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The use of Artificial Intelligence and the Internet of Things in forecasting the market and economy

Abstract. The purpose of this research was to investigate artificial intelligence (AI) and its applications in predicting financial markets. The acceptance of systems and the presence of AI in financial markets and in a way the application of AI in financial markets has grown significantly and this work is possible with the abundance of available data and the affordability of computing capacity. In fact, with the development of digital technology and the increasing growth of AI technology, the use of AI in financial markets has also increased, and the role of companies and their economic structures are changing rapidly. The present research is a survey in terms of data collection. The statistical community is the research of financial companies based on the web, the number of 225 people were selected using the Cochran formula and in the available form. The validity of the factors research was confirmed by the experts and Cronbach's alpha was used to confirm the reliability of the research.

The research findings showed that AI and the Internet of Things (IoT) have a positive and meaningful effect in creating customer and user knowledges. Also, the creation of knowledge from the foreign market, has a positive and meaningful effect on logical marketing decision-making, economy and market prediction.

Keywords: Artificial Intelligence; AI; Internet of Things; IoT; Marketing; Economy; Customer; User Knowledge
JEL Classifications: E24; E41; E64; I18; J28; J31
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1. Introduction and Brief Literature Review

The benefits of expanding the use of information technology and modern automation are expanding, and in this way, the presence of AI in the financial markets is more evident. Big data, AI, blockchain, IoT and other new technologies that have emerged in the fourth industrial revolution will change our economy and society, so that currently the most changes in the areas of evaluation, asset management credit, stock exchange And hedge fund management is ongoing (Li et al., 2023). One of the important applications of AI is in the field of banking and stock market. In this field, AI is used to prevent fraud and money laundering. Also, its application in the stock market is that with the help of this technology, you can predict the stock market index and offer suggestions for investment. AI categorizes customers and services provided and makes them easier to manage (Hong et al., 2022).

In rural and remote areas, access to modern financial system facilities is limited. AI has helped a lot in this field, so that the residents of these areas, using this technology, can do banking and other related matters even with simple phones with minimal facilities (Liu et al., 2023). Due to the special nature of AI, it can provide patterns that are too complex for the human mind to understand. The complex algorithms that this technology provides can find the hidden relationship between economic factors and cases of financial corruption; in this way, the potentials of creating economic corruption are identified before corruption occurs (Tomazzoli et al., 2023). On the other hand, identifying and examining data related to system corruption by human resources is a very time-consuming and costly task, and with the use of AI, a large amount of manual work is done with greater focus and speed. Another thing that has caused AI to be noticed in this field is that it is not human! Since this technology is not beneficial in doing economic work; therefore, it provides the statistics and information review correctly and without any deficiency and there is no possibility of threatening or offering a bribe to a machine!

The purpose of this study is to identify the role of AI in economic performance and market, and to propose priority directions of their solution in Indonesia based on the analysis of indicators for assessing the market and economy, which determine the factors that have a complex impact on the performance, namely:

- Using AI in creating knowledge;
- Use of AI in Economy;
- Using AI in Market Prediction;
- Using the IoT to knowledge;
- Using the IoT in Economy;
- Using the IoT in Market Prediction;
- Economy in logical marketing decision-making;
- Market Prediction through AI in logical marketing decision making;
- Creating knowledge through AI in logical marketing decision making;
- Logical marketing decision-making through AI in efficiency.

2. Intelligent E-commerce and Distribution System

Intelligent e-commerce and intelligent distribution system are two related concepts that are used in the field of selling and distributing products and services through the Internet and intelligent systems (Ding et al., 2023).

1. Intelligent e-commerce: E-commerce refers to the sale and purchase of goods and services through Internet networks. In this way, customers are able to order and pay for the products and services they need through websites, online stores, e-commerce platforms and other virtual channels. This type of business allows products and services to be offered online, reducing the physical complexity associated with traditional stores and allowing customers to compare prices, choose the best option, and access the global market more easily.

2. Intelligent distribution system: Intelligent distribution system refers to the use of intelligent technologies and automatic systems in the process of distributing and sending products to customers. By using these systems, it is possible to improve distribution processes, reduce costs and increase efficiency in the supply chain. Some of the features of the intelligent distribution system are:

- ***Track and follow:*** Using technologies such as barcodes and GPS tracking, it is possible to track the location of products at all stages of distribution and obtain the necessary information about the status and location of products.

- ***Automation:*** the use of automatic and robotic systems in the process of packing, labeling and sending products reduces errors and increases speed and efficiency.
- ***Route optimization:*** using intelligent algorithms and technologies, optimal routes are determined for the distribution of products to the final destination. This includes choosing shorter, efficient routes, thereby reducing costs and delivery times.
- ***Demand forecasting:*** using intelligent algorithms and methods, customers' demand can be predicted and planned according to product inventory and production capacity. This reduces the need for overstocking and minimizes inventory shortages.
- ***Better communication:*** By using communication technologies such as the IoT and Intelligent connection systems, the interaction between the various components of the supply chain is improved. This enables fast and accurate transfer of information and better coordination between organizations, suppliers and customers. In general, e-commerce and intelligent distribution system make it possible to improve and modify business processes and distribute products using intelligent technologies, reduce costs and improve customer experience.

3. Research Methodology

AI can transform the productivity and GDP potential of the global economy. Strategic investment in different types of AI technology is necessary to realize this problem. Research by PricewaterhouseCoopers International Limited shows that 45% of the total economic benefit of AI technology by 2030 will come from product and process improvements, stimulating consumer demand. The expansion of AI monetization is because this technology increases product diversity by increasing personalization, attractiveness and affordability over time. According to the PricewaterhouseCoopers International Limited Institute, the greatest economic gains from AI will be in China (26% increase in GDP in 2030) and North America (14.5% increase), which is a total of 10.7 trillion dollars and almost 70% of the impact. This technology occupies the global economy.

AI technology will completely change the playing field of different companies and businesses; examining the trends shows that many companies that are lagging behind in the exploitation of AI will be disrupted through the creation of new business models and innovative services. This happened before in the competition of digitalization of businesses and companies. With the rise of AI, in the next ten or five years, some of the market leaders may be among those who you have not even heard of. Today's and tomorrow's market leaders are examining and determining their strategy in relation to the four key issues:

- How vulnerable is my business model to change from AI?
- How long do I have to prepare for this big change?
- Are there game-changing opportunities in my business market?
- How to take advantage of game-changing opportunities?
- How to increase the level of trust and transparency of business AI platform?

This research, from the point of view of the application goal, from the point of view of descriptive survey method, its subject area is in the field of AI and IoT in marketing and the spatial territory of Indonesia in 2021-2022. The research data was collected by library and field methods and the statistical population of the research is web-based economic companies. In determining the number of samples, Cochran's formula was used, and the statistical sample of this research was 225 specialists and experts in financial companies who were selected by the method of distress sampling, and Kaiser-Meyer-Olkin (KMO) test and Bartlett test to check the data adequacy (Table 1).

The design of the questionnaire was done with library and Internet studies, review of documents and interviews with experts, and 20 questions were assigned. The questionnaires were designed in the form of a Likert scale, its validity was verified by content validity by experts using SPSS software, and its reliability was confirmed using Cronbach's alpha coefficient.

Table 1:
KMO test and Bartlett test

KMO Test		0.963
Bartlett Test	Approximate chi-square	7300
	Degree of Freedom	200

Note: Significance Level: 0.001; participants number: 225.

Source: Authors' own research

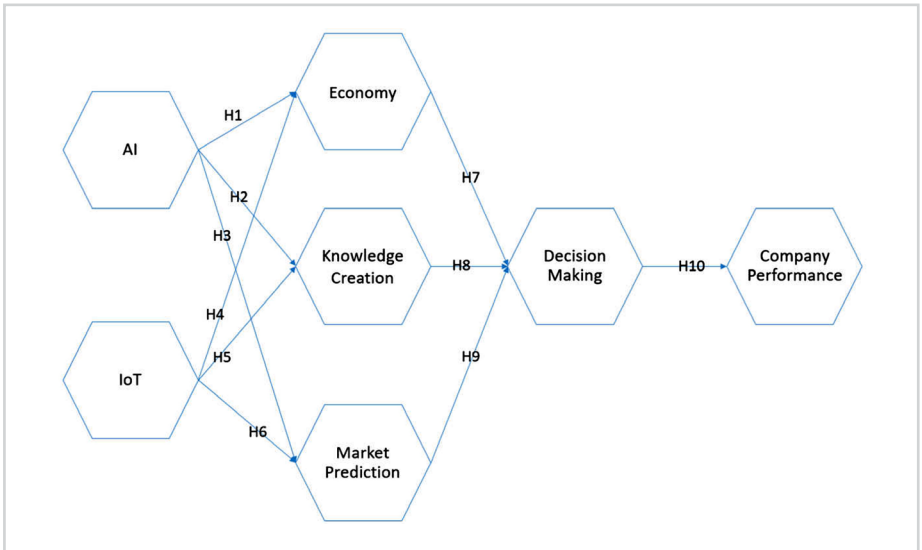

Figure 1:
Research Model
Source: Authors' own research

4. Results

Table 2 shows the required indicators of reliability and validity of the structures. The fit indices and path analysis were calculated using Amos software. In this research, the company's performance variable is the dependent variable, and the dimensions of AI, IoT, independent variable, knowledge creation, Economy, Market Prediction, and logical marketing decision-making are the mediating variables.

This research is based on 10 hypotheses, which were analyzed using the path analysis method in Amos software. The significance level of the hypothesis test is shown in Figure 2. The basis for confirming the hypotheses is that the significance level is less than 0.05 and the path coefficient is positive.

The results of this study showed that AI and the IoT have a positive effect in creating knowledge, economy and market prediction for companies based on technology. In fact, these

Table 2:
Validity and reliability factors

Variable	Cronbach's alpha (0.7)	Construct Reliability (CR; 0.6)	Average variance extracted (AVE; 0.5)
AI	0.921	0.850	0.601
IoT	0.933	0.898	0.768
Knowledge Creation	0.887	0.801	0.592
Economy	0.885	0.888	0.668
Market Prediction	0.778	0.754	0.567
Decision Making	0.993	0.934	0.798
Company Performance	0.948	0.944	0.883

Source: Authors' findings

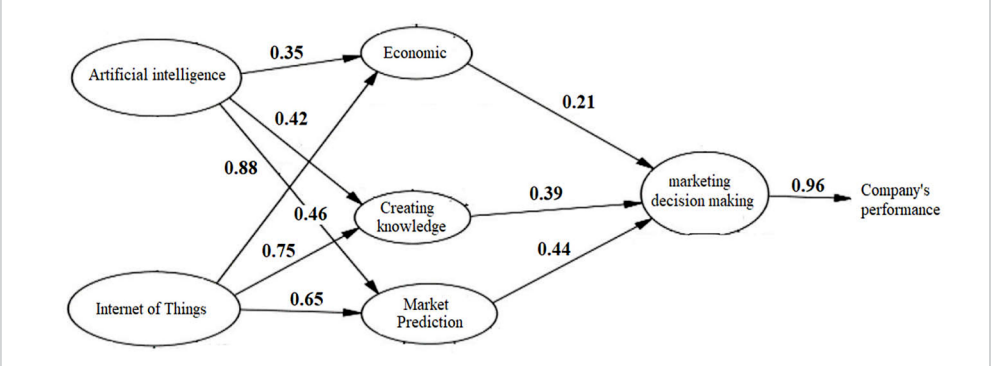

Figure 2:
Estimating the path of research hypotheses
Source: Authors' own research

technologies help to recognize and use the knowledge of the customer, user and foreign market and help the organizations based on this technology. Track real-time data for analysis and quick response to customer and user behavior and know customer and user expectations and guide the future path well. These results are similar to the results of Pouresmaieli et al. (2023) and Islas-Moreno et al. (2023).

The results of this study indicate that the IoT can be used for the customer database in order to create advanced services and improve the performance of manufacturers in particular customer and user specific activities and provide a better understanding. It provided users and creation of strategies. This emerging technology is very effective in empowering service-oriented business models in companies. These findings are consistent with the results of Peter et al. (2023).

The results showed that creating customer knowledge in financial companies has a positive effect on rational marketing decision making. Customer knowledge helps to make better and logical decisions in companies by analyzing the attitude of customers and creating a profile of future customers and improving sales process and knowledge management. These findings are consistent with results of Das et al. (2023).

According to the findings, the creation of market knowledge of financial companies has a positive effect on logical marketing decision making. Creating user knowledge by identifying the content and patterns of social media related to product purchase, developing new products and making predictions about user interests can contribute to the logical decisions of companies. Also, it can be useful in gathering information about the foreign market and shareholders, enabling marketers to identify fake news about their company and develop the company's competitive advantage. These findings are in line with the research findings of Alsayat & Ahmadi (2023).

The results showed that logical marketing decision-making has a positive effect on the performance of financial companies. Examining a set of advantages and inhibiting factors of business models based on new technologies shows that advanced service-oriented business models allow companies to create additional income and savings by reducing operational costs. Long-term business relationship with customers, Improve your performance. Marketers can profit by using AI and virtual reality. These technologies increase customer, user, and foreign market knowledges, improve logical marketing decision-making, and ultimately improve company performance, and also have an impact on marketing and sales management. Not only can you get a better understanding of the patterns, feelings and attitudes of customers towards specific brands by analyzing big data, you can also use AI to support marketers; Marketers can use AI based on big data to improve the knowledge management process, which is important in the progress and promotion of business performance, and it causes the company's performance to increase, and as a result, it leads to profit. There will be competition among competitors. These findings are in line with the findings of Zaidia & Hasana (2022).

4. Conclusion

With the progress of science and technology, AI has found its place in many areas of human life. Among the contributions that AI has made to humanity, the use of AI in the economy can be mentioned. In general, the IoT combined with AI technology has the potential to provide you with the best solution for advanced system performance experience. You can improve your business by integrating AI and data received from IoT devices. The integration of two advanced technologies leads to intelligent devices that help companies make strategic decisions with zero error. By using this technology, many banks and financial institutions have been able to improve their services using new methods and prevent economic crimes and financial corruption.

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