In the last decade, solving mathematical problems via trend algorithms is a well-known research field of operations reseach. In this paper, the hybrid algorithm (HA2) is implemented in the symmetric TSP instances. To measure the performance of the hybrid algorithm, it has been tested on 13 benchmark datasets. The computational results show that the hybrid algorithm (HA2) is superior to the hybrid algorithm (HA1), black hole algorithm (BH), camel algorithm (CA), and genetic algorithm (GA) for 76.92% of TSP datasets and 57.69% of all solutions. As computation time is discussed, the proposed hybrid algorithm is quite fast (8.82 secs.) to find acceptable results. In the second comparison, the experimentational study also shows that the hybrid algorithm (HA1) is superior to the black hole algorithm (BH), camel algorithm (CA), and genetic algorithm (GA) for 61.54% of all datasets and 65.39% of all solutions. BH is effective for

30.77% of all datasets (dj38, eil51, eil76, and pr76). As CPU time is discussed, the second hybrid algorithm is also quite fast (10.06 secs.) to find acceptable results.

In future studies, the hybrid algorithms (HA2) and (HA1) can be further improved and hybridized with other meta-heuristics to optimize the effectiveness and efficiency of the algorithm. Furthermore, many comparative studies can be done in several optimization problems, such as scheduling, assignment, timetabling, routing, mathematical optimization in the field of operations research.

Conflict of Interest

The author declares that there is no conflict of interest.

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Author Contribution

The author is responsible for all the manuscript, data availability, and coded optimization algorithms.

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CHAPTER 13

ARE MARKETS EFFICIENT? EVIDENCE FROM BORSA ISTANBUL

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Introducton:

Efficient market hypothesis (EMH) claims that price of a stock reflects all available information. According to EMH, prices evolve randomly, thus, it is not possible to identify predictable patterns in stock prices. In other words, it is not possible to beat the market returns with publicly available information. Skill is not enough to beat the market unless there is a factor of chance. So, active management is thought to be wasted effort. Therefore, proponents of the efficient market hypothesis recommend investors to pursue passive investment strategies. A well-known strategy for passive management is to hold a portfolio or an index fund that mimicks the performance of a broad-based market indices.

On the contrary, active managers believe that markets are inefficient and, thus, think that it is possible to generate excess returns through skill-based investment strategies. Their goal is essentially to focus on individual securities and generate alpha, which is the excess return achieved compared to a benchmark index. The assets selected in the portfolio can be either bonds or equities and the weights of these assets in the portfolio are determined by the decision of the management team of the actively managed fund.

In order to generate alpha, active equity managers use fundamental or technical analysis for stocks (CFA Institute, 2020). Fundamental analysis involves looking at more qualitative factors which may affect the performance of the stock. For example, a change in the organizational structure of the company or a disruptive force in the industry where the company operates are factors which fundamental analysts would analyze when making decisions to long or short stocks. They believe that these exogenous or qualitative events are the major driver of a stock's performance. Technical analysts, in contrast, will analyze quantitative factors and metrics such as the historical performance of the stock and try to predict the nature of the future performance of the stock based on past movements. Technical analysts believe that rule-based stock selection criteria will generate superior returns in the future. This study employs both technical and fundamental analysis to construct an active management strategy for equities.

The goal of this study is to test whether active investment strategy outperforms passive investment strategy. In other words, our main aim is to test the hypothesis whether there is inefficiency in Turkish stock market and whether it is possible to create excess returns. To this end, we create an actively managed fund portfolio by applying quantitative investing approach to Turkish stocks. The results of our analysis show that Turkish stock market is inefficient and that there is an opportunity to create excess

returns above the market when an active investment strategy is pursued. The stock selection criteria of the proposed fund can generate alpha consistently (for 8 years out of the 10-year analysis period.)

The remainder of the study is structured as follows: Section 2 provides a theoretical background addressing past studies related to active and passive investing. Approaches of constructing an active equity portfolio and various ways of how the performance of a fund portfolio can be measured are provided. Section 3 presents the data used for the analysis. Section 4 outlines the active investment methodology employed in this study. After showing the strategy, section 5 presents the results of the analysis. Section 6 concludes by summarizing the main results of the analysis.

2. Theoretical Background

According to Fama (1969), efficient market hypothesis is based on the theory that the price of a stock contains all available information and that it is not possible to consistently beat market returns. Additionally, the theory states that skill (technical or fundamental analysis) is not enough to beat the market.

There are three forms of market efficiency. First is the weak form of EMH which states that technical analysis employed on past financials and performance will not produce accurate forecasts about the future behaviour of the stock's performance. In other words, above market returns cannot be achieved through analysing of historical price and volume data.

The second hypothesis is the semi-strong form of market efficiency. This hypothesis encompasses the weak-form hypothesis. This states that stock prices reflect all public information and that investors who make investment decisions based on publicly available information related to that stock cannot derive above the market profits from their investments. Here, it is also important to define public information as both market and non-market information which is available to the investor such as stock price, trading volume, rates of return, earnings and dividend announcements, price-to-earnings (P/E) ratios, dividend-yield (D/P) ratios, price-book value (P/BV) ratios, stock splits, fundamental data on the firm's product line, quality of management, patents held, news about the economy, and political news. So, according to the semi-strong form hypothesis, it not possible to derive returns above market return by employing trading strategies, via fundamental analysis, which uses all publicly available information.

The third hypothesis is the strong form of market efficiency which encompasses both weak and semi-strong form of market efficiency. Even the investors who have any additional insider or private information about

the stock's performance are not capable of beating the market consistently and generating above the market returns.

To sum up, if an investor were able to beat the market returns with his insider information or publicly available information then that the market is said to be inefficient. However, to prove that the market is really inefficient an investor needs to beat market returns in a consistent manner which means that they will need to show above market returns for a substantial number of periods.

Generally passive managers believe that the markets are perfect or efficient and that it is not possible to create excess returns with technical or fundamental analysis. In contrast, active managers believe that markets are inefficient and that there is a way to beat the market through skill.

2.1 Active vs passive management

The first passive investment index was created in the early 1970s and there are almost three million passive indices globally today (van Loo & Molander, 2020). Mutual funds and exchange traded funds (ETF) are examples of passive funds which hold the market index. There are also some mutual funds which have active investment strategies. Some popular and largest passive funds in the market are Vanguard 500 Index Fund, S&P 500 ETF and Fidelity 500 Index Fund. Some mutual fund indexes can be grouped according to sectors or countries or geographies. In Turkey some examples of passive funds are BIST-100 and BIST-30.

Active investor's portfolio on the other hand differs from that of the passive managers at some or all times. Because active managers usually act on perceptions of mispricing, and because such misperceptions change very frequently, such managers tend to trade fairly frequently -- hence the term "active" (Sharpe, 1991). Active asset management is based on the theory that market is not efficient and thus there is potential to generate alpha if the investor or fund manager is "skilled".

Active managers essentially take advantage of market anomalies as they present good opportunities for investing. Market anomaly can be defined as "systematically predictable security price patterns that are exploitable through investment strategies." (Meier, 2014). There is a vast literature, for both developed and emerging markets, that shows how anomalies manifest in stock markets. Some of the most popular market anomalies can be listed as "day-of-the-week effect", "January effect", "value effect", "size effect" and "momentum effect". According to the adoptive-efficient market hypothesis, once an anomaly is detected by an investor, it should correct itself and stock prices will return to its efficient state. Other empirical evidence shows that "Some anomalies (day-of-the-

week, January, and size effect) seem to disappear over time, whereas others (value and momentum effects) do not" (Meier, 2014).

An important question to address is whether active managers can really outperform the market when taking the costs into consideration. This is because active management has some operational costs such as performance and management fees which lead to lower returns than the market when subtracted from the gross returns of the fund: "Properly measured, the average actively managed dollar must underperform the average passively managed dollar, net of costs" (Sharpe, 1991). The share of active managers who can beat the market is quite small. For example, Warren Buffet is one of the active managers who was successful in beating the market returns in Berkshire Hathaway fund. His fund's performance is discussed in the next section. Buffet claims that majority of active managers are bound to be unsuccessful or perform worse than a market following index fund. Despite having great success with his active fund management strategy, Buffett himself recommends to investors the simple strategy of following a low-cost S&P 500 index fund due to the high management costs involved in active funds. Globally, the share of outperfoming funds is lower than 25% looking into the performances of funds for one year. Japan seems to be the highest performer with the share of outperforming funds almost reaching 50%. Observing the same share for periods spanning 5 and 10-year, once again outperforming funds are again lower than 50%. This is in line with Warren Buffet's argument and demonstrates that overall it is hard to beat the market with an active management strategy.

In addition to the performance fees of the team overseeing the actively managed fund, taxation is another issue that should be taken into consideration when evaluating the performance of an actively managed fund. A passive fund usually follows a "buy and hold" strategy and therefore is expected to be taxed less frequently than an actively managed fund. Furthermore, in an actively managed fund where the portfolio strategy involves both going long and going short, taxation is expected to happen more frequently than an actively managed fund whose strategy is going long-only. The taxation will be even higher when the selling occurs frequently in accordance with the fund's strategy: "Short-term capital gains receive much less favourable capital gain treatment than long-term capital gains. Short term capital gains (gains on assets held less than one year) are taxed at ordinary rates while long-term capital gains (gains on assets held more than one year) receive more favourable tax treatment. Unfortunately, actively-traded funds are most often guilty of spinning off short-term gains to investors which are then taxed at unfavourable rates" (Atlas Capital Advisors, 2020). Therefore, an individual may consider choosing investing in a passive index vs an actively managed fund, if he wants to avoid paying

high tax costs related to his investment. Some active fund managers may proactively take actions to ensure that the portfolio is more tax efficient and that investors do not face tax burden too often.

Some studies compare the historical performance of active investment funds with passive investment funds. For example, AQR (2020) has looked at the active manager performances in five investment universes (mutual funds, institutional equities, institutional fixed income, hedge funds and private equity) and compared their equivalent equity benchmarks for the period between 2007 and 2017. The results of this analysis show that average manager in all of these categories had positive net returns (simple excess return over benchmark after subtracting management fees). Moreover, this analysis shows that institutional equities outperformed mutual fund equities and hedge funds in the same period. Highest performers were hedge funds and private equity firms; the reason behind their overperformance can be explained by being subject to fewer economic constraints, hiring less costly talent, focus on less competitive markets and selection bias (proper randomization is not achieved due to small number of funds in the universe) (AQR, 2020).

Another important question asked by AQR in their analysis is in which markets or conditions can active fund managers find success: "The classic answer is that dusty corners of financial markets, characterized by few active managers and fewer fundamental analysts are less efficiently priced. Candidates include small/micro caps, emerging / frontier markets, less liquid fixed income markets, private assets and the short side of long/short strategies". There is an evidence that emerging market and non-US equity managers achieved higher returns compared to US managers. AQR's own analysis shows that US small cap and non-US funds had higher active returns when performances within each group were further analysed in detail.

At the same time AQR (2020) notes that performance of active managers has been worse in the past decade compared to the preceding decade except for active fixed income managers in the US. This can be partly explained by environmental reasons (ie worsening macro conditions). Furthermore, there is now higher tendency for passive managers in the market; in other words, the active investing trend is reversing in favour of passive investing. Blomberg data shows that 2019 was the first year when passive investors made much more investments in terms of value than active funds due most likely to "higher cost and risk associated with active investing" (van Loo & Molander, 2020). So, this forces most active managers to lower their management fees and become more competitive against the threat of passive investors.

Active managers can beat/outperform the market by generating alpha and/or offering diversification and exposure compared to market indexes. At the same time, they need to keep the operational costs at an appropriate level. Both alpha and beta are risk ratios that investors use to calculate returns, but they are actually different from each other. Beta measures the systematic risk of a stock compared to the market and so is an indicator of volatility. It is a risk related to the whole market (macro risks) and cannot be diversified away. On the other hand, alpha is the excess return on a stock compared to the return on a benchmark index. So, when an active manager is talking about having achieved "x" alpha, the number is the deviation from a benchmark index (for example either S&P or NASDAQ). This implies that alpha can differ depending on the benchmark chosen by the active manager. Active managers usually use alpha to indicate the performance of their funds. The common goal of active managers is to beat the market index and go above market alpha. Active managers try to seek any mispricing (stocks which are traded significantly below their fair value) in the market.

2.2 Measurement of an active fund's performance

There are several ways to measure the performance of an actively managed fund. Performance measurement helps investors understand how well the fund is performing compared to the benchmark and also what types of risk the fund management is taking. In other words, it allows us to understand diversification and exposure of the fund. Furthermore, it can give us an idea about the operational costs and fees. Below, an overview of two popular methods on how to measure the performance of a fund will be discussed.

2.2.a Holding based approach:

This approach looks at the weights of each individual asset in a fund portfolio and gives an overall score based on the weighted averages. So, in all equity fund, we need to know the individual weights of each stock before we can measure the performance of the fund. The methodology of this approach is described as the following: "Holdings-based style metrics assign a style and a size score to individual stocks within a portfolio. The size score reflects the relative market capitalization of a particular security, while the style score indicates a stock's orientation towards value or growth investment strategies based on certain financial characteristics (price/earnings ratio, price-to-book ratio, dividend yield, five-year sales growth, five-year earnings growth, and five-year average return on equity). The overall portfolio style and size scores are calculated by weighting individual security scores by their appropriate portfolio weights" (Kaplan, 2002).

2.2.b Regression (return) based approach:

If we do not have access to portfolio weights of the fund, then we can simply use CAPM or multifactor models to measure the performance of a fund. Before moving on with this discussion, it is important to understand the basic model in which these approaches have been built. This model is the famous "Capital Asset Pricing Model" or "CAPM" which has been developed by William Sharpe and John Lintner in 1960. The CAPM model itself has been inspired by Markowitz's model of "mean-variace efficient" portfolios. This model assumes that investors either "minimize the variance of portfolio return, given an expected return" or "maximize expected return, given the variance". The result of these choices is the "minimum variance frontier" for risky assets; a curve which shows all possible opportunities of risk and return allocations for an investor. In the curve, expected return is shown on the vertical axis and portfolio risk (standard deviation of portfolio) is given in the horizontal axis. One critical assumption made in this model is that no risk-free borrowing or lending is allowed.

CAPM builds on this model to create relationship between risk and return for investors, especially in the stock market. To summarize, the model states that the expected return on an investment should be the sum of the risk free rate and another factor (beta times market risk premium). Here the risk free rate represents the time value of money and the latter component represents the additional risk that the investor is taking. In other words, CAPM builds on Markowitz's model by adding the possibility of risk free borrowing and lending for the investor (Fama & French, 2004). The portfolios which are available for the investor with the addition of borrowing and lending stand on a straight line that starts with the risk free rate on the vertical axis and goes tangent to the "minimum variance frontier" and is referred as the "Capital Market Line" or "Security Market Line". Any portfolio or combination of risk-return which are on this line is better than any other risk-return combination to the right of that line.

It is also important to understand the meaning of beta in the capital asset pricing model as it is different from alpha in its measurement of performance. First and foremost, as the slope in the capital market line, beta "measures the sensitivity of the asset's return to variation in the market return (Fama & French, 2004). Fama and French (2004) give an additional explanation to beta: "The risk of the market portfolio, as measured by the variance of its return (the denominator of βim), is a weighted average of the covariance risks of the assets in M (the numerators of βim for different assets). Thus βim is the covariance of asset i with the market return relative to the average covariance risk of assets, which is just the variance of the market return (Fama & French, 2004). Beta is an effective tool in

estimating "systematic risk of any individual security or of an unmanaged portfolio" but is not adequate for understanding the performance of an actively managed fund or portfolio as beta alone will not take into account the systematic selectivity skills of the portfolio manager (Jensen, 1967).

Many models which measure the performance of a portfolio/fund have been developed following the introduction of Markowitz's mean-variance model and CAPM. Fama and French's models are especially important because they further introduce alpha which is critical in the assessment of active portfolio investors. Alpha was first introduced by Michael Jensen in 1968 and came to be known as "Jensen's Alpha". This metric measures the risk-adjusted abnormal or superior performance of a portfolio as the intercept of the risk-return regression. This is the result of the selectivity skills of the portfolio manager, as discussed earlier. Jensen's alpha is an additional coefficient or parameter added to the right hand side of the capital asset pricing model. Here alpha coefficient shows how much the manager has returned additionally above the performance of the benchmark. In his paper, Jensen looks at the predictive ability of 115 mutual fund managers in the US for the period between 1945 and 1964. Jensen describes predictive ability as "ability to earn returns through successful prediction of security prices which are higher than those which could expect given the level of riskiness of his portfolio." (Jensen, 1967) After applying the regression model with alpha to this data set, Jensen observed that "these 115 mutual funds were on average not able to predict security prices well enough to outperform a buy-the-market-and-hold policy, but also that there is very little evidence that any individual fund was able to do significantly better than that which we expected from mere random chance". Furthermore, these findings are based on net returns after taking into account management expenses over gross returns. This means that the mutual funds which Jensen looked at underperformed so much so that they were not even able to recover their management or brokerage costs.

Based on Fama and French's factor model, the asset price can be explained by a combination of different factors. The model simply adds different factors on to Jensen's regression model to better understand the returns of an active manager. The first model which was developed by Fama and French was a three-factor model dependent on market premium, size premium and value premium (Hayes, 2020). Alpha, as discussed above, gives us how much the manager has returned additionally above the performance of the benchmark.

The important thing to show in Fama and French's model is the three factors used which are excess return on market, firm size (SMB, small minus big) and book to market values (HML, high minus low). SMB is the

portfolio of historic excess returns of small-cap companies over large-cap companies. HML is the portfolio of historic excess returns of value stocks over growth stocks. In 2014, Fama and French developed this model by incorporating two additional factors to explain excess return on the market index and renamed their 2010 model as "Five Factor Model" (Hayes, 2020).

To understand the meaning these coefficients, a regression can be run based on the three-factor model. Let's assume for example that we obtained negative beta coefficients on all three factors and only HML coefficient which we obtained was statistically significant (this is indicated by a t-stat which is higher than a certain number depending on the sample size when we run a regression. For example, when the sample size is 30 then the t-stat is 2.042 etc). A negative beta on book-to-market value would mean that the portfolio has higher expected returns if high book-to-market stock underperform low book-to-market stocks. We can conclude that the portfolio consists mostly of growth stocks and performance depends largely on the performance of the growth stocks selected. If the market return coefficient also turned out to be statistically significant, then the negative beta would mean that the portfolio moves in the opposite direction of the market (in other words when the stock market is giving negative returns, then the portfolio is expected to give positive returns). To summarize, when market return and HML betas are statistically significant and are both negative, it is hard to predict the performance of the fund. To go back to the efficient market theory, if CAPM were valid we would observe that alpha would be zero and beta would be statistically significant in the traditional CAPM model. Fama and French model proved that CAPM was better in understanding portfolio returns and performance by introducing different factors such as size and value which can affect performance.

There are other factor models developed by economists following Fama and French. Carhart developed in 1997 a four-factor model which included the three factors in Fama and French's three factor model and also a new "momentum factor" to evaluate the performance of mutual funds: "Carhart also based his work on Jegadeesh and Titman´s (1993) paper. Jegadeesh and Titman uncovered a tendency for good and bad performances of stocks to persist over several months, in other words a momentum effect" (Rehnby, 2014). This new factor was named as "WML" called the return of the momentum factor, winners minus losers. Here winner stocks were the top performing 30% percentile of the stock data and loser stocks were the worst-performing 30% percentile of the data. There are also other factors developed by others. Some added macroeconomic variables to their factor model: "Jagannathan and Wang (1996) and Reyfman (1997) use labour income. Chen et al. (1986) test whether innovations

in several macroeconomic variables are risks that are rewarded in the stock market. Included variables are: the spread between long and short interest rate, expected and unexpected inflation, industrial production, the spread between high and low-grade bonds, market portfolio, aggregate consumption and oil price" (Ericsson & Karlsson, 2004).

Market timing models are also used to understand fund performances. Similar to factor models, these models are also built on the capital asset pricing model. Market timing strategy involves selecting the best time to make an investment: "This strategy refers to predicting whether the market will be bullish or bearish. An investor using this strategy is trying to outwit the market most of the time. In other words, this strategy implies that an investor is forecasting the direction of future market trends" (Skrinjaric, 2013).

There are two main market timing models: Treynor and Mazuy's 1966 market timing model and Henriksson-Merton's 1981 model. Both models introduce new coefficients to the capital asset pricing model in order to evaluate market timing in the context of making investments (Hubner, 2011). Where the additional coefficient, ϒ, allows the investor to change portfolio's beta based on the sign of the market return. An investor with good market timing abilities would increase the exposure to the market when the market return as indicated by □(R□_(m,t)-R_(f,t)) is positive and then decrease the exposure to the market when the market return is negative. The coefficient alpha once again provides a measure for the excess return of an active investor with market timing abilities. In the case of Treynor and Mazuy's model, with the addition of a coefficient, the one-factor capital asset pricing model equation becomes a quadratic equation: "The coefficient of this term reflects the convexity achieved by managers in their exposure to the market portfolio. If it is positive, the manager gradually increases her beta as the market goes up, indicating that they display good timing abilities" (Hubner, 2011). In comparing the two models, Hubner concludes that a negative value of gamma coefficient indicates negative market timing: "The HM model translates the behaviour of a manager who succeeds in switching his market beta from a high level equal to βHM when the market return exceeds the risk-free rate to a low level of (βHM − γHM) otherwise..[…] under the standard assumption of a joint normal distribution of asset returns, the TM model is consistent with a manager whose target beta varies linearly with his forecast for the expected market rate of return.

In this section, a comprehensive review of the different factor-based approaches used to evaluate fund's performance has been given. Looking into these different models since the introduction of the capital asset pricing model, we can conclude that regression/return based approaches

for performance measurement are constantly improving and changing and that they are a good way to measure returns of an active investor when portfolio weights are not available or applicable. Active managers try to generate alpha by using different investment strategies using fundamental or quantitative approaches. In the remaining section, some alpha generating strategies are analysed through examples of real-life active asset managers who successfully use these techniques.

2.3 Active equity investment strategies and approaches

There are two different approaches to active equity management: fundamental and quantitative (also known as technical) approaches. First one is fundamental approach and here investors depend on their intuition and judgement to make an investment decision (for example longing and shorting certain stocks). Second approach to active investment is quantitative (or technical) approach where investor uses certain rules and technical models to construct an equity portfolio. Fundamental approach and quantitative approach are also called "discretionary" and "systematic" respectively. There are some characteristic differences between fundamental and quantitative approaches to equity investing. These differences can be described as the following (CFA Institute, 2020). First difference is subjective vs objective decision-making process. In quantitative approach to equity investing the investor relies on the findings and outputs of technical models and therefore the investment decision must be objective and unbiased. Second difference is research vs data as information source. Investors who employ fundamental analysis use research and market intelligence related to stock and also wider macroeconomic conditions and also qualitative factors such as company culture, management team etc while those who employ quantitative analysis will look at available historical data (earnings report, stock market performance etc) to come to a conclusion about the stock's future performance. Third and final difference is forward looking vs backward looking approach. A quantitative analyst will look at past data to predict future performance of a stock. A fundamental analyst will try to predict macro or company-specific events that can directly impact the performance of a stock and so is always forward looking. There are some advantages and disadvantages in both types of approaches. For example, a fundamental analyst may become overly biased towards one stock compared to another after spending too much time analysing it. On the other hand, the fundamental analyst will have more insights into some immeasurable company characteristics such as culture, organization and reputation. In comparison, a quantitative analyst will not be taking into consideration these factors. Furthermore, if the historical data is not complete or wrong, the future predictions are also likely to come out wrong. Still, quantitative analyst holds the benefit

of effectively narrowing down from a large list of stocks using data-driven performance filters.

Fundamental and quantitative approaches also differ in investment processes. Fundamental investor will "define the investment universe; pre-screen the universe; understand the industry and business; forecast the company's financial performance; convert forecasts into a target price; construct the portfolio with the desired risk profile; and rebalance the portfolio according to a buy and sell discipline" (CFA Institute, 2020). Quantitative investor will, on the other hand, "define the investment thesis; acquire, clean, and process the data; backtest the strategy; evaluate the strategy; and construct an efficient portfolio using risk and trading cost models" (CFA Institute, 2020). When making an investment decision, it would be best to use both fundamental and quantitative approaches because both have their own advantages and disadvantages and when used together can create a better picture for active investors.

Active equity management strategies can be grouped into four: bottom-up, top-down, factor-based and activist strategies (CFA Institute, 2020). An overview of each strategy is provided in the following. First strategy is bottom-up strategy. The investor will try to understand the intrinsic value of the company and whether it is overvalued (opportunity to short) or undervalued (opportunity to go long) compared to the market price by focusing on the company. Second strategy is top-down strategy. The investor will look at macroeconomic conditions and also the performance and outlook of the industry in which the company is operating in. This strategy is helpful in filtering a specific industry or geography and so makes stock-picking much easier for the investor. When doing top-down strategy, some attractive themes may also come up and the investor may want to deep dive into stocks which belong to this theme. Third strategy is factor-based strategy. The investor will seek to choose stocks which are filtered based on different factors that have increased stock prices in the past. This is a technique which is used often by quantitative active managers since factors are determined from analysing historical data. Value, growth and momentum are the main grouping factors used by investors as mentioned in the previous section when discussing factor-based models. The final strategy is activist strategy. Activist equity investors usually invest in equities and aim to create value by making changes on the management team, organizational structure, leverage ratio or business model. The fundamental belief of activist investors is that market will react positively to a change in the company when it is executed by an outside investor (CFA Institute, 2020). Well-known institutions such as Morningstar, Berkshire Hathaway Fund, Vanguard Global Momentum Factor Fund and Fidelity Investments can be cited as examples of popular actively managed funds.

3. Data

Our active investment fund is located in Turkey. We use stocks as the only asset class and exclude bonds and other investment instruments. We analyse publicly traded stocks listed in Borsa Istanbul between 2010-2019. Horizon of investing is one year beginning from Q1 end for each stock. The benchmark index for the Fund has been chosen as BIST-100.

There are currently 405 companies listed on the Borsa Istanbul. Our sample begins with 333 companies as of January 2010 and reached 410 in 2018. Table 4.1 shows the annual number of stocks and the number of stocks we examined listed on the Borsa Istanbul at the end of each year from 2010 to 2020. We include all stocks that have traded through our sample period. Stocks that are now dead were included when they were alive.

Table 1: Stocks quoted on BIST vs examined stocks

Year	Stock Amount	Examined Number of Equity
2010	333	256
2011	361	275
2012	403	300
2013	407	315
2014	401	326
2015	423	332
2016	413	343
2017	406	337
2018	410	353
2019	409	346
2020	405	352

3.1 Investment Strategy

The investment type is active equity management in which the ultimate goal is to generate alpha in Turkish equity market. Long-only investing is used (either buy or do nothing). Quantitative approach is applied instead of fundamental analysis. A combination of value (buying low and selling high) and momentum investing techniques are applied to form portfolios every year. An active quantitative investment approach is performed to all stocks in BIST-100 for the period between 2009 and 2020 and a factor based strategy is applied to shortlist best performing stocks for each year. The factor based strategy filters stocks based on different factors; these factors / selection criteria will be mentioned in the following section. Because this stock selection is applied for every year for the past 10 years, a momentum strategy will also be present. The portfolio

composition changes every year at the end of first quarter. Therefore, the active investment strategy is a combination of value and momentum strategies. As an active asset manager, the Fund be applying a 2% and 20% compensation structure just like the majority of hedge funds around the world. This compensation structure consists of two separate fees. One is a fixed management fee of 2% which is calculated on the total assets under management. This fee will be distributed among the investors based on their capital contribution to the fund. The second fee is a 20% fee on the net profits of the portfolio and gives an incentive for the asset manager. The fund will be available for both retail and institutional investors in both Turkey and globally. Finnet has been used to obtain all the relevant stock data needed for this stock selection analysis. Finnet is a Turkish software which provides financial analysis tools to investment professionals. After obtaining raw data of stock information, the analysis is conducted on excel to construct a portfolio and evaluate performance of the Fund.

3.1.1 Exemptions

Some stocks in specific industries and sectors are excluded from the analysis. First industry is conglomerates. These contain more than one company and are usually exposed to different sectors and therefore different market dynamics and risks. Second exempt industry is financial institutions, insurance, brokerage and other financial services companies: The companies in these sectors have very different business models and therefore different balance sheets. Their performance and operational metrics are quite different from other industries. For example, for banks, metrics related to book value are the most relevant performance indicators. Banks do not have a conventional income statement (eg they do not have net sales but consumer and commercial loans) so it will be difficult to compare them against other companies with conventional income statement and balance sheets. Another exempt industry is real estate and REIT (GMYOs). These types of companies work on a project basis and these projects are usually long term (3-5 years) until they are completed. The cash inflows from the project are not reflected into the income statements according to IFRS standards until the project is completed. Therefore, they don't have a steady and consistent income statement, balance sheet and cash flow which we can study and value. Companies which are exposed to political risk are also excluded from the analysis. Companies which are known to be affiliated with the Turkish government have been identified and excluded since they have much higher volatility than other stocks. Additionally, BIST-100 has a categorization named "VBTS" where stocks which are identified to be volatile and which have very small transaction volume (small liquidity) are included. The stocks named in this category have also been excluded as well.

4. Methodology

A quantitative stock selection methodology on all BIST stocks, except for those which have been identified as exemptions in the previous section, is developed. The stock filtering is laid out in detail. Firstly, the stocks which have been identified to exist in "exempt" sectors and industries as discussed in the previous section are filtered out. Secondly, net current asset value (NCAV) for each stock is calculated and stocks with NCAV larger than 1.5 are selected. NCAV is a ratio which is calculated by dividing net current asset value with market capitalization of the stock. Net current asset value is found by subtracting total liabilities from total current assets. Total liabilities are the sum of short and long term liabilities in the balance sheet. Market capitalization is found by multiplying shares outstanding with the share price of a stock. The formula for NCAV ratio is given below:

$$\text{NCAV} = \frac{Total\ current\ assets - total\ liabilities}{Market\ capitalization\ (equity\ value)}$$

When net current asset value (which is the numerator in the above equation) is bigger than the market capitalization, then the NCAV ratio is bigger than 1. A NCAV ratio bigger than 1 implies that the stock we are looking at is undervalued (trading below its underlying value and so can provide returns for its investor). Benjamin Graham, an American economist, professor and widely known as the "father of value investing", also used this ratio as one of this value investing strategies to find stocks which were trading below their value: "Graham's NCAV strategy calls for buying stocks trading at two-thirds or less of their net current asset value and selling when the share price is close to its NCAV. This is a very stringent requirement because NCAV is usually negative for most companies. Even though it is positive, NCAV per share will be rarely greater than the market price. Graham was looking for firms trading so cheap that there was a little chance of falling further (An, Cheh, & Kim, 2015). In this stock selection analysis a ratio of 1.5 is used to keep the stock universe large enough as there aren't many stocks trading in BIST-100 when compared with the US stock market or other global markets (ie Turkish stock market does not have enough depth). Thirdly, stocks which have EBITDA margin higher than 5% are identified. Here an operational performance filter by choosing stocks which have an EBITDA margin higher than 5% is applied. EBITDA margin is a profitability metric which is calculated with the formula below:

$$\text{EBITDA margin \%} = \frac{EBITDA}{Net\ sales}$$

This means that the stock portfolio includes stocks which are profitable. The margin levels and ranges of stocks are different according to their

industries and sectors. As the last step, stocks which are trading below their industry multiples are calculated. In this filter, various multiples including P/E, P/B, EV/EBITDA and EV/ Sales multiples of each stock are analysed. Explanation of abbreviations are shown below. P/E and P/B are two multiples based on the equity values of a stock. The last two are multiples depending on the enterprise value of a stock (includes net debt or cash).

$$P/E = \frac{price\ per\ share}{Earnings\ per\ share}$$

$$P/B = \frac{price\ per\ share}{Book\ value\ per\ share}$$

$$EV/EBITDA = \frac{Enterprise\ value}{EBITDA}$$

$$EV/Sales = \frac{Enterprise\ value}{Sales}$$

Separately the average multiples for each industry in the analysis are calculated. Then it is determined if the stock's multiples are lower or higher than the industry's average multiples. If three or more are lower than the industry averages then those are included in the actively managed fund portfolio. This way it is ensured that there are stocks that are traded below than their potential in the market included in the portfolio. This analysis is done from 2010 to 2019 for every year. Because the stock selection will change every year dynamically based on this criteria, this momentum strategy will be applied on top of value investing. Based on the proposed stock selection methodology, there was only one stock selected for the portfolio, Pergamon Dış Ticaret (PSDTC), in 2018. Generally, companies' financial performance deteriorated in this year possibly due to macro reasons such as market conditions and political environment. Having only one stock in the portfolio in one year carries very high specific risk and therefore we had two options to eliminate this risk: Fist was to completely take out this year (not invest in any stock) and second was to change the stock selection criteria. We choose to slightly alter the filtering methodology for this year. All of the stock selection filters remained the same expect for the EBITDA margin filter, which was pulled from %5 to %1 to account for this exceptional year. With the application of this new filer, there were 6 stocks selected for the portfolio.

The returns of our proposed fund for each year will be shown and compared with the benchmark index return that was identified, BIST-100. In addition, we employ statistical test to see whether our proposed fund is statistically greater than the mean of the benchmark index. To this end, we assume that both samples are randomly and independently drawn. Both populations are normally distributed. We also assume that both population variances are unknown and they are unequal. Since the population variances are assumed unequal, so a pooled variance is not appropriate. We use a t value with ν degrees of freedom, where

$$\nu = \frac{[(\frac{S_x^2}{n_x}) + (\frac{S_y^2}{n_y})]}{\left(\frac{S_x^2}{n_x}\right)/(n_x - 1) + \left(\frac{S_y^2}{n_y}\right)/(n_y - 1)}$$

The test statistic for

H_o: μ1 – μ2 □0

$$t = \frac{(\bar{x} - \bar{y})}{\sqrt{\frac{S_x^2}{n_x} + \frac{S_y^2}{n_y}}}$$

We test, at the 5% level, the null hypothesis that the mean of our proposed fund is greater than the mean of the benchmark index. We form our hypotheses as below:

HO: μ_1 (market return of ECT Fund)-m2(market return of XU100) ≤ 0

H1: μ_1 (market return of ECT Fund)-m2(market return of XU100) > 0

After statistically testing the differences in mean returns between our funds and benchmark index funds, we, also perform regression analysis to show if the fund's investment strategy were able to generate alpha (if the fund were able to beat the market's performance). For the regression analysis, we employ Jensen (1969) model as below:

= +

Here is the return of the portfolio, is the return on the market portfolio. For convenience risk free rate assumed zero (Investmentcache, 2019). The returns of the constructed portfolio are regressed against the returns of the benchmark index, BIST-100. Then the beta () and alpha (α) coefficient results are assessed to understand whether the portfolio were able to generate excess returns for the investor.

5. Results

The stock selection criteria discussed in the previous section was applied to all stocks within BIST for each year of the 10-year investment period.[1] The number of stocks chosen for each period are different due to the nature of the stock selection criteria. Stocks which are in the portfolios dynamically constructed each year can be different from one year to the next. For example, Pergamon Dis Ticaret's stock is in the portfolios of the last three years but is not chosen in the portfolio constructed for 2016. This is because the portfolio is constructed based on momentum investing and is therefore dynamic. The summary of the returns for each year is given in Table 1.

Table 1: ECT vs BIST yearly fund returns (2010-2019)

	ECT Fund	BIST 100
2010	**27%**	**19%**
2011	**131%**	**-14%**
2012	**-2%**	**47%**
2013	**91%**	**31%**
2014	**-5%**	**34%**
2015	**64%**	**-5%**
2016	**109%**	**48%**
2017	**134%**	**-14%**
2018	**237%**	**11%**
2019	**73%**	**-13%**

The results show that our proposed fund which is constructed according to the stock selection criteria outperform the benchmark index BIST-100 for all years except for 2012 and 2014. In these years ECT gave a year over year returns of -5% and -12% when BIST-100 was able to give returns of 47% and 34%. In the remaining years the Fund was able to beat the benchmark index returns.

Nevertheless, as mentioned in previous section, we employ statistical test to see whether the mean return of our proposed fund is statistically greater than the mean of the benchmark index. When moving to the results, we find that our test statistic value is 2.96. We will compare this test statistic value with the critical t value. The critical t value has two parameters namely; v and α. We employ α =0.05 and from the above formula we find v value as 11. Thus, our critical t value for this test is found to be 1.796. Since our test statistic value, (2.96), is greater than the critical value (1.796) we can reject the null hypothesis. Therefore, we can say that the mean return of our proposed fund has significantly been higher than the mean of the benchmark index. The visual comparison of the returns can also be seen in figure 1 as well.

After having tested the differences between the means we now present

1 in order to save space the stocks selected for each year are not provided, but available upon request.

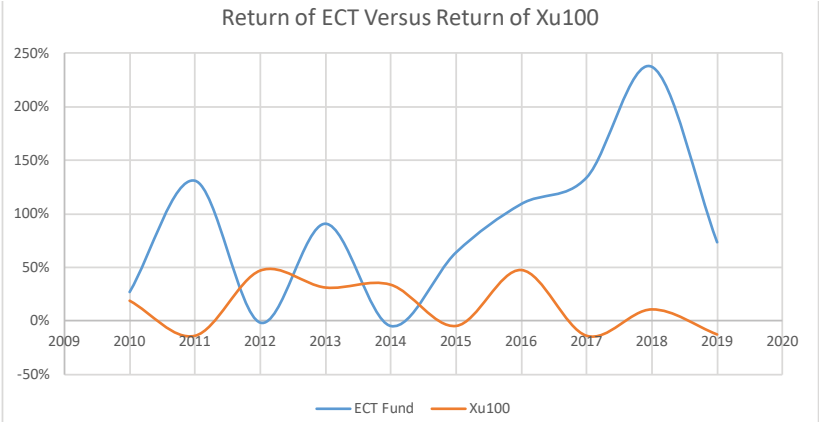
results from a regression analysis.

Table 9 Regression Analysis

	Coefficients	t-statistic
Intercept	1,02387	3.89
beta	-1,1449	0.95

The regression analysis results show that the alpha of the portfolio is 1.02 which means that we were able to beat the market with this strategy. Furthermore, alpha is statistically significant with a t-stat of 3.89 which is higher than the critical t value of 2.30 (based on the degrees of freedom which is equal to 8, and α/2). Therefore, we can conclude that this quantitative long-only investment strategy is successful at beating the market returns with a positive alpha. The regression results also gave us negative beta which means that the ECT portfolio moves in the opposite direction of the market. However, the t-stat is only 0.95 which means that this coefficient's estimate is not statistically significant. This does not affect our results since our main goal is to generate alpha; beta alone is not meaningful unless it is compared to the beta of other stocks. As mentioned above the resulting alpha is statistically significant. Based on the t-statistic, it can be concluded that the proposed active investment strategy made use of the inefficiency of the Turkish stock market gave higher returns than market returns.

Figure 1: ECT vs BIST-100 fund returns comparison



5.1 Discussion

There are some risks involved with this active investment strategy. Some of the major risks involved are as follows. First and foremost, one must take into account the political and economical risk in Turkey: Stocks markets in Turkey have been quite volatile in the past 10 years and companies are being affected greatly by the changes in interest

rates and exchange rates. Inflation is also an important factor. Interest rates are important because they effect the companies in their borrowing and ability to pay back debt. Our stock selection criteria does not have a debt or leverage filter and focuses on the operational performance of the companies only. So, if the companies take on debt and have difficulty paying them back this will also affect their stock market performance in the future. The depreciation in Turkish lira is also very important because if the companies are doing business with foreign currencies any drop in the value of Turkish lira have a negative impact on their business and profitability. For example, if we are looking at the stock of a manufacturing company and one of their raw materials is brought from Europe then a significant decrease in Turkish lira will largely increase their cost of goods sold and also their profitability bottom line. Our stock selection criteria does not look into these macro economic factors in Turkey since we cannot predict their affects on companies performance in advance.

Secondly, the size of the stocks also pose a problem. The majority of the stocks in BIST are small sized stocks. Our stock selection criteria does not filter out small sized stocks. We look at the whole stock universe in BIST. Small – cap stocks are generally more volatile than larger cap stocks as they are affected by macro events much easily. In order to eliminate the risk of small stocks we can add an extra filter to the stock selection criteria such as first choosing the stocks from BIST 100 index which includes the first 100 companies in terms of market capitalization. But since the number of publicly traded stocks is already very small, this will make the universe of stocks even smaller.

6. Conclusion

This study constructs an alpha generating portfolio by using active investment strategy. Active investors believe that they can generate higher than market returns by applying their skills in stock selection. While there are some successful active fund managers who are able to beat the market, there is no evidence that active management can consistently beat the market on a long-term basis.

The active investment strategy used in this paper is long-only quantitative equity investment approach using several operational filters such as NCAV and EBITDA margin. Furthermore, each stock's multiples with industry average multiples are compared to see if they were undervalued or overvalued. This investment strategy is applied every year starting from 2010 and ending on 2019 to the stocks in BIST-100 (except for some stocks which have been kept exempt from the analysis). The purpose of this analysis was to see if active management strategy could result in returns above the market in Turkey. Active management is not

common in Turkish market similar to other developing markets due to the illiquidity of the market compared to the developed markets.

To assess the performance of the fund, initially, the returns achieved each year through the Fund are compared visually with the returns of BIST-100 for the same period. Then we employ statistical test to see whether our proposed fund is statistically greater than the mean of the benchmark index. Furthermore, regression analysis is also performed to see if the beta and alpha achieved are statistically significant. We find that our fund is able to beat the benchmark index BIST-100 returns consistently for every year since 2014 and our portfolio generated positive alpha.

We can conclude that Istanbul Stock Exchange is not efficient in the sense of semi-strong form of market efficiency. There are some risks involved in this strategy such as political risk in Turkey and the inclusion of small stocks in BIST but in general the results prove that this is an effective strategy to generate higher than market returns in Turkey.

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CHAPTER 14

LIQUIDITY RATIOS IN ANALYSIS OF WORKING CAPITAL ADEQUACY

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1. Introduction

In today's economy where competition is globalized, asset management is vitally important for all companies that want to make a profit without disrupting their activities. Assets consist of the sum of the economic values that can be expressed in money owned by a firm, and is divided into two groups as current assets and fixed assets. Working capital expresses the total current assets included in the total assets of a company's balance sheet and also net working capital is obtained by deducting short-term liabilities from current assets.

The components of working capital and working capital management have a significant impact on the profitability and liquidity of the companies. In particular, the effective working capital management may lead to the success and survival of the businesses, while the opposite situation may end the existence of the company. Therefore, it is possible to say that the components of working capital and their management have become a necessity for businesses operating in different sectors to continue their existence.

In order for businesses to carry out their daily business activities, they must have sufficient cash and cash equivalents and assets that can be converted into cash in less than one year. If companies do not have sufficient working capital to meet their cash needs, they face serious default risks. There may be cases of execution and bankruptcy in companies that have fallen into insolvency. In this respect, it is extremely important for companies to have sufficient working capital.

In the following parts of the study, after information about working capital is given, liquidity ratios that one of the ratios used in determining working capital adequacy will be explained. Also in last part, evaluations will be made on ten companies included in the Liquid 10 Ex Banks Index in Borsa İstanbul.

2. The Concept of Working Capital

The concept of working capital emerges as a current asset in terms of accounting in businesses. The investment made in the current assets of a business is the working capital. Current assets can be explained together with the concept of liquidity. The faster an asset converts to cash, and the less it loses value while converting to cash, the more liquid it is. In this context, working capital management is sometimes seen as synonymous with liquidity (Kolb, 1983: 153).

The working capital is one of the most important areas that management should evaluate. Because the success of the businesses depend on the proper working capital management (Boopathi and Leeson, 2016: 374). According

to Eljelly (2004), working capital management refers to the effective planning and control of current assets and current liabilities, reducing the risk of default and avoiding unnecessary investments in current assets. For an effective working capital in companies; it is aimed to create the most appropriate current asset structure to increase financial performance, to minimize the risks caused by cash shortages, and to minimize costs while meeting financing needs (Raheman, vd., 2010: 152).

The main purpose of working capital management is to harmonize items of current assets and short-term liabilities (Korankye and Adarquah, 2013: 124). Effective working capital management ensures the success and survival of the company, while poor or careless management can lead to the bankruptcy of the company (Padachi et al., 2008). Especially for companies that use more financial leverage, working capital management becomes more important (Caballero et al., 2014: 333). Accurate and complete calculation and also continuous monitoring of working capital are very important for the success and value maximization of the business so that businesses can carry out their activities continuously.

It is possible to encounter many classifications regarding working capital. The reason for this is that various working capital classifications have been created by the different approaching. The most common and well-known working capital classification is gross working capital and net working capital.

Gross working capital consists of current assets of businesses classified as the most liquid. Net working capital is the remainder after deducting short-term liabilities from current assets (Laghari and Chengang, 2019: 164). In this context, if the current assets of the businesses are more than their short-term liabilities, they operate with positive net working capital. In cases where current assets are smaller than current liabilities, there is negative net working capital.

Working capital is an important indicator that shows the extent to which businesses can meet their liabilities in the short term. In this context, current assets and current liabilities constitute the main components of working capital (Singh and Kumar, 2014: 174).

3. Determination of Working Capital Adequacy

While the working capital is more than necessary, it provides the companies with the opportunity to work comfortably, but also brings with it some problems. The working capital above the required level increases liquidity and reduces risk, but reduces profitability.

Insufficient working capital leads to disruption of operations. The failure to pay the debts on time, the inability to make the necessary

expenditures for the continuation of the activities in the companies are among the reasons that terminate the activities of the companies.

Considering the negative effects of working capital being less than the required level or more than the required level, the importance of having a sufficient level of working capital is better understood. The working capital should be sufficient for the companies to carry out their activities in the most economical way without any financial difficulties and to meet their sudden needs and losses without facing the danger of a financial disaster. Adequate working capital balances the liquidity of the company and brings the risk to reasonable levels, increasing the profitability as much as possible, in other words, balancing the liquidity, risk and profitability.

Although there is no precise rule to determine the sufficient working capital, working capital adequacy can be measured by taking into account the characteristics of the businesses and putting forward some general principles.

One of the most used tools in determining working capital adequacy is the ratios. Since working capital management necessitates balancing the liquidity, risk and profitability for the purpose of the business, the ratios related to the stated situations should be considered (Aksoy and Yalçıner, 2013: 199).

4. Ratios in Working Capital Adequacy

The mathematical expression of the relationship between various items in the financial statements in the businesses is called the ratio. The main purpose of analysis with ratios is not only to express the ratios mathematically, but also to interpret and evaluate the ratios on a scientific basis (Akgüç, 2002: 379).

According to Akdoğan and Tenker (2007), some criteria should be used in interpreting the ratios by combining them with the purpose of the company subject to financial analysis. It is necessary to compare the ratios calculated from the financial statements of the company with the ratios in the previous period or with the values accepted by the financial authorities as a result of various analyzes or with the ratios calculated for the sector in which the business operates, and the criteria expressed in the evaluation of the ratios should be taken into account.

Ratios are one of the most used control tools and they are meaningful relationships between items in financial statements. The relationships established between accounts or groups of accounts give a wide variety of information about the state of the business.

The ratios to be used in measuring the working capital adequacy are

liquidity ratios for measuring short-term liquidity, operating efficiency ratios, and profitability ratios.

In this study, liquidity ratios which are among the ratios to be used in measuring whether the working capital is sufficient or not will be discussed.

5. Liquidity Ratios

Liquidity refers to the ability of an asset to turn into cash quickly and at low cost. In this context, liquid assets are assets that can be converted into cash quickly, easily and at low cost.

Liquidity ratios are used to measure the company's ability to pay its short-term debts and to determine the working capital adequacy. The values that a business can use to fulfill its short-term liabilities are the current assets of that business (Özerol, 2012: 67).

Current assets consist of assets such as cash and bank account of the business and values that will be converted into cash within a maximum of one year or in the normal operating period of the business. Liquidity ratios, which show the ability to pay short-term debts, are based on the proportional connections between current assets and current liabilities. Current liabilities are debts that will be paid in the normal operating cycle of the company or within one year at most.

The short-term debt payments depend on working capital adequacy. While establishing a relationship between working capital items and short-term debts, liquidity ratios can be divided into three categories according to the characteristics of the items to be considered from the current asset group. It is possible to classify liquidity ratios as current ratio, quick ratio and cash ratio.

5.1. Current Ratio

The purpose of calculating the current ratio is to measure the ability of the business to pay its short-term liabilities and to determine whether the working capital is sufficient or not (Akgüç, 2012: 24). Therefore, evaluations are made about the general liquidity situation of the business and its net working capital by measuring the current assets of the company and its ability to pay its short-term debts thanks to the current ratio.

The current ratio is the ratio that shows the relationship between gross working capital and short-term debt. In other words, it is the ratio of assets that will be converted into cash in one year to liabilities that will be paid in one year.

The formula for the current ratio is given below.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The current ratio shows how many liras of current assets the business has for every 1 lira of short-term debt (Arat and Çetin, 2011: 96). It also expresses how many times the current assets of the company are short-term liabilities.

While the current ratio is generally accepted as 2, this ratio varies at the sectoral level. While less than 2 may be sufficient in some sectors, more than 2 may be required in other sectors. While a short operating cycle may cause a decrease in the current ratio, a longer operating cycle may have a significant share in the increase in the current ratio (Gibson, 2001: 207).

In Turkey, the value of 1.5 is considered sufficient due to long-term borrowing difficulties, limited capital supply in the capital market, and constantly high inflation costs caused by lack of equity capital (Aydın et al., 2008: 49).

The current ratio also gives information about whether the net working capital is sufficient or not.

- If Current Ratio is greater than 1, Net Working Capital is positive. The business can pay its short-term liabilities with its current assets, and it will not have any problems in continuing its daily activities.
- If Current Ratio is equal 1, Net Working Capital is zero. It means current assets are equal current liabilities.
- If Current Ratio is less than 1, Net Working Capital is negative. There is net working capital deficit. The current assets of the business are not sufficient to pay its short-term liabilities.

It is desired that current assets be more than short-term liabilities. This desired surplus means adequacy of working capital. In order to meet short-term liabilities or unexpected liabilities on time, current assets are required to be above short-term liabilities and in sufficient excess.

The high current ratio of the business may indicate that the business has more current assets than it needs for its current activities (Akgüç, 2002: 387).

5.2. Quick Ratio

The quick ratio is a ratio that complements the current ratio and makes it more meaningful. All current assets are taken into account in the current ratio. In the quick ratio, inventories with low liquidity in current assets are deducted from the total current assets (Çabuk and Lazol, 2016: 205).

Inventories are subtracted from current assets in calculating quick ratio. As the reasons for this situation, the possibility that the inventories may be in a slow-moving structure, the possibility of being idle or the possibility of the inventories being mortgaged can be shown. (Gibson, 2001: 207). On the other hand, the current ratio may not yield correct results due to the decrease in the inventory cycle rate during the crisis periods when sales decrease (Gücenme, 2000: 109).

The quick ratio is a more precision ratio in calculating liquidity. Some of the items in current assets are assets that are weaker in terms of turning into cash. With the quick ratio, the adequacy of assets other than assets with poor convertibility, such as inventories, to meet the debts to be paid within one year is determined.

The quick ratio formula is given below.

$$\text{Quick Ratio} = \frac{\text{Current Assets - Inventories}}{\text{Current Liabilities}}$$

With the quick ratio, if the business cannot convert its inventories into cash, the payment status of its short-term debts is determined. In this way, the adequacy of working capital items other than inventories is measured. The qualities of the inventories owned by the companies are also different from each other. Inventories held as manufactured goods are considered relatively more liquid in terms of turning into cash. Inventory types such as raw materials, materials and semi-finished products owned by manufacturing companies are more difficult to convert into cash than finished products. At least a manufacturing time is involved in manufacturing companies.

The quick ratio is considered to be a more sensitive ratio than the current ratio. Because the assets that may take time to be converted into cash are not taken into account, assets that are easy to convert into cash are evaluated (Akgüç, 2012: 28).

The quick ratio of 1 is generally considered sufficient.

- If Quick Ratio is greater than 1, even if the inventory sales of the company stop, it will be able to pay its short-term liabilities with its current assets other than its stocks.

- If Quick Ratio is less than 1, the business will not be able to pay all of its short-term liabilities without turning its inventories into cash, and it will become dependent on its inventories in order to pay its short-term debts. In this case, it may be necessary to examine how dependent the company is on its inventories.

Although the accepted value at this ratio is 1, the value of 0.8 is considered reasonable since businesses in Turkey benefit from short-term credit facilities (Özerol, 2012: 69).

5.3. Cash Ratio

The cash ratio measures the company's ability to pay its short-term debts more precisely than other liquidity ratios. In the literature, the cash ratio is also called the first degree liquidity ratio, the quick ratio is also called the second degree liquidity ratio, and the current ratio is also called the third degree liquidity ratio. The cash ratio is important in terms of showing the extent to which the business can meet its short-term debts if it cannot sell its inventories and collect its receivables (Çabuk and Lazol, 2016: 206).

The cash ratio indicates the ability to pay the debts in case of stopping various funds from the activities and stopping collection of receivables (Erol and Sarıaslan, 2008: 192).

The cash ratio is calculated by dividing cash and cash equivalent by short-term liabilities. The cash ratio formula is given below.

$$\text{Cash Ratio} = \frac{\text{Cash and Cash Equivalents}}{\text{Current Liabilities}}$$

A very low cash ratio indicates a cash shortage, while an high cash ratio may indicate idle cash.

Although the cash ratio differs from sector to sector, the values of 0.20 is considered sufficient. It is stated that the cash amount is related to the size of the business (Drobetz and Grüninger, 2007: 293). If the ratio falls below acceptable value, the business may be in a difficult situation in terms of liquidity in the short term.

It is also undesirable for the ratio to be too high. A high ratio may mean that the company has more cash and cash equivalents than it needs. This situation adversely affects the profitability of the business. At the same time, this situation can be an indication that money is not used well and remains inactive (Berk, 1998: 37).

6. An application on Borsa İstanbul

In this section, the determination of working capital adequacy with the liquidity ratios will be examined through the companies included in BIST Liquid 10 Ex Banks Index (X10XB) in Borsa İstanbul. The index consists of stocks except banks, traded on Stars Market with the highest free float market value and trading volume. Ten companies are included in the index and index has been calculated since 4th November 2019 (https://borsaistanbul.com).

The companies included in BIST Liquid 10 Ex Banks Index are given in Table 1 below.

Table 1: Companies in BIST Liquid 10 Ex Banks Index

ASELSAN ELEKTRONİK SANAYİ VE TİCARET A.Ş. (ASELS)
EMLAK KONUT GAYRİMENKUL YATIRIM ORTAKLIĞI A.Ş. (EKGYO)
EREĞLİ DEMİR VE ÇELİK FABRİKALARI T.A.Ş. (EREGL)
KARDEMİR KARABÜK DEMİR ÇELİK SANAYİ VE TİCARET A.Ş. (KRDMD)
KOZA ALTIN İŞLETMELERİ A.Ş. (KOZAL)
PETKİM PETROKİMYA HOLDİNG A.Ş. (PETKM)
SASA POLYESTER SANAYİ A.Ş. (SASA)
TÜPRAŞ-TÜRKİYE PETROL RAFİNERİLERİ A.Ş. (TUPRS)
TÜRK HAVA YOLLARI A.O. (THYAO)
TÜRKİYE ŞİŞE VE CAM FABRİKALARI A.Ş. (SISE)

In the following part of the study, the working capital adequacy of these companies operating in Borsa İstanbul with high market value and trading volume will be analyzed with the liquidity ratios for the years 2019-2020. Current ratios, quick ratios and cash ratios will be examined respectively for working capital adequacy.

The current ratios of the companies included in BIST Liquid 10 Ex Banks Index for the years 2019 and 2010 are given in Figure 1 and Figure 2.

Figure 1: The Current Ratios of Companies in 2019

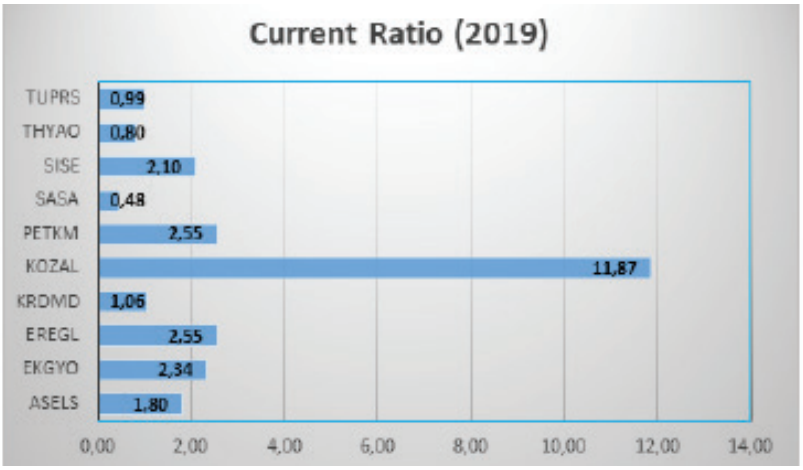
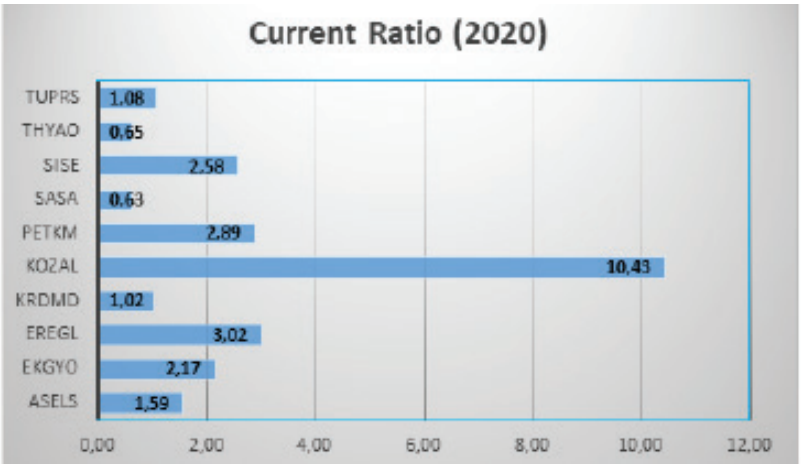


Figure 2: The Current Ratios of Companies in 2020



The current ratio of five companies is greater than the generally accepted value of 2 in both years. In addition, the current assets of seven companies in 2019 and the current assets of eight companies in 2020 are greater than the total short-term liabilities. This desired surplus indicates positive working capital. Since the total current assets of the three companies in 2019 is smaller than total short-term liabilities, there is a net working capital deficit in these companies. In one of these three companies, net working capital turned from negative to positive, as total current assets exceeded the short-term liabilities in 2020.

The quick ratios of the companies included in BIST Liquid 10 Ex Banks Index for the years 2019 and 2010 are given in Figure 3 and Figure 4.

Figure 3: The Quick Ratios of Companies in 2019

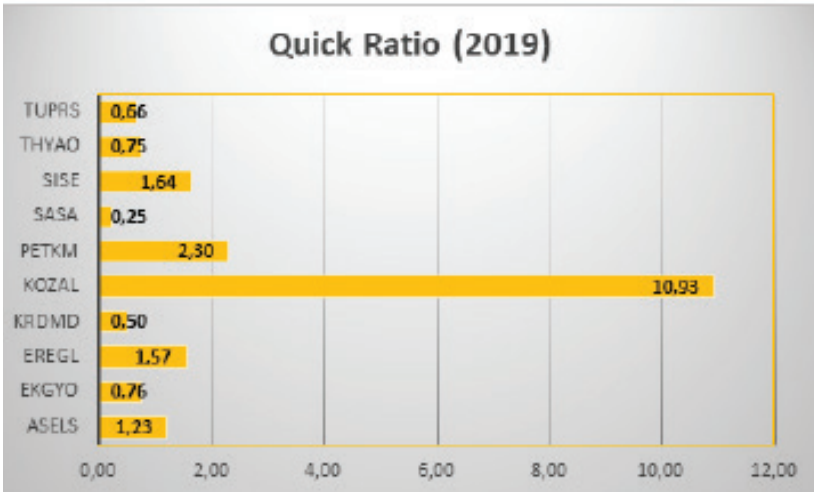
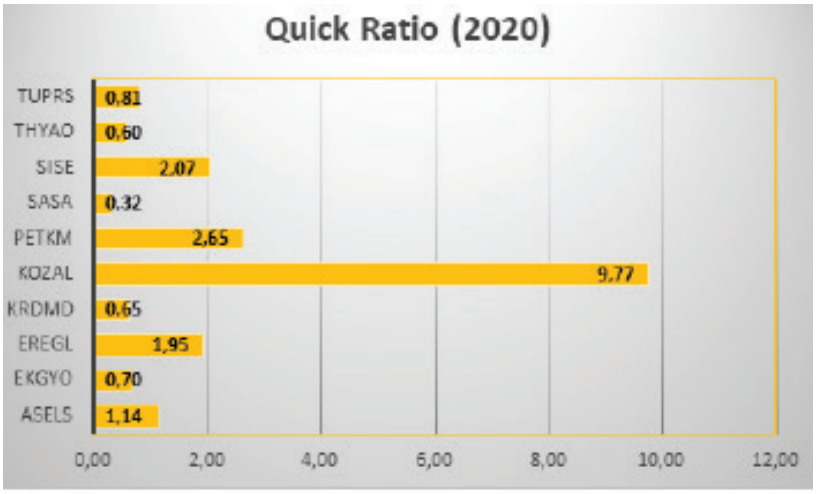


Figure 4: The Quick Ratios of Companies in 2020



The quick ratio is greater than the generally accepted value of 1 at five companies in both years. In this context, it can be said that working capital items other than inventories are sufficient for these companies. These companies are in a position to pay their short-term debts without selling their inventories. On the other hand, the other five companies will not be able to pay all of their short-term debts without turning their inventories into cash, and they will become somewhat dependent on their inventories in order to pay their short-term debts.

The cash ratios of the companies included in BIST Liquid 10 Ex Banks Index for the years 2019 and 2010 are given in Figure 5 and Figure 6.

Figure 5: The Cash Ratios of Companies in 2019

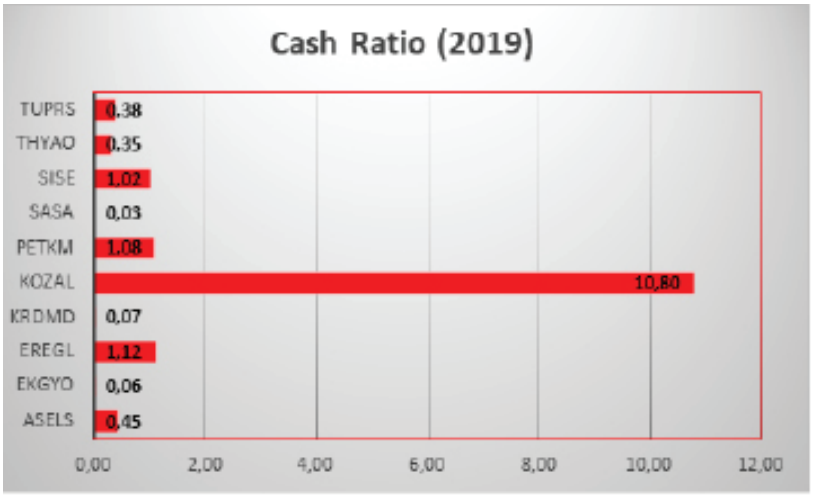
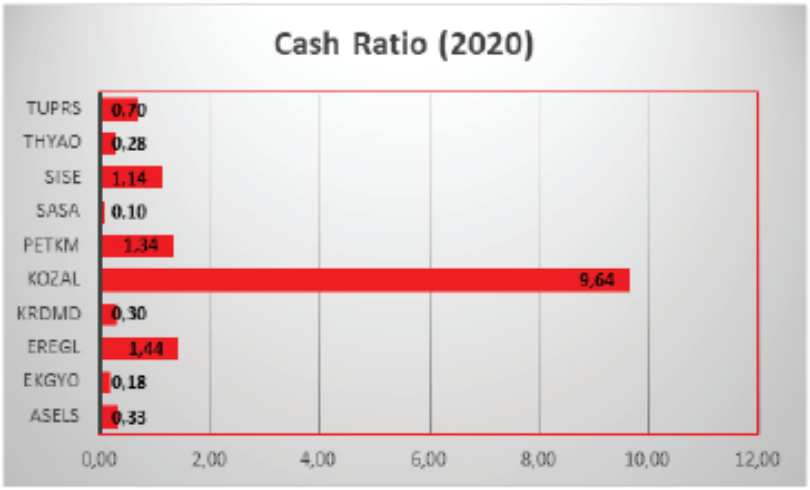


Figure 6: The Cash Ratios of Companies in 2020



The cash ratio of seven companies is above the generally accepted value of 0.20 in 2019. The same is true for eight companies in 2020. Even if these companies cannot sell their inventories and cannot collect their receivables, they will not have problems in paying their short-term debts.

By 2020, all companies have increased their cash and cash equivalents. The increase in cash and cash equivalents are particularly high in three companies. In 2020, when the impact of the Covid-19 pandemic was experienced, the increase in companies' cash and cash equivalents was higher than the increase in short-term liabilities.

When the liquidity ratios are examined in general, it is seen that all three ratios are very high in Koza Altın İşletmeleri A.Ş. The high current ratio is due to the fact that the current assets of the company are very high compared to its short-term liabilities. Although inventories do not have a very high portion in current assets, cash and cash equivalents constitute a large part of current assets. In particular, this excess in cash and cash equivalents may also indicate the inefficiency of these assets. However, such an excess of cash and cash equivalents in the company comes from the characteristics of the sector in which the company is operated.

7. Conclusion

The working capital has an important part in the execution of the daily activities of the companies. In this sense, working capital ensures that businesses have sufficient cash flow to continue their normal activities and minimizes the risk of not paying their short-term liabilities. In the globalizing world having sufficient working capital also contributes to the expansion of the business volume by reducing the liquidity risk of the company.

In this study, after giving information about the working capital and the liquidity ratios that one of the ratios used in determining the working capital adequacy, the application section was started. In the application part, working capital adequacy was examined with the liquidity ratios. For this purpose, evaluations of the companies included in BIST Liquid 10 Ex Banks Index were made for the years 2019 and 2020.

Although the sectors of the ten companies examined within the scope of the research are different, it is possible to say that most of them are sufficient in terms of working capital. The working capital of all companies except for three companies in 2019 and two companies in 2020 are positive. It is obvious that these companies will not have problems in paying their short-term debts.

According to the quick ratio results, half of the companies are not in a position to pay their short-term debts without selling their inventories. It is possible to say that these companies are dependent on their inventories to pay their short-term debts.

When the cash ratios are taken into account, it cannot be said that companies generally have problems in terms of liquidity. Even if they cannot sell their inventories and cannot collect their receivables, they can pay their short-term debts.

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CHAPTER 15

THE EFFECTS OF DIGITAL MARKETING ON CUSTOMERS IN THE DIGITAL AGE AND THE ACCELERATION OF DIGITAL MARKETING STRATEGIES THROUGH SOCIAL MEDIA

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1. INTRODUCTION

The marketing sector is constantly changing, making it a dynamic and busy area. As a result of shortages of raw resources and energy, inflation, economic recessions, high unemployment, dying industries, dying firms, terrorism and conflict, and the rapid technical progress in specific industries, marketing has experienced a fundamental transition. These innovations, including the rise of the Internet, have forced marketing executives to make more market-driven decisions. As a result, businesses need a defined approach for gathering accurate and up-to-date information about consumers, goods, the market, and the environment. Internet marketing refers to the practice of promoting and selling products or services via the use of the Internet. Internet marketing taps into the potential of electronic commerce to facilitate the buying and selling things through the Internet. The term "electronic commerce" can be used to refer to any market that is conducted through the Internet. The purchasing, selling, and bartering of goods and services through the Internet are all made possible by the practice of electronic commerce. Electronic commerce may be broken down into subcategories, one of which is internet marketing. As a result of the explosion in internet usage, internet marketing has started gaining a lot of ground in terms of its popularity. It is said that the first iteration of internet marketing occurred around the beginning of the year 1990 and that it consisted solely of text-based websites that provided information on various products. Because of the proliferation of the Internet, it is no longer sufficient to sell products merely; rather, the Internet now facilitates the dissemination of information regarding products, as well as the purchase and sale of advertising space, software applications, public auctions, stock trading, and the introduction of potential romantic partners. A few firms have transformed how the Internet may be utilized for marketing, such as Google.com, Yahoo.com, Amazon.com, Alibaba.com, and Youtube.com. These are just a few examples (Bala and Verma: 2018).

All forms of marketing that use electronic devices or the internet are collectively called "digital marketing." This encompasses both more conventional methods of marketing and more contemporary approaches. When it comes to communicating with existing customers and those who have the potential to become customers in the future, businesses heavily rely on digital channels such as search engines, social media, email, and the websites they own and run themselves. Sometimes people may refer to this type of promotion as "web marketing," "internet marketing," or "online marketing," but they are all just different names for the same thing. The term "digital marketing" refers to adopting a wide variety of digital techniques and channels to connect with customers where they spend most of their time, primarily online. This is done to communicate

with customers interested in the product or service offered. This is done to deepen our connections with customers and keep them satisfied. The term "digital marketing" is used to refer to a wide variety of different marketing strategies. Some of these marketing strategies include a company's website and other online branding assets, as well as digital advertising, email marketing, and online brochures, amongst different marketing strategies. Other marketing strategies fall under the umbrella of "digital marketing." The term "digital marketing" can also be used to refer to different types of marketing methods. Search engine optimization (SEO), paid search advertising (PPC), content marketing (CM), influencer marketing (IM), content automation (CA), campaign marketing (CM), data-driven marketing (DM), e-commerce (e-commerce), social media (SMM), display advertising (DA), e-mail marketing (E-mail), electronic books (e-books), and optical disks (DVDs) are all examples of digital marketing strategies that are growing in popularity as technology develops (Desai: 2019).

Jupiter Research, a business specializing in research, has identified seven elements connected to the effect of digital technology on the behavior of consumers. These aspects are as follows (Nair: 2015, Sawicki: 2016):

* Internet communicators and users build mutual ties with one another and communicate with one another through the usage of electronic mail. As a result, the boundaries of time and space that separated individuals were eliminated, and new virtual communities came into being; this was made possible by advances in digital technology.

* To create and publish content quickly. Consumers can follow changes in products/service prices every day before deciding to buy.

* A consumer can block content unrelated to their needs or interests. In addition, technical solutions made it possible for organic advertisements to exist.

* Consumers are typically categorized into specific subsets, or target groups, based on their unique inclinations and preferences.

* It is possible to express oneself on the internet, sharing one's thoughts and experiences with others to get attention.

* Participation of customers in developing goods and services raises the likelihood that those goods and services will satisfactorily address their requirements.

IBM created the first personal computer in 1981, while Channel Net, originally Soft Ad Group, created digital marketing in the 1980s. In response, advertising attempts have evolved, such as Reader Reply Cards in publications in return for multimedia floppy disks. In 1990, "Digital

Marketing" began to take on a new meaning. 1995 had 16 million internet users, and 2002 had 558 million. In 1996, Americans spent 30 minutes every day online. In 2014, the typical American spent 11 hours per day online. By 2005, most consumers understood "digital marketing's" meaning in the new century. Despite this, popularity has remained low due to slow development in internet affordability and adaptability, as well as decreased use of web hosting services/hosts. "Digital marketing" is a new-century word. Zuckerberg founded Facebook in February 2004, Google introduced Gmail in April 2004, and Twitter debuted in March 2006. Digital marketing likely grew by 48% in 2010. 2012 and 2013 are best for "Digital Marketing." Australia led developed economies in Digital Marketing growth, followed by the U.S. and Luxembourg (Kamal: 2016).

2. DIGITAL MARKETING APPLICATIONS

You are all aware that Google, Yahoo, and Bing are three of the most well-known search engines in the world. Bing is the fourth most popular search engine. Search engines generate an index of the websites they crawl as part of their function. While this is happening, indexing algorithms are hard at work in the background to record information pertinent to the process. The 1990s witnessed the launch of the first search engines, the popularity of which has only increased since the decade in which they were initially developed. At the turn of the millennium, a pay-per-click (PPC) service was introduced for the first time. Regarding search engine marketing everywhere else, Google is now the industry leader in the driver's seat. The second and third-place finishers are Yahoo! and Microsoft (Bing), respectively (Ask.com). There is a significant gap in the market share of search engines between the various languages. For example, people in China use Baidu, people in Russia use Yandex, and people in Hong Kong use Timway. Timway is the most popular search engine in Hong Kong. In each of their regional marketplaces, these search engines hold a considerable market share. It is important to note that the primary objective of the market for search engines, in contrast to the direct purposes of other marketing strategies, is not to attempt to grab customers' attention or arbitrarily influence them. This primary distinction sets the market for search engines apart from different marketing strategies (Durmaz and Efendioglu: 2016).

With digital technology, advertisers may build direct, online, and experiential marketing campaigns, which allows them to develop a more personal relationship with their target audience. These campaigns may include niche database advertising in addition to award-winning card layouts, digital tape ads, pay-as-you-go online, rich text ads, branded websites, viral ads, branded social networks, in-game advertisements (advergames), interactive virals and entertainment advertisements,

SMS texts, online blogs, text, e-mail, and mass media. Four actions are highlighted in efforts to be closer to the client. The first stage is to establish a conversation with the customer; the second is to start a dialogue; the third is to participate in discussions and become an active customer, and the fourth is to convince the consumer to be both a customer and an advocate of the brand. This platform, which allows companies to communicate with consumers without space constraints and gives unrestricted customer freedom to digital marketing, cannot be controlled by brands, and utmost care should be given regarding the hazards that come from this circumstance (Karaağaoğlu and Çiçek: 2019, Öztürk: 2013).

Applications for social networking sites that are compatible with mobile devices and operate on those devices provide valuable data on typical consumer habits. The firm can promptly access the check-in data of the consumer in the business's outlet, and the customer's experience can be gauged by reading the comments they post on the company's website. Businesses have found that making use of applications for social media has made it easier for them to collect customer data such as age, gender, the number of times a customer has checked in at a specific outlet, the total number of customers who have visited the outlet, the customer who visits the outlet the most frequently, and the customer who spends the most time there. Other types of information that can be collected include the total number of customers who have visited the outlet. Particulars on the retail establishment or shopping centers serve the most significant number of clients. It allows grocery shops and other auction houses to manage their customers efficiently, similar to how big online business giants like eBay and Amazon handle it. This is made possible when this data is obtained using various data mining methods. However, social media apps on mobile devices give some power to businesses, allowing them to manage their operations more. It is a prevalent belief that social media gives customers more control, but this is not the case (Yadav, Joshi and Rahman: 2015).

The essential component of precision marketing is conducting exhaustive research on the purchasing patterns of target consumers. Using data mining technologies is vital to segmenting clients' purchasing habits. According to Pareto's Law of 80/20, critical consumers who have the potential to make profits for businesses account for just 20% of all customers. Yet, these essential customers are responsible for 80% of the profits generated by these businesses. As long as they can get these clients, companies have the opportunity to maximize their profits while simultaneously minimizing their use of resources. Because of this, the first stage in the actual application process of precision marketing for retail businesses is customer segmentation, which is also the first step in precision marketing. For instance, when analyzing customers' behaviors,

Suning.com creates a classification and regression tree, also known as a CART, to determine the values of various customers. These values are then targeted on the purchase materials made by these customers based on their consumption times, types, most recent consumption time, consumption amount, consumption frequency, and consumption cycle. Only by doing so is it possible to ensure that clients are given the significance they deserve (Zhu and Gao: 2019).

3. IMPACT OF DIGITAL MARKETING ON CUSTOMER BEHAVIOR

The technique of leveraging various digital channels to reach the targeted demographic specified is referred to as "digital marketing," and the phrase "digital marketing" refers to this approach. E-marketing, interactive marketing (polls, the game ads, mobile marketing), and e-marketing are all current marketing. Other forms of modern marketing include social media, websites, multimedia advertising, online search engine advertising, and E-marketing. Many individuals consider digital marketing to be a new sort of marketing, and as a result, it has enabled businesses to seek new business opportunities through previously inaccessible channels. Regarding marketing, activities carried out through digital channels enable marketers to engage with prospective consumers at a rapid pace directly and regardless of the location of the potential customers. This is made possible because digital media allow marketers to access prospective customers from all over the world. In recent years, digital marketing has become one of the best methods to cut through the noise and engage directly with customers. This is a movement that is gaining more and more traction. As a result, with the trend toward direct, one-to-one marketing, increased emphasis is being devoted to using the various digital channels to promote to customers effectively. This is a direct consequence of the fact that there is a trend toward natural, one-to-one marketing. This is in line with the move toward direct marketing that has been taking place. Mobile marketing is a relatively recent phenomenon that must be considered whenever digital channels are discussed. Because of the growth in the number of consumers in India who have earnings that fall somewhere in the center of the income spectrum, the mobile market in India has become one of the markets globally that is increasing at the fastest rate. Industry experts predict that this sector will have millions of customers within the next ten years. Because of this, research on advertising through digital platforms would likely substantially affect how business is performed. The widespread adoption of technologies based on the internet and the use of these technologies in regular life has significantly influenced how members of society communicate information, both in their personal and professional spheres of activity. One of the most prominent indications

that this transformation is taking place is the emergence of new types of communication technology. The proliferation of new communication channels made possible by technological advancements is what is meant when people talk about "digital marketing." When we talk about digital media, some of the first things that come to mind are social networks such as Facebook, Twitter, and Instagram, in addition to other analogous online social networks and virtual platforms such as websites, microblogs, and search engines. As a result of the proliferation of new methods of communicating with customers through digital channels, the communication tools that are currently available are increasingly being referred to as "conventional communication tools." This is because customers prefer these newer methods of communication. Traditional modes of transmission include the written word (such as magazines and newspapers), the moving image (such as movies and television), and the spoken word (such as radio and podcasts) (Mahalaxmi and Ranjith: 2016).

An emotional connection to the product drives brand loyalty most of the time. Emotions have a part in many different types of decision-making processes, including economic and other decision-making processes. The results of a study that was carried out on the topic of behavioral finance suggest that sentiments do play a role in the choices that individuals make about their financial situations. The advent of the digital era has resulted in significant shifts in how customers behave. Customers have grown to expect prompt results, an immediate feeling of pleasure from their purchases, and prompt payment or delivery of the requested things. Additionally, customers have come to anticipate swift delivery of their ordered products. However, there is a possibility that the shipping may take some time. Buyers need their information searches to be finished as fast as possible to seize the opportunity to acquire the best items. Because of the aid provided by digital and online marketing, customers can make purchases simply without sacrificing their sense of security. This is because customers can access various tools that compare prices, evaluate products, provide detailed product descriptions, conduct rapid financial transactions, and interact with others through social networks (Dhivya et al.: 2022).

Customers may compare prices and research faster. (International) service providers have new decision-making options. Transformation isn't challenging. A single click can send a consumer to a new provider with a good appearance and deal. Transparent markets also have. Customers know service providers' top-performing techniques. This raises all companies' expectations. Customers demand the most outstanding service and communication everywhere and everywhere. Marketing departments must optimize their strategy from an economic standpoint, saving expenses and justifying investments. The marketing plan must show viability. Digital

transformation is driven by client-focused marketing. Marketing can only fulfill the customer's requirement for personal recognition and a superior experience in an escalating competition environment. Marketing pushes data availability, process automation, and analytical insight for customer-focused user experiences. Digitalization removes market entry barriers, creates new business models, and transforms value chains, exacerbating time-to-market challenges. Digital direct marketing shifted from campaign-centered to customer-centered communication. This transition will be driven by increased pressure on enterprises for profitability by mobile customers who are constantly on, linked, sociable, ready to switch, and habituated to best-in-class user experiences (Tanase: 2018).

4. DIGITAL MARKETING STRATEGIES

Finding a tool that gives them access to a large audience is the principal purpose of marketers. Their goal is to locate such a tool. The use of social media is becoming increasingly widespread around the world. Multiple millions of individuals utilize social media daily. They invest a more significant amount of time and effort into Facebook in comparison to other channels and media. It is challenging for businesses worldwide to differentiate their messages from those of their competitors and for customers to find what they are searching for due to the volume of information currently available to marketers everywhere. Making better use of Facebook as a marketing tool might be one solution to this problem. It allows advertisers to communicate directly with the people they are trying to reach. They can utilize the information in user profiles to connect the good folks at the appropriate time with a suitable message. It is essential for digital marketers who want to use Facebook as a digital marketing strategy to have a solid understanding of the link between the level of engagement exhibited by users and the methods that can be utilized to elicit that engagement. In addition to selling a range of products, services, ideas, events, and experiences, Facebook may also be operated in this capacity. It may be of great use in the field of advertising as well as in the sphere of marketing. Businesses have the opportunity to place advertisements on Facebook, where the advertisements are presented to a potential audience of millions of users. It was not feasible in the past for businesses to create their accounts, also known as fan pages, which aid them in boosting the attractiveness of their brand through interaction with existing and potential consumers (Piranda, Sinaga and Putri: 2022).

A look at several digital marketing strategies is provided below (Darma and Noviana: 2020):

4.1. Search Engine Optimization

Search Engine Optimization, sometimes known as SEO, refers to

optimizing a website to get higher rankings in the results of a search using SEO. You can rank your firm at the top of the search engines if you have a solid grasp of the technology that powers search engines. Websites, blogs, and infographics are examples of the types of media that may be employed.

4.2. Content Marketing

Planning, developing, and disseminating material that pertains to a firm can be done as part of an initiative to entice readers to learn more about the company's operations and encourage them to make purchases. This material may be generated in various formats, including blog postings, social media, articles, e-books, infographics, and online brochures.

4.3. Marketing Automation Marketing

The process of carrying out activities in a manner that is repeated is referred to as automation. Workflows, content upload frameworks, and campaign reports may all be provided. This automation is ideally suited for digital communication platforms like electronic mail (email) and social media.

4.4. Pay-Per-Click (PPC)

Pay-Per-Click, often known as PPC, is a method of driving visitors to your website in exchange for a price per click. For instance, with Google AdWords, a business must pay an upfront price in addition to being charged a fee for each click to obtain the top position on a Google search results page. In addition, there are now sponsored messages on LinkedIn and Facebook that may be used to advertise.

4.5. Native Advertising

Native advertising, also known as promoted posts on Facebook and Instagram, is a form of sponsored content that is presented in a manner that is analogous to that of traditional media content and placement. The material seems part of the connected media and performs its duties similarly.

4.6. Affiliate Marketing

You are paying out commissions to advertisers for directing readers, visitors, or viewers to a firm's business if the company has formed partnerships with the services or websites of third parties. This technique is also regarded as practical because it can be carried out in the comfort of one's own home, and the only thing the business needs to do is wait for the outcomes. For example, you might put your video adverts on YouTube.

4.7. Marketing on Social Media

Because social media is a method of marketing that can be used

to launch and grow the brand, it is crucial to promote companies and content on these platforms. When it comes to communicating with users, companies have the option of utilizing Facebook, WhatsApp, Twitter, or even Facebook Messenger. However, for businesses to save time, money, and other resources, as well as increase their level of expertise, they must concentrate on only one social media platform. The next step is to consider the persona you present on social media platforms, whether it is official or semi-formal.

5. THE EXPANSION OF DIGITAL MARKETING STRATEGIES VIA SOCIAL MEDIA

The marketing of a product or service via various websites and platforms associated with social media is referred to as social media marketing (SMM). Although e-marketing and digital marketing are still commonly utilized in academic circles, social media marketing is gradually becoming a more sought-after subject of study among professionals working in the sector and academics. The vast majority of social media networks come pre-loaded with data analytics tools that businesses can use to track the growth, success, and engagement of advertising campaigns. Companies may use these tools to analyze the progress of advertising campaigns. Businesses can engage with various interested parties, including their current and potential customers, current and potential employees, journalists, bloggers, and the general public, thanks to social media marketing. As part of the strategic level of social media marketing, the management of a marketing campaign, governance, the determination of the scope (such as whether more active or passive usage is desired), and the formulation of the company's intended social media "culture" and "tone" are all included. Businesses that employ social media marketing may decide to let customers and other Internet users upload user-generated material as an alternative to using advertising copy developed by the marketer (for example, online comments, product reviews, and so on). This form of content is also referred to as "earned media" in some circles (Ibrahim and Ganeshbabu: 2018).

Alterations in customer behavior patterns necessitate businesses to revise the marketing techniques they employ in the digital space. Currently, a sizeable amount of the study related to this topic focuses more on the client than the company. To boost consumer engagement with digital marketing, marketers need to emphasize relationship-based interactions with their target audiences (Tiago and Veríssimo: 2014).

A new point of view about the value that social media marketing may provide to a company's operations has emerged among online marketers. There has been a meteoric rise in customers turning to social media platforms to locate businesses that can provide the goods and services

they want. According to famous social consumer statistics (Ibrahim and Ganeshbabu: 2018):

• Approximately 76% of organizations utilize social networking to fulfill their marketing aims.

• Business merchants saw a rise in revenues of around 133% after marketing their company in the mobile market, which emphasizes the importance of social media marketing for their company.

• Forty percent of internet customers in the United States use their smartphones to complete in-store purchases.

• Approximately 71% of consumers base their purchasing decisions on the comments and recommendations made by other users of social media platforms concerning a specific brand.

• Shoppers place a higher level of faith in the opinions of other consumers than they do in the marketing promotion that comes straight from the brand's website.

• The vast majority of profitable companies now maintain a social media presence to broaden the scope of their marketing efforts and make their products more accessible to users of social media platforms.

Because it allowed the customer to be more actively involved in the product's manufacturing through the co-creation of brand identity and frequently the product itself, the quick emergence of social media marketing came as a bit of a surprise to those who work in the marketing industry. Research in academic institutions is increasingly focusing on investigating various facets of social media marketing. The ability to listen to conversations on social media and respond in real-time to concerns raised by customers around the clock made social media an essential interactive marketing platform. In other words, digital marketing emerged to take its place almost as soon as interactive and internet marketing became common phrases to use in business contexts. According to Google Trends, the number of people searching for "digital marketing" surpassed the number of people searching for "internet marketing" and "interactive marketing" in about 2013. From that point on, the term "digital marketing" has come to be used to refer to a certain kind of marketing that emphasizes high levels of engagement and is driven by data management, analytics, and measurement. The foundations of digital marketing are found in direct marketing, where database administration and measurement principles were first developed. Because multivariate tests could be carried out in real-time, A/B testing, which has long been a standard component of direct marketing, became more advanced. These internet and mobile-based applications are examples of digital technologies that may be used

in digital marketing. Examples of these applications include search engine marketing, social media, customer databases, and other similar applications. Print operations, which are now dependent on digital technology, can be covered on a large scale under this description. In addition to measurement and the act of engaging customers, digital marketing also incorporates all of the benefits above (Zahay: 2021).

6. THE BENEFITS THAT CUSTOMERS RECEIVE FROM DIGITAL MARKETING

As a result of the proliferation of digital marketing, made possible by the rapid growth of technology, consumers' buying behaviors have undergone significant transformations. The following is a list of the many benefits that it has brought to its consumers because of its use (Yasmin, Tasneem and Fatema: 2015):

• **Ensure that your expertise in products or services is kept up to date at all times:** Customers can keep their connection to the most up-to-date information regarding the company owing to the instruments offered by digital marketing. Many customers can now utilize the Internet from any location at any time, and businesses are continuously changing the information they give about their products and services to reflect these developments.

• **Greater engagement:** Because of the proliferation of digital marketing, consumers can now take part in a wide range of activities offered by businesses. Customers may make purchases and provide feedback on the company's website, in addition to having access to a variety of information regarding the products or services being offered for sale by the business.

• **Information describing the products or services that may be comprehended in its entirety:** Customers receive correct information regarding the products or services sold to them via digital platforms. There is a hidden potential that a consumer would misunderstand the information they get from a salesperson in a retail facility; nevertheless, the likelihood of this occurring is low. On the other hand, consumers have access to a variety of product information that they can rely on when deciding on an online purchase while using the Internet.

• **The capacity to quickly contrast one's situation with that of others:** As a result of the proliferation of businesses attempting to market their goods or services through digital marketing, consumers can now compare products or services offered by a variety of suppliers in a manner that is both cost and time efficient. This is possible thanks to the fact that customers can now make these comparisons in a price- and time-efficient way. This is rapidly becoming the most significant benefit that customers

may receive. Customers do not need to visit different retail stores to collect information about the products or services being provided to them.

• **Shopping Is Available Around the Clock Customers may shop whenever convenient:** The fact that one may access the Internet at any time means that there is no restriction on the hours in which one can purchase a product through the Internet.

• **Spread information about the goods or services offered:** Through digital marketing, the target audience is presented with the possibility to share information regarding the product or service with others. By leveraging digital media, one can readily express information to others on the attributes of a product or service while obtaining access to that information. This is possible both for the person conveying the data and the person receiving the information.

• **Apparent Pricing:** Because the firm displays the pricing of the products and services it sells to customers through the digital marketing channel, those customers have a far better awareness of the expenses associated with those products and services. Customers are always in control since they can remain up to date instantly by simply glancing at any one digital marketing method. This puts customers squarely in the driver's seat. It is not uncommon for businesses to sometimes change the prices of their goods and services or to provide limited-time promotions on those products and services.

• **Makes it feasible to make a purchase right away:** When consumers are presented with traditional forms of advertising, the expectation is that they would initially seek out the appropriate brick-and-mortar firm to purchase the goods or services being marketed. On the other side, owing to digital marketing, customers can make speedy purchases of the things or services being offered.

7. CONCLUSION

After the outbreak brought on by the coronavirus (Covid-19), there has been a discernible increase in the amount of interest displayed by businesses in digital marketing. Digital marketing, also known as electronic marketing, is a form of marketing that uses the internet to promote various goods, services, and brands. In addition, due to the epidemic, research has begun on how individuals might become prosperous businesspeople in digital marketing. There has been a significant shift in our concept of commerce and marketing due to the power of the internet and the transformation brought about by mobile technology. In addition, there has been rapid growth in influencers and digital marketing in social media. Both of these developments are attributable to the rise of mobile technology.

Consequently, the emergence and expansion of social media channels have led to the growth and development of digital marketplaces. People's convenience and product accessibility have become more dependent on the expansion of digital markets. It has been noted that societies have grown more sedentary due to spending more time in virtual settings and making better-informed purchasing decisions due to digital marketplaces. Since most online purchases are made using debit and credit cards, the necessity for banks and cards has increased. Both banks and shipping firms have expanded in tandem with this development. With the advent of social media, product advertising promotions have expanded significantly. The consumer can initially evaluate a product's pricing and quality in the virtual environment.

In this modern digital era, everyone has started migrating their businesses to the digital environment, and manufacturers unable to keep up with the digital environment will not be able to advance in their field. A recently opened place of business is conscious that it must establish itself in the social and virtual surroundings before it can be considered successful. A sizable presence in the market is impossible to achieve without some form of promotion. A brand's significance extends to the company that makes the product and the individual who buys it.

Many people who run their businesses on social media have become famous, increased the number of people they can contact, and boosted the growth of their companies as well as their profit margins as a direct result of the substantial advertising efforts and commercial expansion they have undertaken. Due to a significant social media phenomenon, many people have given incredibly major advertising and breakthroughs for their businesses. These individuals' contributions have been noteworthy. Customers have benefited from the beneficial effects that digital marketing has brought about. In this era of digital technology, the evolution of marketing has been aided in part by social media marketing and digital marketing methods.

To summarize, the scope of digital markets continues to grow daily. In addition, manufacturers that want to be successful in the virtual and digital marketers are becoming more aware of the challenges they face to do so. Either we can change with the times and thrive, or we will fail if we continue to hold onto traditional ideals. Consequently, businesses will need to increase their investments in digital marketing to manage their products and brands. The use of digital marketing will see tremendous growth in the years to come.

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