PressAcademia
www.pressacademia.org/journals/jbef

JBEF
ISSN 2146-7943

Journal of Business, Economics and Finance YEAR 2024 VOLUME 13 ISSUE 1

THE IMPACT OF ARTIFICIAL INTELLIGENCE RECOMMENDATIONS ON INDIVIDUAL INVESTOR DECISIONS

DOI: 10.17261/Pressacademia.2024.1897
JBEF- V.13-ISS.1-2024(1)-p.1-12

Kadir Gokoglan[1], Huseyin Sevim[2]
[1]Dicle University, Diyarbakir Vocational School of Social Sciences, Diyarbakir, Turkiye.
kadir.gokoglan@dicle.edu.tr , ORCID: 0000-0001-6397-8477
[2]Dicle University, Institute of Social Sciences, Department of Business Administration, Diyarbakir, Turkiye.
huseyinsevim355@gmail.com , ORCID: 0000-0002-2565-0988

Date Received: January 11, 2024 **Date Accepted:** June 3, 2024

To cite this document
Gokoglan, K., Sevim, H., (2024). The impact of artificial intelligence recommendations on individual investor decisions. Journal of Business, Economics and Finance (JBEF), 13(1), 1-12.
Permanent link to this document: http://doi.org/10.17261/Pressacademia.2024.1897

ABSTRACT

Purpose- Although artificial intelligence technology is a new technology, it affects every aspect of our lives by finding a very fast field of activity. Artificial intelligence technology, which also shows its effect in the field of finance, is seen to have many applications. There are many alternatives in the investment markets, it will take a long time to make a profit in the markets and a certain amount of knowledge is required. People cannot master the data in all markets when they will invest, but technological developments provide the opportunity to invest by storing each data or observing their changes. This study aims to investigate the effects of artificial intelligence technology on individual investor decisions.

Methodology- The study consists of individual investors who live in Diyarbakır province and generally make investments. The questionnaire prepared in accordance with the scope of the study was applied to 1800 participants using face-to-face survey method. The 22 statements prepared in accordance with the scope of the study were applied to the participants. The questionnaires that 1616 participants answered correctly and accurately were included in the scope of the study. In order to ensure the reliability of the study statements, Cronbach's Alpha was calculated and this rate was determined as 91%. The answers given to the study statements were transferred to the tables as a result of the analyses. The transferred information was tried to be interpreted. In addition, frequency tables, t-test and anaova analysis were used in the analysis of the study data.

Findings- Thanks to artificial intelligence algorithms, which is one of this technology, it analyses the data in the market and enables the investor who wants to invest to trade in the market by giving buy and sell orders. Thus, artificial intelligence technology allows the investor to make more profitable investments by guiding the investor.

Conclusion- As a result, it is possible to say that the individual investors participating in the research do not have sufficient knowledge about artificial intelligence technologies, but they have an interest in investing using artificial intelligence technologies. In addition, it has been determined that the older the age, the lower the education level, the higher the income level and the married investors are insecure about investing using artificial intelligence technology.

Keywords: Artificial intelligence, markets, investment, technological developments, investment behaviour
JEL Codes: G10, G11, G41

1. INTRODUCTION

Artificial intelligence technology has become a technology that affects every aspect of our lives today. Artificial intelligence technology, which is also prominent in the finance sector, creates awareness about investments and helps investors make the most appropriate decision and shape their investments while making these decisions. Artificial intelligence technology analyses the data of investment instruments in the best way and creates an investment portfolio, which instruments are invested more in the investor and by analysing the investment graphs, it has an impact on the individual decision-making process of the investor. Thanks to artificial intelligence algorithms, by collecting information about the company to be invested in and analysing the risks and opportunities faced by investor portfolios, it allows investors to make analyses and comments by collecting more information about the company. It is almost impossible for investors to analyse and interpret large amounts of data. In terms of time, it is a tiring job in terms of making many transactions and taking time. Artificial intelligence technology allows the investor to invest in the most appropriate financial instrument by analysing important and complex data and making the data most suitable for the investor by revealing opportunities and threats.

Thanks to artificial intelligence algorithms, the role of the investor on investment decisions is shaped and enables the investor to make the right investment decision. Artificial intelligence technology analyses investor groups more comprehensively and creates a report about them, allowing the investor to shape his/her investment accordingly. With the inclusion of artificial intelligence systems in the investment field, it will create a sustainable investment area and will continue to advise investors on investment. Investors generally shape their investments by prioritising environmental factors or social factors when making decisions. However, artificial intelligence technology allows them to invest in the right investment instruments by comparatively analysing the data with algorithm models. It aims to discover the effect of artificial intelligence technology on investment instruments by collecting and analysing the data of investment companies thanks to artificial neural networks in artificial intelligence technology. Thanks to the technology, it aims to determine whether it is suitable for profitable investments by making suggestions to investors who will invest in companies. While investors are making investment decisions, this technology provides investors with a recommendation whether these decisions are taken correctly or not. Artificial intelligence technology is not known by many investors and this situation reveals the result that many investors cannot benefit from sufficient technology, but the investor should make the right decisions for the right investment by taking advantage of the data and investment forecasting models that artificial intelligence technologies reveal about them when buying a stock or bond by taking advantage of more technology. With the inclusion of artificial intelligence technology in the field of investment, it reveals that artificial intelligence-based systems should be used effectively by preventing investor loss with a correct decision of the investor by eliminating many risk factors.

By talking about the effects of artificial intelligence technology on investors, artificial intelligence technology allows individual customers who make investment decisions to make a more accurate decision and make predictions. Individual investors will help them make the right investment decision by analysing how to make better investment decisions by using artificial intelligence technology and how to get a better result in financial markets. While making an investment decision, the investor will be affected by psychological and sociological factors and will risk their existing savings by not making the right investment decision, but in artificial intelligence technology, they carry out the investment transactions without risking their savings. High frequency trading (HFT), one of the products of artificial intelligence technology, is one of the trading tools that make artificial intelligence-based algorithm trading. HFT analyses the markets and allows customers who trade in a short time period to make the right investment in the markets by making decisions without any human influence.

2. LITERATURE REVIEW

Ellezoğlu (2020), in his study, tried to determine whether the behaviour of individual investors in Ankara while making financial decisions affects this decision-making. In addition, he examined how investor risks appear and related changes due to the behaviour they exhibit. Gu, Kelly, & Xlu (2020), analyses how it will perform in the financial field from time series and cross-sectional models by predicting prices in the stock exchange with machine learning techniques in artificial intelligence technology. Güdelek (2019), in his study, approaches to financial problems were explained by examining time series. He states that the models created by developing deep learning models in financial data have achieved success in the financial field. Rasekhschaffe & Jones (2019), referring to the role of machine learning in the financial sector in the future, he mentioned the importance of artificial intelligence in the financial field and stated that the biggest effect of artificial intelligence is not realised in the financial field by giving the example of machine learning-supported Robo consultants of banks in the USA.

Sabharwal (2018), argues that the way to overcome the problem of compliance when using machine learning to predict income in stocks is the forecasting modelling to be created with data sets in machine learning methods. Korkulutaş (2018), made an application in Erzincan province by examining individual investor behaviours and evaluating investor behaviours in the financial context. By surveying 390 individual investors, he tried to investigate the behavioural effects on investment by examining the behavioural tendencies of investors. Aldemir (2015), investigated the factors affecting the civil servants and workers living in Tokat province while making investment decisions. According to the results of the surveys conducted with 400 participants and individual investors, the results of the financial profiles of investors on investment decisions were mentioned.

Küden (2014), in his study, examined the investor psychology of investment instruments by examining traditional and financial theories from a behavioural perspective. In the light of the data obtained as a result of the study, it was revealed that investors do not act rationally by being under the influence of psychological tendencies. Ayvalı (2014), tried to reveal the investment tendencies of individual investors in Bartın province with their level of knowledge and investment understanding while investing. In the light of the data obtained by conducting a questionnaire survey with investors and bank employees on investment, it was determined that investors in Bartın province are affected by factors such as past investment experiences and factors such as income levels and investor views, factors such as financial stability, and that investors keep their self-confidence at a high level by diversifying their investment and reducing risks. Çelik (2013), in the light of the data obtained as a result of his study by examining the psychology of individual investors in our country by examining the behavioural effects

in the financial field, it was found that individual investors invest under the influence of psychological prejudices in their investment decisions and thus cannot achieve the desired result in the market.

Özer, Sarı, & Başakın (2017), in their study, evaluated the stocks of 8 developing countries on a weekly basis and made forecasts using fuzzy logic and artificial intelligence neural network technique and stated that the ii study management made similar predictions by trying to find the best stock in terms of investment among them. Shen, Jiang, & Zhang (2012), in his artificial intelligence study, revealed the investability of the next day's stock situation by predicting the profit margin of the stocks by predicting the profitability of the stocks by predicting the profit margin of the stocks by predicting these stock ratios of artificial intelligence technology by 74.4% for NASDAQ stock market, 77.6% for S&P and 77.6% for DJIA. Kutlu & Badur (2009), in his study, made a forecasting study for the Istanbul Stock Exchange 100 index and stated that the forecasts given for investment in stocks using artificial intelligence neural network technique are promising. Tsai & Wang (2009), There are many studies on making stock forecasts using artificial intelligence technology. He stated that by using neural techniques, using algorithms in decision tree models in investment using neural techniques, stocks in the Taiwan market were correctly inferred by 77%.

3. CONCEPTUAL ARTIFICIAL INTELLIGENCE

Artificial intelligence technology, unlike natural intelligence, can be defined as the ability of computers or computer-controlled robots to perform tasks related to entities in general. These robots created with the computer system are a technology created by thinking like humans and acting like them (Say, 2018). Artificial intelligence can be defined as a concept that produces technological devices using abilities such as communication and perception based on the mind (Kuşçu, 2015).

When we look at another definition of artificial intelligence; it is a device that performs operations through programming to perform logical and arithmetic operations of computer systems. Artificial intelligence is a technology that creates intelligent machines by imitating human behaviour. Intelligent machines are defined as machines that behave like humans, think like them and at the same time make decisions like humans. While artificial intelligence is given a task, we do not need to define it; instead, it is defined as a technological machine that creates machines with algorithms and programming that works on its own (Karakuş, 2023).

Artificial intelligence technologies are expressed as the transfer of human intelligence to machines to perform the given task. The purpose of artificial intelligence is to fulfil tasks and reason. Artificial intelligence technology is based on neural networks, deep learning and machine learning. In this way, it will be seen that artificial intelligence technology is taking place more and more in our lives every day and that this technology comes up with different models with software every day. Artificial intelligence is a technological tool that imitates the human brain by having functions such as thinking like a human and finding solutions to problems (Wisetsri, vd., 2021).

3.1. Artificial Intelligence Technology

Artificial intelligence technology has pushed the limits of machines to create an efficient and trouble-free technology. The aim of artificial intelligence is not to replace human beings, but to create a more efficient working environment due to increasing workloads in artificial intelligence. Artificial intelligence backs up a workload and ensures that things are planned and finished faster. Artificial intelligence technology, which minimises human error, produces solutions to many critical problems. The most important part of artificial intelligence is artificial neural networks, and it stands out as an indispensable part of artificial intelligence that makes independent decisions thanks to these self-developing and learned system networks. Artificial intelligence technology shows its presence in the field of investment and directs the investor to make the right investment with an analysis modelling (Think Tech, 2022). Artificial intelligence technology can be expressed as a comprehensive computer discipline by creating intelligent machines by imitating human intelligence. Artificial intelligence technology has become an area where every company invests in many areas, and it is in our lives as a technological field that every segment from the financial field to the health sector is interested in.

The basic concepts of artificial intelligence technology; John Searle is the first to introduce these concepts. Some experts explain artificial intelligence with these two concepts. Strong artificial intelligence: It is a machine that solves problems alone without any training. This artificial intelligence aims to find solutions by proposing new approaches to problems by going beyond various problems. Machines and programmes are a technological concept that overcomes complex tasks without any human intervention and produces solutions to problems by thinking like humans. Weak artificial intelligence: weak artificial intelligence is also called narrow artificial intelligence. Weak artificial intelligence, which operates in a limited area, is a simulation of human intelligence, such as a narrowly defined problem or transcribing human speech. This artificial intelligence focuses on performing a single task in the best way (Schroer, 2023).

It is possible to explain the techniques of artificial intelligence technology as follows;

Neural network technique: In this technique, it is a technical analysis used on the basis of mathematical models based on the way the human brain works. They operate like neurons in the human brain. With this technique, it is used as prediction modelling in the financial field by predicting and generalising the data related to an event and guiding investors.

Deep learning techniques: It is a sub-field created by using preloaded information to decide on machine learning. This learning technique is a continuation of the machine learning technique. In this technique, it is an analysis technique used to make data with a very complex structure more understandable in stock data or portfolio management.

Machine learning: In this technique, without any human intervention, the machine accesses information completely by its own means. It is defined as the process of making predictions about a situation by analysing the data collected in this technique and separating the necessary information. Machine learning is used in financial markets to make risk prediction or market analysis for an investment instrument and guide investors in financial decisions (Yıldız, 2022).

4. FACTORS AFFECTING INDIVIDUAL INVESTORS AND INVESTMENT BEHAVIOUR

Investors are people who invest some of their income in investment instruments for their own account in order to earn income in the future. While some of these investors make conscious investments, some of them are referred to as investors who make investment attempts to manage their own fund source without any knowledge (Karan, 2011).

The individual investor is an essential element in the basic building block of the market. Investors want to earn income in the future by investing in different investment instruments and valuing their savings in this field. Investors shape their investments according to their personality traits and factors affecting investor behaviour, but in this case, investors unknowingly put their savings at risk by investing according to the guidance of the environment or their personality traits behaviour. It is aimed to minimise the risk by using applications that make recommendations to investors in artificial intelligence technology that allows investors to invest with completely accurate data without being exposed to environmental influences that guide investors in order not to risk their savings (Özcan, 2011).

Individual investors try to become investors in the investment market by acting with the idea of buying and selling both in the short and long term while investing in the capital market. Individual investors cannot be expected to comprehend the market like companies because they are not experts and act entirely on their own efforts and personal guidance. In this case, it cannot be expected to predict the risk of the instruments to be invested in the market, which will cause investors to withdraw from the market early and result in disappointment. Individual investors are expected to take steps that minimise the risk in the investment market by requesting help from experts and using technological developments (Dizdarlar & Şener, 2016). Individual investors shape their investments by being influenced by three main factors when making investment decisions. It is stated what kind of effects these factors have on investors and which factors affect investors when they make investments. Another factor is that the investor makes an investment without any knowledge and without making use of experts.

Personal factors: We can state that the individual investor not having the necessary knowledge and information about the instruments to be invested in while investing in investment instruments will create a risk in terms of income and the investor's income will be at risk. The level of education of the investor has a very important factor in investment while making financial decisions, in other words, investment preferences and knowledge levels will differ according to the type of education received by the investor. The fact that the individual investor has no knowledge about the financial instruments that he/she will invest in will cause him/her to be deprived of the profit returns that he/she has determined, which will lead to negative factors such as the inability to bring small savings into the economy, which will pave the way for the formation of negative factors.

It will be seen that the lack of information for individual investors and their inability to dominate the market have a direct impact on financial decisions. Having knowledge about financial instruments and having a certain level of education will benefit individuals when making investment decisions and they can make the right investment decision without risking their savings by making use of technological developments (Böyükaslan, 2012).

Environmental factors: While making investments, investors generally shape their investments according to the information they see in the environment or the information circulated by word of mouth depending on external factors. When individuals cannot make decisions on their own, they shape their investments with the help of groups or by getting help advice from family members, but these financial decisions reveal a risk factor. Individuals are influenced by the social and cultural environment of the society in which they are located and make their investments according to the financial instruments specified by the environment by accepting the behaviours of the environment as correct.

Individuals also invest in financial instruments by making use of their friend groups and groups of people who are valued by the environment while making investment decisions, or they invest in financial instruments in line with investment advice by taking suggestions from people who invest in stock exchanges and shaping their investments in this direction, but this is extremely risky and will be an approach that jeopardises the return of the investor (Usul, Eroğlu, & Bekçi, 2002).

The effects of financial factors: Investors make their investment decisions in line with financial objectives in order to generate income. The investor who makes an investment decision can be defined as directing his/her investments in the form of a desire to maintain his/her capital and to ensure a continuous income from the deposits he/she holds. When individuals want to turn their savings into investments, they should make their investments in this direction without losing their capital, that is, by minimising the risk factors. While making an investment decision, the individual should always follow up and direct his/her investments cautiously.

The investor wants to continuously increase the value of his capital. This desire of the investor will bring along risk factors, causing him to make the wrong investment and thus risk all his savings. Investors should definitely invest in financial investment instruments by taking advantage of the applications offered by artificial intelligence technology and reducing the risk level by shaping their investments in line with the analyses and data offered by this technology to investors (Özaltın, Ersoy & Bekci, 2015).

4.1. Impact of Artificial Intelligence Technology on Individual Investor Decisions and an Example of Artificial Intelligence Applications

Investors cannot be expected to make a correct investment by encountering more data while buying and selling commodities or stocks in the markets, in this case, investments are under the control of intelligent machines that have the ability to think like humans, working on big data and analysing data thanks to artificial intelligence and neural network algorithms, allowing investors to make the right decision. With the widespread use of systems in artificial intelligence technology, investors using this technology continue their investments by making gains in the market environment. In this context, machine learning enables investors to make their investments accordingly by detecting complex investment patterns and providing real-time data to investors thanks to big data processing power (Chlu, 2020).

If we give an example of using artificial intelligence technology, the company named kavout makes daily stock recommendations that will earn the most by sorting the stocks and using the artificial intelligence system for price determination and pattern confusion. This company also uses artificial intelligence algorithms to create a portfolio in the same way. Epogue, another investment firm, developed a three-stage artificial intelligence system and developed the technique of observing and analysing potential investment options in the first stage, and in the second stage, they created purchase orders, and in the third stage, active purchase orders were carried out and performance analysis was performed through machine learning, allowing investors to invest in the right investment instruments (Thakar, 2020).

By using artificial intelligence-supported investment applications, investors can use machine learning techniques to monitor market conditions, investment strategies and data, analyse these data, predict the investment opportunity in the future and create the investment conditions themselves, allowing investors to invest with the right decisions. In artificial intelligence technology, it continues to operate independently without any human intervention in artificial intelligence technology, learns the trends in the market by analysing the market and reveals them with a good analysis technique and directs investors to make the right decision with their reasoning and decision-making abilities. With artificial intelligence technology, investors can perform their transactions very quickly and provide more reliable and faster service to customers by automating their transactions (platinum crypto academy.com, 2020)

As an example of a company operating in the field of artificial intelligence, Kavout uses artificial intelligence technology to rank stocks. This company uses artificial intelligence technology to detect complex patterns by detecting complex patterns and determining their prices and recommending the most profitable stocks, allowing the investor to make the right investment. Investors recommend the most profitable stocks for investment by using algorithms in artificial intelligence technology to create a new portfolio. If we give an example of another company in artificial intelligence technology, Epuque creates a three-stage artificial intelligence system, making observations and analyses on potential investors in the first stage, creating purchase orders in the second stage, and actively placing purchase orders in the third stage, and analysing performance through machine learning in artificial intelligence technology. With the deep learning technique, which is a sub-branch of artificial intelligence technology, the news on the internet or information on social media is to collect data from various sources and analyse how the market reacts to the reactions by analysing the past and trend data that brings them together and to ensure that the investor is prepared for the market conditions in the future in the long term.

Today, with the development in artificial intelligence technology, the investment volume of accounts managed by traditional investors corresponded to 10% of the investment volume, while in 2012 it corresponded to 55% of the transactions made in the USA. Since 2000, with the use of artificial intelligence technology in investment, investment robots with artificial intelligence have been more successful than individual investors in analysing large volumes of data, simplifying complex transactions and making technical analysis, allowing investments to be made faster with artificial intelligence technology. Artificial intelligence technology is a technology that is open to development. In this way, by identifying and correcting errors, it allows investors to invest by providing investors with simple, understandable and simple analysis data. It is known that

investment instruments are using artificial intelligence by enabling the participation of serious investors in the financial world through investment practices in artificial intelligence technology (Walker, 2021).

5. DATA AND METHODOLOGY

The study consists of individual investors who live in Diyarbakır province and generally make investments. The questionnaire prepared in accordance with the scope of the study was applied to 1800 participants using face-to-face survey method. The 22 statements prepared in accordance with the scope of the study were applied to the participants. The questionnaires that 1616 participants answered correctly and accurately were included in the scope of the study.

In order to ensure the reliability of the study statements, Cronbach's Alpha was calculated and this rate was determined as 91%. The answers given to the study statements were transferred to the tables as a result of the analyses. The transferred information was tried to be interpreted. In addition, frequency tables, t-test and anaova analysis were used in the analysis of the study data.

6. FINDINGS AND DISCUSSIONS

The statements determined within the scope of the study were analysed and tabulated.

Table 1: Statistical Information on Research Statements

Descriptive Statistics			
Valid	N	Mean	Std. Deviation
Do I have enough knowledge about artificial intelligence technology	2616	2,42	1,251
I think that I invest according to environmental impacts when making financial investments	2616	2,52	1,396
I think that artificial intelligence technology invests in the right investment instruments	2616	2,65	1,371
I think that I will make a profit in financial investment by using artificial intelligence technology	2616	2,66	1,380
When making an investment decision, I invest by thinking that I have a high level of knowledge	2616	2,58	1,319
I think that artificial intelligence technology will make a difference in the financial investment world	2616	2,61	1,374
Thanks to the algorithms in artificial intelligence technology, I think that complex data is presented to investors in a simple and understandable way	2616	2,61	1,421
I am aware that artificial intelligence technology can perform analysis techniques that many investor experts cannot do	2616	2,61	1,368
I have information that artificial intelligence technology analyses the market by operating independently without any human intervention	2616	2,70	1,354
I think that with artificial intelligence technology, investors can perform their transactions very quickly and provide more reliable and faster service to customers	2616	2,63	1,464
I think that the demand for investment instruments will increase by enabling the participation of serious investors in the financial world through investment practices in artificial intelligence technology?	2616	2,66	1,406
I have information about Kavout, a company that ranks stocks in the field of artificial intelligence investment and reveals the 3 most profitable ones	2616	2,61	1,394
I think artificial intelligence technology will shape our investments in the future	2616	2,53	1,362
When investing, I invest without taking any technology recommendation as a basis	2616	2,73	1,406
When making an investment decision, I invest by following the decision of the majority	2616	2,64	1,388
When investing, I prefer to buy the most purchased investment instrument	2616	2,70	1,446
I think to get support from investment counselling companies while investing	2616	2,63	1,428
I prefer to invest in instruments with few investments	2616	2,60	1,389
I always think that I will win while investing	2616	2,63	1,419

I always think that I win thanks to my intuition in my investments	2616	2,72	1,366
When making investment decisions, I always act with the ambition that I will earn more	2616	2,39	1,368
I always consider it unlucky when I lose in investment	2616	2,52	1,369
Valid N	***2616***	***2,611***	***1,358***

According to Table 1, the participants stated, "I think that artificial intelligence technology will shape our investments in the future," which is the statement with the highest mean of 2.73. In addition, it was determined that "I have enough knowledge about artificial intelligence technology" was the statement with the lowest mean of 2.42. In this direction, although the participants stated that they did not have enough information about artificial intelligence technology, it was determined that they thought that artificial intelligence technology could be effective in their investment decisions in the future. In addition, it was determined that the individuals participating in the research were generally undecided about approving the research statements.

Table 2: Statistical Information about Participants

Gender	***n***	***%***	***Age***	***n***	***%***
Female	1620	62	*18 years and under*	372	14
Male	996	38	*19 years to 29 years*	768	29
Total	2616	100	*30 years to 39 years*	672	26
Level of Education	***n***	***%***	*40 years to 49 years*	516	20
Primary education	480	18	*50 and above*	288	11
Associate degree	864	33	**Total**	2616	100
Undergraduate	948	37	***Income Level***	***n***	***%***
Postgraduate	324	12	Between 0 - 9.000 TL	384	15
Total	2616	100	Between 10.000 - 19.000 TL	960	37
Marital Status	***n***	***%***	Between 20.000 - 29.000 TL	660	25
Married	960	37	Between 30.000 - 49.000 TL	444	17
Single	1284	49	50.000TL and Above	168	6
Other	372	14	**Total**	2616	100
Total	2616	100	**Which financial instruments do you invest in?**	***n***	***%***
Do you invest in financial investment instruments?	***n***	***%***	*Gold*	372	18
Yes	2076	79	*Repo*	272	13
No	540	21	*Stocks and shares*	612	30
Total	2616	100	*Bond*	172	8
Where do you get information about financial investment news?	***n***	***%***	*Foreign currency*	324	16
Television channels	732	28	*Virtual money*	264	12
Internet news sites	876	34	*Other*	60	3
social media news sites	948	36	***Total***	2076	100
other	60	2			
Total	2616	100			

Table 2 shows the demographic characteristics of the participants and their answers to the questions determined within the scope of the study. According to Table 2, the majority of the participants are women. Participants are generally between the ages of 19 and 40. Participants generally have an associate's degree and a bachelor's degree. It was also determined that the participants had an income between 10.000 TL and 19.000 TL. The majority of the participants are single. While 79% of the

participants stated that they used financial investment instruments, it was determined that the instrument they used the most was stocks. However, it was determined that they generally follow financial instruments on the internet.

Table 3: T-Test and Statistical Information on Gender

Variables	Group	N	Mean	Std. Dev.	t	df	p
Gender	Woman	1620	2,701	,798	**824**	**2198**	**,260**
	Man	996	2,702	,773			
	Total	2616					

Table 3 shows the relationship between the gender factor of the participants and the effect of artificial intelligence on investor decisions. Table 3 shows no statistically significant effect of gender factors and artificial intelligence on investor decisions.

Table 4: ANOVA Analysis on Age Factor

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23,456	4	5,864	9,546	,000
Within Groups	1603,975	2611	,614		
Total	1627,431	2615			

Table 4 shows the relationship between the age factor of the participants and the effect of artificial intelligence on investor decisions. Table 3 shows a statistically significant effect of the age factor and artificial intelligence on investor decisions. To determine between which age groups this effect exists, the Tukey HDS test was performed.

Table 5: Tukey HDS Analysis

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
18 and under	19 - 29	-,17036	,04951	,005	-,3055	-,0352
	30 - 39	-,11233	,05065	,173	-,2506	,0259
	40 - 49	-,31208	,05331	,000	-,4576	-,1666
	50 and above	-,11828*	,06152	,305	-,2862	,0496
19-29	18 and under	,17036	,04951	,005	,0352	,3055
	30 - 39	,05804	,04140	,627	-,0550	,1710
	40 - 49	-,14172	,04461	,013	-,2635	-,0199
	50 and above	,05208*	,05416	,872	-,0957	,1999
30-39	18 and under	,11233	,05065	,173	-,0259	,2506
	19 - 29	-,05804	,04140	,627	-,1710	,0550
	40 - 49	-,19975	,04588	,000	-,3250	-,0745
	50 and above	-,00595*	,05520	1,000	-,1566	,1447
40-49	18 and under	,31208	,05331	,000	,1666	,4576
	19 - 29	,14172	,04461	,013	,0199	,2635
	30 - 39	,19975	,04588	,000	,0745	,3250
	50 and above	,19380*	,05765	,007	,0364	,3512
50 and above	18 and under	,11828*	,06152	,305	-,0496	,2862
	19 - 29	-,05208*	,05416	,872	-,1999	,0957
	30 - 39	,00595*	,05520	1,000	-,1447	,1566

40 - 49	-,19380*	,05765	,007	-,3512	-,0364

*The mean difference is significant at the 0.05 level.

According to Table 5, it is determined that there is an interaction between participants aged 50 and over and other age groups.

Table 6: ANOVA Analysis on Level of Education Factor

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	101,716	4	25,429	43,517	,000
Within Groups	1525,715	2611	,584		
Total	1627,431	2615			

Table 6 shows the relationship between the level of education factor of the participants and the effect of artificial intelligence on investor decisions. Table 6 shows a statistically significant effect of the level of education factor and artificial intelligence on investor decisions. To determine between which age groups this effect exists, the Tukey HDS test was performed.

Table 7: Tukey HDS Analysis

(I) Education	(J) Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
primary education	associate degree	,31111*	,04352	,000	,1923	,4299
	undergraduate	,24318*	,04586	,000	,1180	,3684
	postgraduate	-,17500*	,05496	,013	-,3250	-,0250
associate degree	primary education	-,31111*	,04352	,000	-,4299	-,1923
	undergraduate	-,06793	,03952	,422	-,1758	,0399
	postgraduate	-,48611*	,04980	,000	-,6220	-,3502
undergraduate	primary education	-,24318*	,04586	,000	-,3684	-,1180
	associate degree	,06793	,03952	,422	-,0399	,1758
	postgraduate	-,41818*	,05185	,000	-,5597	-,2766
postgraduate	primary education	,17500*	,05496	,013	,0250	,3250
	associate degree	,48611*	,04980	,000	,3502	,6220
	undergraduate	,41818*	,05185	,000	,2766	,5597

* The mean difference is significant at the 0.05 level.

According to Table 7, it is determined that there is an interaction between the participants with primary education levels and the participants with other education levels.

Table 8: ANOVA Analysis on Income Level Factor

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	51,448	4	12,862	21,309	,000
Within Groups	1575,983	2611	,604		
Total	1627,431	2615			

Table 8 shows the relationship between the income level factor of the participants and the effect of artificial intelligence on investor decisions. Table 8 shows a statistically significant effect of the income level factor and artificial intelligence on investor decisions. To determine between which age groups this effect exists, the Tukey HDS test was performed.

Table 9. Tukey HDS Analysis

(I) income	(J) income	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Between 0-9.000 TL	Between 10.000-19.000 TL	-,29375*	,04691	,000	-,4218	-,1657
	Between 20.000-29.000 TL	-,13125*	,04986	,065	-,2674	,0049
	Between 30.000-49.000 TL	-,34206*	,05414	,000	-,4898	-,1943
	50.000TL and Above	-,53125	,07187	,000	-,7274	-,3351
Between 10.000 - 19.000 TL	Between 0-9.000 TL	,29375*	,04691	,000	,1657	,4218
	Between 20.000-29.000 TL	,16250*	,03928	,000	,0553	,2697
	30.000-49.000 TL arası	-,04831*	,04459	,815	-,1700	,0734
	50.000TL and Above	-,23750	,06497	,002	-,4149	-,0601
Between 20.000 - 29.000 TL	Between 0-9.000 TL	,13125	,04986	,065	-,0049	,2674
	Between 10.000-19.000 TL	-,16250*	,03928	,000	-,2697	-,0553
	Between 30.000-49.000 TL	-,21081*	,04769	,000	-,3410	-,0806
	50.000TL and Above	-,40000	,06714	,000	-,5833	-,2167
Between 30.000-49.000 TL	Between 0-9.000 TL	,34206*	,05414	,000	,1943	,4898
	Between 10.000 -19.000 TL	,04831*	,04459	,815	-,0734	,1700
	Between 20.000 -29.000 TL	,21081*	,04769	,000	,0806	,3410
	50.000TL and Above	-,18919	,07037	,056	-,3813	,0029
50.000TL and Above	Between 0-9.000 TL	,53125	,07187	,000	,3351	,7274
	Between 10.000-19.000 TL	,23750	,06497	,002	,0601	,4149
	Between 20.000-29.000 TL	,40000	,06714	,000	,2167	,5833
	Between 30.000-49.000 TL	,18919	,07037	,056	-,0029	,3813

*. The mean difference is significant at the 0.05 level.

According to Table 9, it is determined that there is an interaction between the participants with an income level of 50.000 TL and above and the participants with other income levels.

Table 10. ANOVA analysis on marital status factor

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	33,658	2	16,829	27,591	,000
Within Groups	1593,774	2613	,610		
Total	1627,431	2615			

Table 10 shows the relationship between the marial status of the participants and the effect of artificial intelligence on investor decisions. Table 8 shows a statistically significant effect of the marial status factor and artificial intelligence on investor decisions. To determine between which age groups this effect exists, the Tukey HDS test was performed.

Table 11. Tukey HDS Analysis

(I) Marial Status	(J) Marial Status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Married	Single	,07383*	,03332	,069	-,0043	,1520
	Other	-,26774	,04770	,000	-,3796	-,1559
Single	Married	-,07383*	,03332	,069	-,1520	,0043
	Other	-,34157	,04599	,000	-,4494	-,2337

Other	Married	,26774	,04770	,000	,1559	,3796
	Single	,34157	,04599	,000	,2337	,4494

*The mean difference is significant at the 0.05 level.

According to Table 11, it is determined that there is an interaction between married participants and single participants.

7. CONCLUSION AND IMPLICATIONS

Within the scope of the study, it was carried out to investigate whether artificial intelligence technology has effects on investments for individuals who live in Diyarbakır province and generally make investments. With this study, it was tried to determine which investment instruments investors use and what they pay attention to while making their investments.

Individual investors participating in the research believe that using artificial intelligence technologies while investing will make the right investment decisions. However, the majority of investors stated that they do not have enough knowledge about artificial intelligence applications. Therefore, investors need to receive training on artificial intelligence technologies. However, it is important to receive this training with the help of experts or teams. Because they should be aware that these trainings cannot be received at an adequate level from various social media, etc. platforms or with hearsay information.

The relationship between the gender of the participants and the effect of artificial intelligence on investor decisions could not be determined. However, a relationship between other factors determined within the scope of the study and the effect of artificial intelligence on investor decisions was determined. Accordingly, it was determined that investors aged 50 and over do not use or trust artificial intelligence technologies. Because it is possible to say that experience has a high impact on investment decisions as age progresses. However, as a result of the young population keeping up with the developing technology, it is possible to say that they make their investments by integrating technology.

It has been determined that participants with primary education level do not use technological developments while investing. It has been determined that investors with a high level of education generally follow technological developments and use artificial intelligence technologies while investing. In addition, it was determined that investors with high income levels do not utilise artificial intelligence technologies. It is thought that investors with high income levels try to keep the risk level at the lowest level. It is seen that they do not trust the investments they will make using artificial intelligence technologies. It has been determined that single participants invest more courageously than married participants and direct their investments using artificial intelligence technologies. However, married investors seem to lack confidence in artificial intelligence technologies by hesitating to take too much risk.

In addition, it was determined that the most frequently used investment instrument of the individual investors participating in the study was stocks. This situation shows that investors do not want to take too much risk. In addition, it has been determined that when they make investment decisions or when they want to invest, they usually benefit from the relevant platforms on the websites.

REFERENCES

Aldemir, S. (2015). Davranışsal Finans Açısından Yatırımcı Davranışlarının incelenmesi: Tokat ili örneği. Yayınlanmış Yüksek Lisans Tezi . Eskişehir: Gazi Osmanpaşa Üniveritesi Sosyal Bilimler Enstitüsü.

Ayvalı , A. (2014). Bireysel Yatırımcı Profili ve Yatırımcı Tercileri Üzerine Bir Araştırma: Bartın İli Örneği. Yüksek Lisans Tezi. Bursa: Bartın Üniversitesi Sosyal Bilimler Enstitüsü.

Böyükaslan, A. (2012). Bireysel yatırımcıları finansal yatırım kararına yönlendiren faktörlerin davranışsal finans açısından incelenmesi: Afyon karahisar örneği. Afyonkarahisar, Türkiye: Afyon Kocatepe Üniversitesi Sosyal Bilimler Enstitüsü, Afyon.

Chlu, J., (2020). Block; writings artificial intelligence. The Power of AI in Finance and Algorithmic Trading: https://www.datacamp.com/blog/the-power-of-ai-in-finance-and-algorithmic-trading adresinden alınmıştır

Çelik, Ç. (2013). İMKB'de İşlem Yapan Yatırımcıların Davranışlarını Belirlemeye Yönelik Bir Araştırma. Yüksek Lisans Tezi . İzmir: Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü .

Dizdarlar, H., & Şener , Ö. (2016). Yatırımcıların risk alma davranışı üzerine bir uygulama. International Journal of Social Sciences and Education Research, 8, 1-14.

Ellezoğlu, N. (2020). Bireysel yatırımcı davranışlarının finans kapsamında incelenmesi: Ankara İli uygulaması. Ankara , Türkiye : Yüksek Lisans Tezi. Gazi Üniversitesi.

Gu, S., Kelly, B., & Xlu, D. (2020). Empirical asset pricing through machine learning. TheReview of Financial Studies, 14, 2223-2273.

Güdelek, M. (2019). Zaman Serisi analiz ve tahmin : derin öğrenme yaklaşımı. Yüksek Lisans Tezi.

Karan, M. (2011). Yatırım Analizi ve Portföy Yönetimi. Ankara: Gazi Kitabevi.

Korkulutaş, D. (2018). Bireysel Yatırımcı Davranış ve Kararlarının Davranışsal Finans kapsamında değerlendirilmesi. Erzincan, Türkiye: Erzincan Binali Yıldırım Üniversitesi Sosyal Bilimler Enstitüsü.

Kuşçu, E. (2015). çeviride yapay zeka uygulamaları. Kazım Karabekir Eğitim Fakültesi Dergisi, 46, 212-235.

Kutlu, B., & Badur, B. (2009). Yapay Sinir Ağları ile Borsa Endeksi Tahmini. İstanbul Üniversitesi İşletme Fakültesi İşletme İktisadı Enstitüsü Dergisi, 8, 25-40.

Küden , M. (2014). Davranışsal Finans Açısından Bireysel Yatırım Tercihlerinin Değerlendirilmesi. Yüksek Lisans Tezi. İzmir: Gediz Üniversitesi.

Özaltın , S., Ersoy, E., & Bekci, İ. (2015). Kar Dağıtım Politikasının Bireysel Yatırımcıların Yatırım Kararları Üzerindeki Etkisi. Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Dergisi, 397-411.

Özcan, H. (2011). Davranışsal Finansın Bireysel Yatırımcıların Karar Mekanizmaları Üzerindeki Etkileri. Yüksek Lisans Tezi. Nevşehir, Türkiye: Nevşehir Üniversitesi Sosyal Bilimler Enstitüsü.

Rasekhschaffe, K., & Jones, R. (2019). Machine Learning for Stock Selection. Financial Analysts Magazine, 70-88.

Sabharwal, C. (2018). The rise of machine learning androbo-advisors in banking. IDRBT Banking Technologies Journal, 1-28.

Say, C. (2018). 50 soruda yapay zeka. istanbul: 7. Renk Basım Yayın ve Filmcilik Ltd. Şti,.

Schroer, A. (2023, Mart 03). Yapay Zeka nedir ? nasıl çalışır https://builtin.com/artificial-intelligence adresinden alınmıştır

Shen, S., Jiang, H., & Zhang, T. (2012). Stock market forecasting using machine learning algorithms. (Stanford University Working Paper). Retrieved from (s. 1-5). http://cs229.stanford.edu/proj2012/ShenJiangZhang-StockMarketForecastingusingMachineLearni.

Thakar, C. (2020). This Blog. Artificial Intelligence and Machine Learning in Commerce: https://blog.quantinsti.com/artificial-intelligence-machine-learning-trading/ adresinden alınmıştır

Think Tech . (2022, 9 5). STM Think Tech: https://thinktech.stm.com.tr/tr/yapay-zekanin-gelecegi adresinden alınmıştır

Tsai, C., & Wang, S. (2009). Stock price forecasting by hybrid machine learning techniques. International MultiConference of Engineers and Computer Scientists. http://www.iaeng.org/

Usul, H., Eroğlu, A., & Bekçi, İ. (2002). Bireysel yatırımcıların hisse senedi edimine yönelik yaklaşımlar. Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 135-150.

Walker , J. (2021). Polygant. Artificial Intelligence for Commerce: https://polygant.net/ai/artificial-intelligence-for-trading/ adresinden alınmıştır.

Wisetsri, W., Julie Aarthy, C., Thakur, V., Culati, K., & Pandey, D. (2021). Systematic analysis and future research directions in artificial ıntelligence formarketing. Turkish Journal of Computer and Mathematics Education, 43-55.

Yıldız, A. (2022). Finansal alanda yapay zeka teknolojisinin kullanımı:sistematik literatür incelemesi. Pamukkale Sosyal Bilimler Enstitüsü Dergisi, 52, 1-20.