



AN OVERVIEW OF ARTIFICIAL INTELLIGENCE APPLICATIONS IN INTERNATIONAL TRADE

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Abstract

Artificial intelligence (AI) technologies, increasingly prominent in our lives, also widely apply in international trade. Effectively harnessing AI capabilities can yield significant benefits in planning, managing, and executing International Trade. This study aims to analyze academic research on AI applications in International Trade from the past to the present. To accomplish this, an extensive literature review has been conducted. Within the research scope, this study has provided a general assessment of the focus areas of studies related to AI use in International Trade and identified areas with gaps, aiming to pave the way for new research endeavors by proposing recommendations. AI applications, characterized by their expansive and intricate structure, represent a dynamic technology that continues to evolve with each passing day, unveiling new dimensions and capabilities. Consequently, identifying the specific domains within International Trade where AI can be effectively harnessed is an imperative inquiry. The complexity of AI underscores the importance of discerning its potential applications across various facets of global commerce. By projecting the potential utility of AI within International Trade, such investigations not only provide valuable insights but also serve as a catalyst for fostering innovation and addressing pertinent challenges. Moreover, shedding light on the areas within International Trade that stand to benefit most from AI interventions can facilitate informed decision-making and strategic planning among stakeholders. Hence, this research not only seeks to explore the existing landscape of AI applications in International Trade but also endeavors to lay the groundwork for future endeavors by identifying areas ripe for exploration and potential avenues for further investigation.

Anahtar Kelimeler: Technology, Artificial Intelligence, AI Applications, International Trade
JEL Sınıflandırması: F17, F19

ULUSLARARASI TİCARETTE YAPAY ZEKA UYGULAMALARINA GENEL BAKIŞ

Öz

Hayatımızda giderek daha fazla yer edinen yapay zekâ (YZ) teknolojileri, uluslararası ticarete de geniş bir uygulama alanı bulmaktadır. YZ yeteneklerinin etkili bir şekilde kullanılması, uluslararası ticaretin planlanmasında, yönetiminde ve uygulanmasında önemli faydalar sağlayabilir. Bu çalışma, geçmişten günümüze uluslararası ticarete YZ uygulamalarına ilişkin akademik araştırmaları analiz etmeyi amaçlamaktadır. Bunu başarmak için kapsamlı bir literatür taraması gerçekleştirilmiştir. Araştırma kapsamında, uluslararası ticarete YZ kullanımına ilişkin çalışmaların odaklandığı alanlarla ilgili genel bir değerlendirme sunulmuş ve eksikliklerin bulunduğu alanlar tespit edilmiştir, böylece yeni araştırma girişimlerine zemin hazırlamayı amaçlayarak önerilerde bulunulmuştur. Geniş ve karmaşık bir yapıya sahip olan YZ uygulamaları, her geçen gün yeni boyutlar ve yetenekler kazanan dinamik bir teknolojiyi temsil etmektedir. Dolayısıyla, YZ'nin uluslararası ticarete etkin bir şekilde kullanılabileceği belirli alanları tespit etmek önemli bir konudur. YZ'nin karmaşıklığı, küresel ticaretin çeşitli yönlerinde potansiyel uygulamalarını belirlemenin önemini vurgulamaktadır. YZ'nin uluslararası ticaretteki potansiyel faydalarını öngörerek, bu tür araştırmalar yalnızca değerli içgörüler sunmakla kalmaz, aynı zamanda inovasyonu teşvik etmek ve ilgili zorlukları ele almak için bir katalizör görevi görür. Ayrıca, YZ teknolojisinin en çok fayda sağlayacağı uluslararası ticaret alanlarına ışık tutmak, paydaşların bilinçli kararlar almasına ve stratejik planlama yapmasına katkı sağlayabilir. Dolayısıyla, bu araştırma yalnızca uluslararası ticarete YZ uygulamalarının mevcut durumunu incelemeyi değil, aynı zamanda keşfedilmeye uygun alanları ve ileriye dönük araştırma yollarını tespit ederek gelecekteki girişimler için temel oluşturmayı hedeflemektedir.

Keywords: Teknoloji, Yapay Zeka, Yapay Zeka Uygulamaları, Uluslararası Ticaret
JEL Classification: F17, F19

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1. INTRODUCTION

Artificial intelligence (AI) represents one of the most advanced technologies today, when the future is being built, and its use is becoming widespread in almost every aspect of life. One of these areas is International trade processes. International Trade processes are complex processes that include quite different stages and factors. In world trade where big data and variables are involved, the use of technologies such as AI that facilitate the analysis of complex processes and maximize efficiency is undoubtedly of great importance.

Since AI is a relatively new and constantly developing technology that most of us are not yet familiar with, its field of use is constantly evolving and it is possible to talk about uncertainty in this field. For this reason, it is necessary to reveal in which International Trade processes AI applications are used and the potential of their usage areas.

This study was carried out to reveal which AI processes are used in International Trade processes. An analysis of academic studies on AI and International Trade processes from past to present has been made, and the aim of these studies is to reveal in which International Trade processes and in what way AI is mostly used.

AI will be used in almost every aspect of our lives in the future and will make life easier. It is possible that AI, which is also used effectively in International Trade processes, can be used in different ways in many more processes in the future , and by revealing the current situation in the study, there is also the opportunity to make a projection into the future.

1.1. Fundamentals of Artificial Intelligence

Nowadays, artificial intelligence technology appears in almost every aspect of our lives. AI technology, used in many areas from internet search engines to personal digital assistants, from smart home devices to the automotive industry, is defined as a branch of computer systems aimed at imitating and even exceeding human intelligence in some cases (Baronchelli, 2024). However, the science and mathematics behind developments in this field are often deep and complex. Therefore, understanding this complex topic can be challenging for those who want to learn about artificial intelligence (Czarnitzki et al., 2023).

AI combines many disciplines such as mathematics, statistics, computer science and engineering to improve the ability of computers to perform complex tasks. AI generally uses a set of algorithms and methods intended to resemble human intelligence in areas such as information processing, language understanding, problem solving, learning, perception and decision making. These algorithms and methods can be listed as follows:

Machine Learning: It is a sub-branch that enables computer systems to gain the ability to learn based on data. Machine learning involves learning from experience and discovering common patterns across data (Mackenzie, 2018; Alpaydin, 2020).

Deep Learning: It is a machine learning approach based on deep architectures such as artificial neural networks. Deep learning is used to solve complex problems based on large amounts of data and is often effective in areas such as image recognition, natural language processing and voice recognition (Goodfellow, Bengio and Courville, 2016).

Natural Language Processing: It is a field that allows computers to understand and process human language. Applications such as text analysis, language translation, and emotional analysis are carried out using natural language processing techniques (Gonzalez and Woods, 2018).

Image Processing: It is a field that allows computers to understand and process images. Many applications such as object recognition, face recognition, image classification are carried out with image processing techniques (Jan et al., 2023, OpenAI, 2023).

AI has a wide range of applications in various industries, from automotive to healthcare, from finance to entertainment. For example, autonomous vehicles are being developed in the automotive industry, while artificial intelligence is used in healthcare for disease diagnosis and treatment. Therefore, AI is one of the most important technological developments today and affects many aspects of our lives.

1.2. Artificial Intelligence and International Trade

AI enables more accurate decisions to be made by strengthening the prediction and analysis processes at International Trade. In particular, AI-based forecasting models can be used more effectively in supply chain management by using them in important functions such as demand forecasting and inventory management. Additionally, AI helps improve operational processes such as customs clearance, logistics and transportation. Customs procedures can be made faster and more efficient by using AI algorithms to analyze customs data. In addition, AI in logistics management can contribute to reducing logistics costs and improving delivery times by using it in areas such as routing optimization, transportation planning and fleet management. In this way, AI enables the emergence of more competitive and efficient businesses in international trade (Trefler and Sun, 2022, Czarnitzki et al., 2023, Meltzer, 2024).

According to Meltzer (2024) AI will impact international trade will also depend on how it is regulated by law. As a matter of fact, it is thought that AI regulations are already on the agenda in many countries and that these regulations may become an obstacle to international trade in the future.

1.3. The Impact of Artificial Intelligence Applications on International Trade

In the literature and extant applications, it has been seen that AI can be used in basic areas such as supply chain and logistics management, product and service development, marketing and customer services, risk management and security, financial forecasting and analysis and finally customs and border controls in the field of International Trade. On the other hand, AI can be used in every process of general business management, and this is also included in International Trade processes. In addition, since AI is a technology that constantly develops and continues its development exponentially, it is very difficult to predict in which areas it will be used in the future (Ferencz et al., 2022).

1.3.1. Supply Chain and Logistics Management

AI has a huge impact on supply chain and logistics management. It is especially used in demand forecasting, inventory management and logistics optimization. Big data analytics and machine learning algorithms help optimize stock levels and reduce logistics costs by analyzing supply chain data (Avcı, 2022, Aylak et al., 2021). Because AI allows businesses to analyze large amounts of data and make accurate predictions, it can enable better forecasting of demand in third countries, optimizing production and logistics, and making more informed decisions about pricing, stock levels and market trends (Meltzer, 2024).

1.3.2. Product and Service Development

AI can also support product and service development processes in international trade. For example, analysis of customer feedback leads to identifying market needs and optimizing the product/service portfolio. Additionally, AI is a technology that has the potential to create game-changing products and services that will disrupt global trade patterns. Autonomous driving cars are a good

example of this (Goldfarb and Trefler, 2018, Jayathilaka, 2022).

1.3.3. Marketing and Customer Services

AI is widely used in international marketing and customer service. For example, AI is widely used to create personalized marketing campaigns, better understand customer demands, and optimize customer service processes. AI makes great contributions to performance in both direct-to-customer and business-to-business (Paschen et al., 2020). Companies benefit from artificial intelligence by transforming big data into information and knowledge, which allows them to develop more effective marketing and sales strategies. This situation turns into a sustainable competitive advantage. Using decision support systems, marketers increase the efficiency of marketing plans by predicting net customer lifetime value from customers' purchasing behavior, making full use of all available databases (Vlačić et al., 2021)

1.3.4. Risk Management and Security

Risk management and security are of great importance in the International Trade field. AI is used to identify potential risks in trading processes, prevent fraud and ensure data security (Meltzer, 2024, WCO/WTO, 2022). International Trade processes bring with them a number of risks such as fraud, dishonesty and illegal activities. AI technologies help reduce these risks by increasing risk assessment and fraud detection capabilities. AI algorithms can broadly analyze transaction data, financial records, and shipping information to identify repeat suspicious transactions or anomalies that may indicate fraudulent activity. This enables customs authorities and businesses to take effective measures to prevent illegal trade and protect intellectual property rights (Digiampietri et al., 2008).

1.3.5. Financial Forecasting and Analysis

The accuracy of financial forecasts is of great importance in International Trade processes. AI is used to analyze financial data and predict future business trends. This is an important factor that helps make more informed trading decisions. In the world of finance, where there is a dynamic and variable process, taking advantage of AI's data analysis speed and high accuracy rates will take businesses one step forward in financial planning. On the other hand, the impact of AI on financial management is not limited to increasing efficiency, but also includes a deep transformation in the way institutions manage risks, make choices and interact with the financial environment (Berdiyeva et al., 2021, Ahmed et al., 2022, Hidayat et al., 2024).

1.3.6. Customs and Border Controls

In customs and border controls, AI is used to speed up import and export processes, increase security and prevent possible fraud. Facial recognition technology, biometrics methods such as data analysis and big data analytics make customs and border controls more effective. It is seen that the contribution of AI is great in various areas such as detection of suspicious activities, credit card fraud, telecommunication fraud, detection of terrorist activities, financial crime detection and computer intrusion detection, and the use of AI-supported technology in customs is increasing day by day (Digiampietri et al., 2008, Shubailat et al., 2024).

1.3.7. Business Administration

Artificial intelligence has a significant impact on business management. Businesses can optimize data analysis, forecasting and decision-making processes by using artificial intelligence technologies. Additionally, thanks to artificial intelligence-supported systems, businesses can increase efficiency, reduce costs and accelerate decision-making processes by automating (Ballamudi, 2019).

2. ARTIFICIAL INTELLIGENCE IN INTERNATIONAL TRADE IN THE LITERATURE

In recent years, many studies on AI applications have attracted attention in the academic literature. Since AI has penetrated almost every aspect of life, it is normal for there to be a lot of these studies and it can be predicted that they will increase day by day. AI applications in International Trade processes are one of the topics that are increasingly covered in the literature. In this study, by searching the databases of Web of Science, Scopus and Google Scholar for the keywords “*international trade processes*” and “*artificial intelligence applications*” and different combinations of these terms in Turkish and English, remarkable academic studies on AI applications in International Trade processes have been revealed. Undoubtedly, AI is actively used in many areas of international business and trade. Since business functions are also a field of international trade, some studies in this field were also included in this review. Table 1 lists the studies in the literature that include AI applications in International Trade processes, the contents of these studies, and information about the International Trade process in which AI applications are used in each study.

Table 1. Academic Studies on Artificial Intelligence Applications in International Trade Processes

Study	Subject of the Study	Field
Digiampietri et al. (2008)	<ul style="list-style-type: none"> • Demonstrates how AI systems, like Brazil's HARPIA, are used to detect and prevent customs crimes (e.g. smuggling, tax evasion). • Highlights AI's effectiveness in reducing human limitations at borders and enhancing enforcement capacity. • Emphasizes the shift from manpower to AI as essential in managing increasing international trade volumes. 	Customs and Border Controls
Goldfarb and Trefler (2018)	<ul style="list-style-type: none"> • Suggests AI will reinforce the importance of knowledge-intensive industries and economies of scale. • Argues that regulatory policies will determine AI's effectiveness in trade contexts. • Posits that AI-driven trade models could reshape traditional comparative advantage theory. 	Product and service development
Brynjolfsson et al. (2019)	<ul style="list-style-type: none"> • Shows that AI-driven translation tools significantly boost export capacity by breaking language barriers. • Empirical data (17.5% export increase) supports AI's economic impact in e-commerce. • Points out the lack of literature measuring AI's macroeconomic effects in trade. 	Marketing and customer service
Civelek and Artar (2019)	<ul style="list-style-type: none"> • Introduces the "smart trade matrix" using AI and blockchain to eliminate customs duties. • Suggests AI will democratize trade by minimizing dependence on centralized authorities. • Claims potential for AI to mitigate currency fluctuation risks and ensure more equitable trade. 	Financial forecasting and analysis
Ballamudi (2019)	<ul style="list-style-type: none"> • Explores AI's role in transforming business management and middle-management functions. • Concludes AI is a “necessary evil” due to both its utility and associated risks. • Emphasizes the need for future managers to develop new competencies for AI-integrated work environments. 	Business Administration
Nishant et al. (2020)	<ul style="list-style-type: none"> • Investigates AI's role in sustainability, risk, and security management in corporate settings. • Cautions against over-reliance on AI due to limitations like model bias and cyber threats. 	Risk management and security

	<ul style="list-style-type: none"> Encourages culturally adapted AI solutions that consider behavioral and environmental factors. 	
Savinov and Taranovskaja (2020)	<ul style="list-style-type: none"> Analyzes AI's transformative impact on innovation, production networks, and digital platforms. Identifies the need for global standards and IP protection in AI-driven trade ecosystems. Advocates for integrating AI into value chains to boost industrial competitiveness. 	<p>Product and service development</p> <p>Business Administration Marketing and customer service</p>
Paschen et al. (2020)	<ul style="list-style-type: none"> Examines AI's potential to reshape B2B sales through data processing and knowledge generation. Discusses the evolving balance between human agents and AI in sales. Highlights managerial strategies to optimize AI-human collaboration in customer relations. 	Marketing and customer service
Ferreira et al. (2021)	<ul style="list-style-type: none"> Systematically reviews 2,300+ articles on AI in stock markets, categorizing them into four themes. Tracks the growing specificity and sophistication of AI financial applications. Highlights a shift from generic AI models to tailored, hybrid forecasting methods. 	Financial forecasting and analysis
Vlačić et al. (2021)	<ul style="list-style-type: none"> Reviews research on AI in marketing, focusing on adoption, ethics, and data protection. Explores the influence of institutional support and regulatory frameworks. Suggests AI's success in marketing depends not only on tech capacity but also social trust. 	Marketing and customer service
Gupta and Kumar (2021)	<ul style="list-style-type: none"> Reviews ML-based models in forecasting international trade trends. Finds that AI outperforms traditional statistical methods in trade prediction. Highlights the emerging role of AI in macroeconomic modeling and policy planning. 	<p>Financial forecasting and analysis</p> <p>Business Administration</p> <p>Marketing and customer service</p>
Berdiyeva et al. (2021)	<ul style="list-style-type: none"> Conducts a meta-analysis on 150 articles about AI in accounting and finance. Finds AI reduces human error and increases efficiency in financial tasks. Notes broad consensus on AI's benefits, but limited research on integration challenges. 	<p>Financial forecasting and analysis</p> <p>Business Administration</p>
Belu et al. (2021)	<ul style="list-style-type: none"> Explores AI's effect on international logistics and payment systems. Finds positive impacts on trade process modernization and competitiveness. Reveals that despite awareness, actual adoption in Romanian businesses remains low. 	<p>Supply chain and logistics management</p> <p>Business Administration</p> <p>Financial forecasting and analysis</p>

Aylak et al. (2021)	<ul style="list-style-type: none"> • Applies AI-based demand forecasting in textile industry supply chains. • Demonstrates high prediction accuracy using artificial neural networks. • Confirms consistency and reliability of AI models through rigorous error testing 	Supply chain and logistics management
Trefler and Sun (2022)	<ul style="list-style-type: none"> • Uses comparative advantage theory to model AI's impact on global trade. • Shows that AI-adopting countries gain substantial trade and welfare advantages. • Highlights creative destruction as a core mechanism for AI-led progress. 	Marketing and customer service Product and service development
Jayathilaka (2022)	<ul style="list-style-type: none"> • Uses panel data from 150 countries to assess AI's influence on trade volumes. • Confirms strong correlation between AI capability and export performance. • Recommends policies to invest in national AI infrastructure. 	Product and service development Business Administration
Kouka and Magallanes (2022)	<ul style="list-style-type: none"> • Offers a thematic literature review of AI and supply chain integration. • Identifies both technical and policy barriers to full AI optimization. • Emphasizes the need for more empirical studies on AI's global impact. 	Supply chain and logistics management Marketing and customer service
Ahmed et al. (2022)	<ul style="list-style-type: none"> • Bibliometric review of AI in finance using 348 articles from Scopus. • Maps AI applications across fraud detection, forecasting, and portfolio management. • Shows exponential growth in AI research post-2015, especially in fintech. 	Financial forecasting and analysis
Vrontis et al. (2022)	<ul style="list-style-type: none"> • Analyzes how intelligent automation is reshaping human resources (HRM). • Finds AI improves performance but also introduces ethical and governance challenges. • Emphasizes need for HR leaders to adapt strategies around AI integration. 	Business Administration
Sestino and De Mauro (2022)	<ul style="list-style-type: none"> • Proposes a comprehensive definition of AI through systematic review. • Frames AI as a business value enabler across sectors. • Serves as a conceptual guide for researchers and practitioners. 	Business Administration
Hasan (2021)	<ul style="list-style-type: none"> • Reviews interdisciplinary AI use in accounting. • Highlights efficiency, accuracy, and productivity gains. • Warns of risks like job loss in traditional roles. 	Financial forecasting and analysis Business Administration
Avcı (2022)	<ul style="list-style-type: none"> • Analyzes AI and blockchain in logistics. • Emphasizes AI's role in international competitiveness. • Highlights emerging tech infrastructure benefits. 	Supply chain and logistics management Financial forecasting and analysis

Czarnitzki et al. (2023)	<ul style="list-style-type: none"> • Investigates AI's impact on firm productivity. • Uses data from German enterprises. • Finds strong positive AI-productivity link. 	Business Administration
Arzu and Bilgiç (2023)	<ul style="list-style-type: none"> • Evaluates AI's trade effects through political economy. • Finds productivity-driven trade volume growth. • Highlights AI's influence on economic policy. 	Business Administration Product and service development
Qi et al. (2023)	<ul style="list-style-type: none"> • Focuses on AI in e-commerce logistics. • Demonstrates improved distribution efficiency. • Supports digital transformation in logistics. 	Supply chain and logistics management
Goti et al. (2023)	<ul style="list-style-type: none"> • Explores AI in fashion e-commerce. • Conducts literature review to identify gaps. • Emphasizes growing B2C AI relevance. 	Marketing and customer service
Chowdhury et al. (2023)	<ul style="list-style-type: none"> • Conducts systematic review on AI in HRM. • Stresses importance of non-technical resources. • Lists organizational competencies needed for AI. 	Business Administration
Israhadi (2023)	<ul style="list-style-type: none"> • Discusses IT law in Industry 5.0. • Points to new legal challenges in AI-regulated trade. • Highlights global regulatory and IP needs. 	Supply chain and logistics management Business Administration Risk management and security
Jones (2023)	<ul style="list-style-type: none"> • Analyzes trade policy gaps on AI ethics. • Notes risks in data, labor, and consumer rights. • Urges immediate regulatory reforms. 	Risk management and security
Belghachi (2023)	<ul style="list-style-type: none"> • Evaluates broad AI business benefits. • Highlights ethical risks and oversight needs. • Covers AI's impact on efficiency and compliance. 	Financial forecasting and analysis Business Administration Product and service development Risk management and security
Tüfenk (2023)	<ul style="list-style-type: none"> • Discusses AI's pros/cons in trade operations. • Highlights benefits in logistics, quality, and cost. • Warns of potential negative effects. 	Product and service development Supply chain and logistics management Business Administration Marketing and customer service

Boşgelmez and Çengel (2023)	<ul style="list-style-type: none"> • Focuses on AI's role in trade processes. • Emphasizes AI's contribution to supply chains. • Notes operational efficiency benefits. 	Supply chain and logistics management
		Business Administration
		Marketing and customer service
Aktepe and Karakulle (2023)	<ul style="list-style-type: none"> • Analyzes AI in mobile commerce apps. • Finds AI boosts competitiveness across departments. • Uses e-commerce site case studies. 	Financial forecasting and analysis
		Product and service development
		Supply chain and logistics management
Jan et al. (2023)	<ul style="list-style-type: none"> • Investigates AI in Industry 4.0. • Emphasizes sector-specific adoption differences. • Argues against one-size-fits-all AI solutions. 	Business Administration
		Business Administration
		Financial forecasting and analysis
Meltzer (2024)	<ul style="list-style-type: none"> • Explores how AI impacts international trade. • Links outcomes to regulatory and geopolitical factors. • Highlights inclusion in trade agreements. 	Risk management and security
		Marketing and customer service
		Product and service development
Hidayat et al. (2024)	<ul style="list-style-type: none"> • Examines AI in financial decision making. • Highlights operational, ethical, and regulatory dimensions. • Focuses on banking and customer relations. 	Financial forecasting and analysis
		Supply chain and logistics management
Shubailat et al. (2024)	<ul style="list-style-type: none"> • Studies AI's impact on customs and sustainability. • Finds potential for greener and more secure supply chains. • Emphasizes strategic tech adoption. 	Customs and Border Controls
		Risk management and security

		Product and service development
Yan (2024)	<ul style="list-style-type: none"> • Focuses on AI-based trade investment platforms. • Finds AI may unintentionally reduce home export productivity. • Examines international IT flows. 	Marketing and customer service
		Financial forecasting and analysis

Source: (The table was created by the authors of the article.)

3. ARTIFICIAL INTELLIGENCE AND THE FUTURE OF COMMERCE

AI can significantly impact the future of International Trade . The most important of these effects is productivity increase. Artificial intelligence technologies can provide significant improvements in businesses' data analysis, process automation and decision-making processes. This can increase the efficiency of international trade by enabling businesses to operate faster and more effectively (Czarnitzki et al., 2023).

An important contribution of AI to the future of trade stems from its predictive power. By analyzing large data sets, AI can be more accurate and precise in predicting future demand and trends. This allows businesses to better respond to demand and manage stock levels more effectively (Aylak et al., 2021).

Personalization is becoming more and more important in marketing. The contributions of AI to the development of personalized services are enormous. AI can help businesses deliver personalized products and services by better understanding customers' preferences and behaviors. This can increase customer satisfaction in international trade (Paschen et al., 2020).

AI also has an impact on risk reduction in International Trade processes. AI can be used in areas such as fraud detection, risk analysis and security measures, helping businesses reduce business risks. This enables more reliable and secure transactions in IT (Digiampietri et al., 2008).

AI is also very effective in increasing cooperation opportunities across borders. AI enables businesses to collaborate more effectively across borders in areas such as language translation, cultural analysis and global marketing. This can contribute to the expansion and growth of IT (Savinov and Taranovskaja, 2020).

At this point , when asked to make some futuristic predictions about the roles that AI can take in the future of International Trade processes, the ChatGPT (version 3.5) AI program makes some interesting suggestions. One of these is AI-supported automatic agreements. International Trade processes with smart contracts and blockchain technologies, it may be possible to automatically execute and verify transactions. This can make trading processes faster and more efficient. Another innovation predicted by AI is virtual trading assistants. Accordingly, advanced AI-supported virtual trade assistants can help businesses manage their International Trade processes more effectively. These assistants can provide businesses with real-time recommendations on topics such as demand forecasting, pricing strategies and market analysis. Another and important future prediction is about dispute resolution which is frequently encountered in International Trade processes. Artificial intelligence could help resolve disputes arising in International Trade more quickly and fairly, according to a proposal for precision arbitration and dispute resolution. By integrating with machine learning and natural language processing techniques, dispute resolution processes can be made more objective and effective (OpenAI, 2024)

4. CONCLUSION AND RECOMMENDATIONS

As a result of the research conducted in the literature on International Trade processes and AI applications, it has been revealed that AI can be used effectively in certain AI processes and that its usage potential may be unlimited in proportion to the development of AI technologies. It has been understood that the AI applications discussed in the academic literature from past to present have been used in basic areas such as supply chain and logistics management of International Trade processes, product and service development, marketing and customer services, risk management and security, financial forecasting and analysis and finally customs and border controls.

Since AI is currently a developing technology and considering that sometimes great breakthroughs can be achieved in technological processes even in a very short time, it is understood that it is not possible to limit the use of AI to certain areas.

In our study, thirty-eight different academic studies from hundreds of different studies in the literature were determined to be relevant to our subject, these studies were compiled, and it was revealed in which International Trade process or processes the AI applications were predicted to be used in these studies. As a result of this review, Table 2 was revealed.

Table 2. Areas of Use of AI in International Trade Processes in Studies in the Literature

International Trade Process	Number of Studies Conducted
Supply Chain and Logistics	10
Product and Service Development	10
Marketing and Customer Services	12
Risk Management and Security	6
Financial Forecasting and Analysis	13
Customs and Border Controls	2
Business Administration	18

Source: (The table was created by the authors of the article.)

According to Table 2, AI applications are mostly used in general business management areas. On the other hand it has been understood that AI can be used very efficiently in customs and border controls, but its use to the expected extent has not yet been the subject of research. The areas where AI is widely used are noteworthy as marketing and customer services, financial forecasting and analysis, and a considerable amount of work has also been found in the fields of supply chain and logistics and product and service development. It has become clear that more AI studies will need to be carried out in the field of risk management and security in the coming times.

While Table 2 provides a structured overview of key studies in the field, it is important to note that the literature review is not exhaustive. The selection of sources was based on thematic relevance and availability within a defined timeframe, rather than on a comprehensive statistical or meta-analytical approach. As such, the table is intended to highlight representative contributions rather than to quantify the entire body of existing research. Readers should therefore interpret the table as a qualitative synthesis of significant trends and findings, not as a complete mapping of all scholarly work on the subject.

Considering that the basis and first step of International Trade is export and that export can be done through target market research, it is noteworthy that AI applications are not used enough in target market research. Target market research is a complex process that requires compiling very large data and analyzing them in detail (Demirağ Çakıcı and Yılmaz, 2021). AI is an advanced technology that facilitates and accelerates information collection and big data analysis and makes research processes highly efficient and accurate (OpenAI, 2023). In this regard, more intensive use of International Trade processes, especially in target market determination processes, will provide great advantages to businesses in export processes.

The picture emerging from the research reveals that International Trade companies are not yet fully aware of their AI potential. In this regard, it is thought that further research and development studies on AI applications in International Trade processes will contribute greatly to increasing the efficiency of International Trade in the future.

Etik Beyan

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Extended Abstract

An Overview of Artificial Intelligence Applications In International Trade

Aim: The increasing use of artificial intelligence (AI) technologies in international trade has opened up new avenues for improving the efficiency and effectiveness of trade management processes. AI's integration into the trade landscape presents numerous advantages that can be leveraged across different stages of trade, making it a transformative technology in the global economy. This research aims to analyze the existing academic literature on the application of AI in International Trade and to identify areas that have not yet been sufficiently addressed. The literature review presents a general evaluation of AI's application in International Trade and offers recommendations for researchers. In this context, strategic insights are provided on how AI may play a role in the future of international trade.

Method: In this study, a systematic literature review methodology was employed to examine the academic research on artificial intelligence applications in International Trade. Relevant peer-reviewed articles, conference papers, and scholarly publications were identified through comprehensive searches in major academic databases using predefined keywords related to AI and International Trade. Inclusion and exclusion criteria were applied to ensure the relevance, quality, and academic rigor of the selected studies. The collected sources were then categorized according to their thematic focus, methodological approaches, and the specific areas of International Trade in which AI was utilized. This classification enabled a comparative analysis to identify prevailing research trends, commonly explored topics, and understudied or emerging domains within the field. The findings from this structured review formed the basis for evaluating current knowledge, highlighting existing gaps, and developing recommendations for future research directions.

Findings: One of the key areas where AI shows significant promise is in optimizing supply chain management. By applying AI to the vast amount of data generated during the supply chain process, companies can better forecast demand, monitor inventory levels in real-time, and respond to unexpected disruptions with greater agility. Predictive analytics, powered by AI, allows for the anticipation of trends and demand fluctuations, leading to more efficient stock management and reduced wastage.

Additionally, AI is also transforming the logistics sector, which is critical to international trade. The use of AI in logistics optimization helps companies identify the most efficient routes for transporting goods, reduce fuel consumption, and lower overall transportation costs. This optimization not only benefits companies financially but also contributes to sustainability efforts by reducing the carbon footprint associated with global trade.

Furthermore, by utilizing machine learning algorithms, decision support systems can assess potential risks, forecast financial outcomes, and provide recommendations for optimizing business operations. This technology is particularly useful in assessing market conditions, evaluating trade agreements, and determining the best course of action when entering new international markets.

However, despite the growing applications of AI in International Trade, there are still several areas that require further exploration and development. One such area is the use of AI in customs and border controls. While AI has the potential to greatly enhance the efficiency of these processes by automating inspections, detecting anomalies, and streamlining compliance with trade regulations, research on its application in this field is still limited. Given the complexity and importance of customs and border controls, there is a need for further studies to explore how AI can be effectively implemented to reduce delays and improve accuracy in cross-border transactions.

Moreover, AI can also contribute to enhancing the security and risk management aspects of international trade. As global trade becomes increasingly digitized, the risk of cyberattacks and data breaches rises. AI can be instrumental in identifying and mitigating these risks by detecting suspicious activities and strengthening cybersecurity measures. However, the application of AI in this area remains underexplored, and there is a pressing need for more research to fully understand the potential benefits and limitations of AI in managing trade-related risks.

The literature on AI in international trade also highlights the need for companies to better understand the full potential of AI. While AI technologies are rapidly advancing and being adopted in areas such as marketing, customer service, financial forecasting, and product development, many companies are still not fully aware of how AI can enhance their operations. This is particularly true in the case of International Trade companies, where AI's potential in improving trade processes has yet to be fully realized. For instance, AI can assist in automating various back-office functions, such as invoicing, payments, and contract management, which are crucial to the smooth operation of international trade.

Conclusion: In conclusion, the integration of AI into international trade presents significant opportunities for improving trade efficiency, reducing costs, and enhancing decision-making processes. This research not only provides an in-depth analysis of the current state of AI applications in International Trade but also identifies areas that are ripe for further exploration. By addressing the gaps in the literature and conducting more research on AI's potential in customs, logistics, and risk management, companies can better position themselves to take advantage of the opportunities presented by this dynamic technology. Furthermore, continued research and development of AI applications in International Trade processes are essential for companies to unlock the full potential of AI and achieve greater efficiency in their trade operations. As AI continues to evolve, its impact on international trade will likely grow, shaping the future of global commerce and creating new possibilities for businesses and governments alike.
