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Uluslararası Ticarette E-Ticareti Geliştirmek İçin Yapay Zekâ Kullanımı

Using Artificial Intelligence For Enhancing E-Commerce In Foreign Trade

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Özet

Küresel ticaret bağlamında e-ticaret; gümrük prosedürlerinin karmaşıklığı, farklı ödeme sistemleri, kültürel ve dilsel engeller ile lojistik zorluklar gibi birçok sorunla karşı karşıyadır. Bu makale, yapay zekâ (YZ) teknolojilerinin bu engelleri aşmada ve dış ticarette e-ticaret operasyonlarını geliştirmedeki rolünü incelemektedir. Görüşmelere dayalı tek yöntemli bir araştırma yaklaşımıyla gerçekleştirilen çalışmada; makine öğrenimi, doğal dil işleme ve bilgisayarla görme gibi YZ teknolojilerinin tedarik zinciri optimizasyonu, envanter yönetimi, kişiselleştirilmiş pazarlama stratejileri ve sınır ötesi işlemlerin kolaylaştırılması gibi alanlardaki etkileri değerlendirilmiştir. Bulgular, YZ'nin operasyonel verimlilik, tahmin doğruluğu ve müşteri katılımı açısından önemli katkılar sunduğunu göstermektedir. Araştırma ayrıca, YZ'nin uluslararası ticaret süreçlerini sadeleştirme, maliyetleri azaltma ve her ölçekteki işletmenin küresel pazarlara erişimini artırma potansiyelini vurgulamaktadır. Tez, etik ve düzenleyici hususları gözeterek e-ticarette YZ'nin etkin kullanımına yönelik öneriler sunmakta ve gelecekteki araştırma alanlarına ışık tutmaktadır

Anahtar Kelimeler: *Yapay Zekâ, E-Ticaret, Dış Ticaret, Makine Öğrenimi, Kişiselleştirilmiş Pazarlama.*

Abstract

In the context of global trade, e-commerce faces numerous challenges such as complex customs procedures, diverse payment systems, cultural and language barriers, and intricate logistics. This thesis explores how artificial intelligence (AI) technologies can be leveraged to overcome these obstacles and enhance e-commerce operations in international trade. Using a single-method research approach based on interviews, the study examines the application of AI technologies—such as machine learning, natural language processing, and computer vision—in key areas of e-commerce, including supply chain optimisation, inventory management, personalised marketing strategies, and the facilitation of cross-border transactions. The findings reveal that AI integration leads to significant improvements in operational efficiency, forecasting accuracy, and customer engagement. Furthermore, the research highlights AI's potential to simplify international trade processes, reduce costs, and promote global market access for businesses of all sizes. The thesis concludes with practical recommendations for e-commerce businesses, policymakers, and technology developers to maximize the benefits of AI while addressing ethical and regulatory considerations. Future research directions are also outlined to further explore AI's evolving role in global e-commerce.

Keywords: *Artificial Intelligence, E-commerce, Foreign Trade, Machine Learning, Personalized Marketing*

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1. INTRODUCTION

The rapid advancement of information and communication technologies has fundamentally transformed global trade by ushering in the widespread adoption of e-commerce, revolutionizing traditional trade practices characterized by complex paperwork, extended lead times, and high transaction costs. E-commerce has democratized access to international markets, enabling businesses of all sizes to streamline operations and enhance customer engagement through digital platforms. The integration of artificial intelligence (AI) into e-commerce systems has marked a pivotal shift, with applications like predictive analytics, recommendation systems, and intelligent supply chain management empowering firms to make data-driven decisions with unprecedented precision, particularly in the post-COVID-19 era where digital agility and resilience are critical for survival and growth (Russell & Norvig, 2021; Kumar et al., 2021). However, significant barriers persist, especially for small and medium-sized enterprises (SMEs), including inadequate digital infrastructure, limited technical expertise, and challenges in accessing cross-border logistics networks, which exacerbate the digital divide in global trade (McCarthy, 2007). This thesis investigates the evolution of e-commerce as a transformative force in foreign trade, with a focus on the Turkish business context, analyzing how AI-driven tools enhance cross-border transactions, marketing strategies, supply chain management, and customer relationship management. By exploring both theoretical frameworks and practical applications, the study assesses the extent of AI adoption in international trade, its impact on operational efficiency, market expansion, and decision-making, and offers insights for businesses and policymakers to bridge the digital divide and foster a robust digital trade ecosystem. Through case studies and global examples, the research provides a comprehensive understanding of worldwide e-commerce trends and their implications for Turkish firms navigating the complexities of global markets.

2. EVOLUTION OF E-COMMERCE IN FOREIGN TRADE

The evolution of e-commerce in foreign trade has unfolded over several decades, beginning with the development of Electronic Data Interchange (EDI) in the 1960s–1980s. EDI enabled companies to exchange trade documents electronically, reducing manual errors and improving efficiency in customs and international logistics (The OECD Observer, 1999; UN ESCAP, 2007). This marked the first significant step toward trade digitization.

In the 1990s, the commercialization of the internet and the emergence of the World Wide Web transformed the landscape of global trade. Platforms like Amazon and eBay pioneered consumer-facing online commerce, while the introduction of SSL encryption and payment systems such as PayPal made international transactions secure and convenient (Zwass, 1996; WTO, 1998).

The 2000s witnessed rapid global expansion of e-commerce platforms. Companies such as Alibaba and Rakuten offered integrated services for cross-border sellers, including logistics and customer protection systems. During this period, international organizations like UN/CEFACT and UNCTAD began creating standardized documentation and policy frameworks to facilitate broader participation in global digital trade, particularly by developing countries (UN/CEFACT, 2021; OECD, 2019).

From the 2010s onward, new technologies such as mobile commerce (m-commerce), artificial intelligence (AI), and cloud computing drove another wave of transformation. The widespread adoption of smartphones and apps allowed consumers to shop anywhere, while AI technologies like chatbots, personalized recommendations, and dynamic pricing enhanced customer experiences and operational efficiency. Cloud infrastructure further reduced technological barriers, making global e-commerce accessible even to small and medium-sized businesses (UNCTAD, 2021).

The COVID-19 pandemic served as a digital catalyst. Lockdowns and travel restrictions forced even traditional exporters and brick-and-mortar businesses to shift online. Digital platforms became

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essential for sustaining trade, especially in sectors like healthcare, electronics, and consumer goods. According to UNCTAD, global e-commerce sales surged to $26.7 trillion in 2020, highlighting the critical role of digital trade during global disruptions (United Nations, 2021).

2.1 Impact on International Trade

E-commerce has significantly lowered entry barriers for SMEs by offering turnkey platforms that simplify global market access (UN/CEFACT, 2021; World Bank Group, 2022). It has also enhanced efficiency and reduced trade costs through AI, automation, and single window systems that streamline documentation and customs procedures (Javier López González, 2017). The rapid rise of cross-border digital services—including software, media, and cloud computing—has outpaced goods trade but raised concerns over intellectual property protection and regulatory adequacy (OECD, 2019; UNCTAD, 2021). However, challenges persist due to fragmented digital regulations, data localization laws, and increasing cybersecurity risks, particularly under frameworks like the GDPR (World Trade Organization, 2020; GDPR). In response, global efforts such as the WTO's Joint Statement Initiative and regional agreements like CPTPP and DEPA aim to harmonize digital trade governance (World Trade Organization, 2019).

2.2 Economic Effects of E-commerce

E-commerce significantly enhances efficiency and cost reduction by eliminating redundancies and streamlining operations across the value chain. Real-time inventory and production monitoring leads to better asset utilization and minimized waste. Enhanced data exchange enables faster time-to-market, while automated fulfilment systems accelerate order processing and delivery. Additionally, personalized digital customer service improves satisfaction and loyalty.

Beyond operational gains, e-commerce also expands global market access, allowing SMEs to reach international customers with fewer resource constraints. It has transformed logistics and fulfilment by offering integrated shipping, warehousing, and last-mile delivery solutions, increasing reliability in cross-border transactions. Moreover, it facilitates market insights and cross-cultural exchange, enabling consumers to discover unique products worldwide. Finally, e-commerce supports SME internationalization, providing cost-effective entry into global trade, boosting competitiveness, and contributing to economic growth.

2.3 Key Concepts in Artificial Intelligence

The reviewed literature underscores the transformative role of artificial intelligence (AI) in reshaping e-commerce and foreign trade dynamics by enhancing operational efficiency, customer engagement, and global market adaptability, while also highlighting significant challenges that must be addressed. AI, as a multi-disciplinary field encompassing machine learning (ML), natural language processing (NLP), computer vision (CV), and knowledge representation and reasoning (KRR), drives innovation in e-commerce through applications like ML-powered recommendation systems, predictive analytics, and dynamic pricing, which improve personalization and customer retention (Russell & Norvig, 2021; Goodfellow et al., 2016; LeCun et al., 2015). NLP and CV enable intuitive human-computer interactions and visual product search, breaking down language and cultural barriers critical for cross-border trade, as seen in platforms like Alibaba and Amazon that leverage these technologies for enhanced customer service and product discovery (Jurafsky & Martin, 2023; Szeliski, 2022). In supply chain and inventory management, AI's predictive modelling, route optimization, and automated warehousing reduce lead times, costs, and demand variability, addressing logistical complexities in global trade (Kumar et al., 2021). Strategically, AI supports real-time risk assessment, automated document processing, and behaviour-based fraud detection, aiding compliance with regulations like GDPR and CCPA and mitigating cross-border uncertainties (Brachman & Levesque, 2004). However, challenges such as high implementation costs, data quality issues, and a shortage of skilled professionals

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disproportionately impact small and medium-sized enterprises (SMEs), potentially widening the digital divide in global trade (McCarthy, 2007; Russell & Norvig, 2021). Collectively, the literature positions AI as a strategic imperative that offers transformative opportunities in e-commerce while necessitating careful navigation of technical, ethical, and institutional constraints to ensure equitable and responsible adoption.

3. APPLICATIONS OF AI IN E-COMMERCE

AI simulates human cognition and is categorized into narrow AI (task-specific) and general AI (human-level versatility) (Stuart Russell, 2022). Rapid progress in big data, cloud infrastructure, and models like GPT, BERT, and transformers has enhanced machine understanding (Vaswani et al., 2017). Governments globally now recognize AI's strategic value through national AI policies.

3.1 AI-Driven Supply Chain, Forecasting, and Marketing Personalization

Artificial intelligence has revolutionized e-commerce by optimizing operations, personalizing customer experiences, and enhancing security across various applications. In supply chain management, AI leverages predictive analytics to forecast disruptions, enabling proactive mitigation (Downie & Finn, 2024; Alicke et al., 2021), while robotics streamline automated warehousing processes, as seen in Amazon's fulfillment centers (Amazon, 2024), and real-time route optimization improves delivery efficiency, as implemented by DHL (DHL, 2024). For inventory forecasting, AI facilitates SKU-level demand prediction, auto-replenishment systems, and optimized regional stock distribution, achieving up to 50% reduction in forecasting errors and 65% in lost sales (Tiwari, Wee, & Daryanto, 2018; Chaturvedi et al., 2021). In personalized marketing, AI-driven recommendation engines, like those used by Netflix and Amazon, generate over 30% of revenue, while dynamic pricing, targeted ads, and email personalization, powered by platforms like Meta and Google Ads, further boost engagement (Babatunde et al., 2024; Easdon-Smith, 2024). AI-powered customer service employs NLP-based chatbots, adopted by brands like H&M and Sephora, to provide 24/7 support, enhancing user satisfaction (Medida, 2024). For fraud detection and cybersecurity, AI systems, such as those used by PayPal, monitor millions of transactions daily, employing anomaly detection and behavioral biometrics to prevent fraud (Girimurugan et al., 2024). Lastly, visual search and augmented reality tools, as seen on platforms like Pinterest and ASOS, enable visual product discovery and virtual try-ons, increasing purchase confidence and reducing return rates (Yadav, 2024). These integrated AI applications collectively drive efficiency, customer loyalty, and revenue growth in e-commerce.

3.2 AI in Cross-Border E-Commerce

Artificial intelligence plays a pivotal role in enhancing cross-border e-commerce by streamlining logistics, enabling cultural adaptability, personalizing experiences, and ensuring compliance. In logistics optimization, machine learning analyzes complex variables such as weather, tariffs, and geopolitical risks to optimize shipping routes and reduce costs, improving efficiency for global supply chains (Toorajipour et al., 2021). For multilingual and cultural adaptation, natural language processing (NLP) powers real-time translation and localized user experiences, as exemplified by platforms like Alibaba and Amazon, which tailor content to diverse linguistic and cultural contexts (Wu et al., 2016). In personalization and pricing, AI dynamically adjusts content and pricing strategies to align with regional consumer behaviors and preferences, ensuring relevance and competitiveness in diverse markets (Tomitza, Ibrahimli, & Herm, 2024). Additionally, in fraud detection and compliance, AI enhances security by improving fraud detection through anomaly analysis and ensures adherence to international data privacy regulations, such as GDPR and CCPA, safeguarding both businesses and consumers (Chen & Wang, 2022). Together, these AI-driven capabilities enable seamless, efficient, and customer-centric cross-border e-commerce operations.

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3.3 Impact on Consumer Behavior and Business Models

Artificial intelligence significantly influences consumer behavior and reshapes e-commerce business models by driving operational efficiency and addressing consumer expectations, while also raising ethical concerns. In terms of business performance, AI enhances efficiency and profitability, particularly through optimized supply chains and targeted marketing strategies, with dynamic pricing improving margins for 60% of retailers using AI (Singla, 2024). For instance, Salesforce leverages AI to streamline B2B sales processes, boosting performance and revenue (XENA Intelligence Inc., 2024). Regarding consumer trust and behavior, AI-driven personalization is highly valued, with 72% of consumers expecting tailored experiences, as noted by Coveo (2024). However, trust remains a challenge, as only 26% of consumers believe companies use AI responsibly, with concerns centered on data ethics, transparency, and fairness (Yangyang Lu, 2025). These dynamics highlight AI's transformative potential in e-commerce, balancing enhanced business outcomes with the need to address consumer apprehensions about ethical AI use.

3.4 Challenges and Limitations in AI Adoption

The adoption of artificial intelligence in e-commerce, while transformative, is fraught with challenges that hinder its widespread implementation and effectiveness. In data quality, AI systems frequently encounter issues with complex, inconsistent, or biased datasets, which can undermine the accuracy and reliability of AI-driven insights (Jakkula, 2022). High implementation costs pose a significant barrier, particularly for small and medium-sized enterprises (SMEs), as deploying AI demands substantial investments in infrastructure and skilled talent (247Commerce, 2024). Algorithmic bias is another critical concern, as AI models may inadvertently perpetuate societal biases, leading to unfair outcomes in areas like personalization and pricing (Gomez, 2024). Regulatory and ethical issues further complicate adoption, with compliance to global data protection laws such as GDPR and CCPA, alongside robust cybersecurity measures, being essential to maintain trust and legality (Ozturk, 2024). The integration of AI with legacy systems often requires expensive custom development, creating additional hurdles for businesses with outdated IT infrastructure (247Commerce, 2024). Lastly, a talent shortage exacerbates these challenges, as the global demand for qualified AI professionals far outstrips supply, limiting the ability of organizations to effectively implement and manage AI solutions (Ashfaq, 2023). These challenges highlight the need for strategic planning and investment to fully harness AI's potential in e-commerce.

3.5 Scalability, Data Quality, and Cross-Border Logistics

Artificial intelligence in e-commerce must navigate significant challenges related to scalability, data quality, and cross-border logistics to support global expansion and operational efficiency. In terms of scalability, growing e-commerce platforms encounter infrastructure bottlenecks that hinder the ability to scale personalization and integrate advanced technologies seamlessly, particularly as transaction volumes and customer expectations increase (Codiant, 2024). Data quality poses another hurdle, especially for international operations, where inconsistent data standards, siloed datasets, and varying privacy regulations across regions complicate the development of reliable AI models and cohesive customer experiences. In cross-border logistics, complex customs processes, inadequate infrastructure in certain regions, and high return costs create inefficiencies that disrupt supply chains and increase operational expenses (VirtuBox, 2025). Addressing these challenges requires robust infrastructure investments, standardized data practices, and optimized logistics strategies to ensure AI-driven e-commerce solutions can scale effectively and support global trade.

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4. REGULATORY AND ETHICAL CONSIDERATIONS IN AI FOR E-COMMERCE

The adoption of artificial intelligence (AI) in international e-commerce necessitates robust regulatory and ethical frameworks to ensure fairness, transparency, and compliance in a rapidly evolving digital landscape.

4.1 Legal and Regulatory Frameworks Governing AI in Trade

Traditional trade laws are ill-equipped to manage AI-driven disruptions, prompting the World Trade Organization (WTO) to call for updated legal frameworks (WTO, 2024). The European Union's AI Act, effective August 2024, introduces a risk-based classification system with strict compliance for high-risk applications like credit scoring and border control (European Commission, 2025). In the United States, over 550 AI-related bills were introduced across 45 states in 2024, reflecting a decentralized approach (Thornhill, 2025). The Council of Europe's Framework Convention on AI, adopted in June 2024, mandates transparency and human oversight for AI systems impacting civil liberties, such as automated customs screening (Wikipedia, 2025). International trade agreements, as noted by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), increasingly incorporate AI-specific clauses to promote regulatory harmonization and reduce the digital divide (ESCAP, 2025).

4.2 Data Privacy and Cross-Border Data Regulations

Data privacy is critical for ethical AI deployment, with regulations like the General Data Protection Regulation (GDPR) and California Consumer Privacy Act (CCPA) enforcing stringent standards on user consent and data protection (Ocampo, 2024). Cross-border data flows create governance challenges due to a "regulatory patchwork," as seen in Japan's struggles to balance AI integration in healthcare with privacy laws (Hengesbaugh & Denham, 2024; Keohane, 2025). Robust and adaptable data governance frameworks are essential for compliance and maintaining consumer trust.

4.3 Algorithmic Bias, Fairness, and Transparency

Algorithmic bias, often arising from skewed training data, can perpetuate discrimination, such as excluding women who have taken maternity leave from job opportunities or skewing e-commerce pricing and recommendations (The Australian, 2024; Konrad Meier, 2024). Mitigating bias requires diverse datasets, regular audits, and explainable AI (XAI) models to ensure transparency. Consumer autonomy and consent, particularly in personalized marketing, are vital to avoid manipulative targeting (Dr. N. Venkatesan, 2025).

4.4 Ethical AI Practices and Corporate Responsibility

Ethical AI practices emphasize transparency, accountability, and inclusivity. Businesses must communicate AI decision-making processes, establish mechanisms to address errors, and design inclusive systems to avoid discrimination. Adhering to these principles enhances customer satisfaction, strengthens brand loyalty, and reduces reputational risks (Bertovich, 2025).

4.5 Emerging Trends and Future Directions in AI Governance

The EU's AI Act, set for full enforcement by 2027, mandates rigorous standards for high-risk applications, while the U.S. relies on sector-specific guidelines and state-level statutes like California's CPRA (Mishova, 2025; White & Case, 2025). Globally, over 1,000 AI-related regulatory efforts across 69 countries signal a push for comprehensive governance (Sherman, 2024).

4.6 Research Gaps and Future Ethical Priorities

Key research gaps include the need for standardized ethical AI frameworks, improved explainability of black-box systems, advanced bias mitigation strategies, integration of AI with

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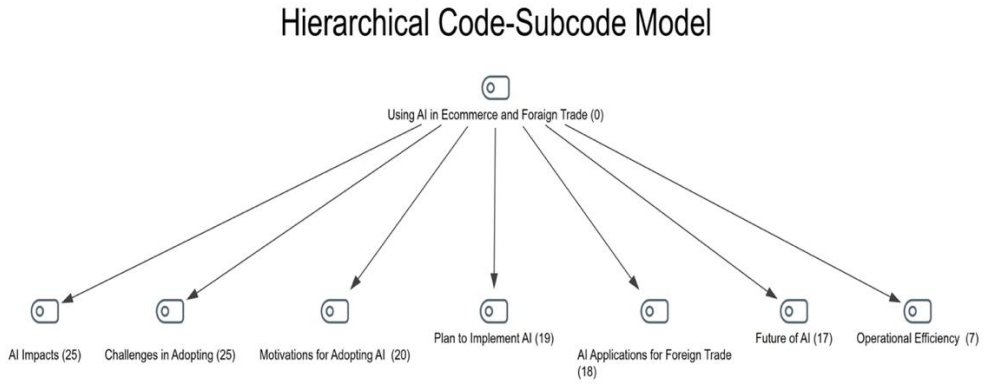
blockchain and IoT, sustainable AI practices to minimize e-waste, and deeper insights into consumer perceptions of AI to develop user-centric systems (Brown, 2024; Bawack et al., 2022; Ren et al., 2024; Schulz, 2025).

5. METHODOLOGY

Data analysis was conducted with the assistance of MAXQDA software.

MAXQDA is a powerful data analysis tool used in qualitative and mixed-method research. Widely utilized across various disciplines, the program stands out with its rich features and user-friendly interface. Compared to its alternatives, MAXQDA offers a more balanced set of features, making it particularly prominent in mixed-methods research.



Interviews with Turkish firms reveal that the primary motivations for adopting AI in e-commerce and foreign trade are to enhance operational efficiency, reduce costs, and improve customer experience. Key AI applications include chatbots (60% adoption), product recommendation systems (72%), inventory management, and demand forecasting, which streamline processes and boost engagement. AI-driven automation accelerates tasks, reduces errors, and shifts employees to strategic roles. However, barriers such as technical expertise shortages, high costs, data security concerns, and integration challenges, particularly for SMEs, hinder adoption. Future plans prioritize advanced NLP (75%), predictive analytics (60%), and robotic automation (35-40%), with AI expected to transform industries over the next five years through automation, personalization, and data-driven models. Ethical and regulatory challenges, including GDPR compliance and algorithmic bias, underscore the need for responsible AI adoption to maintain competitive advantages.

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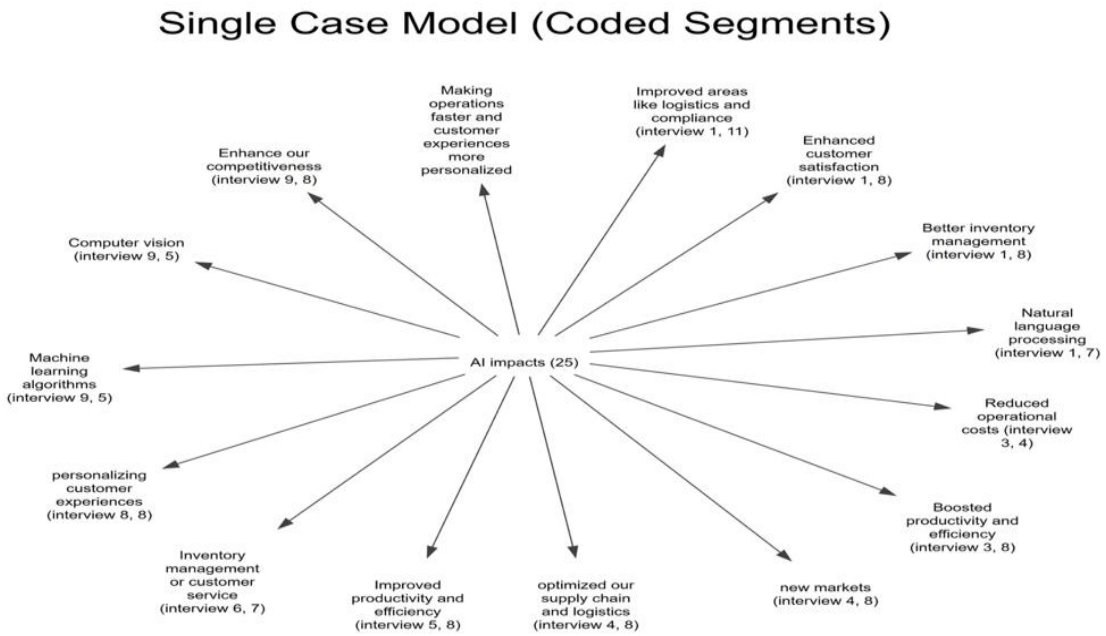
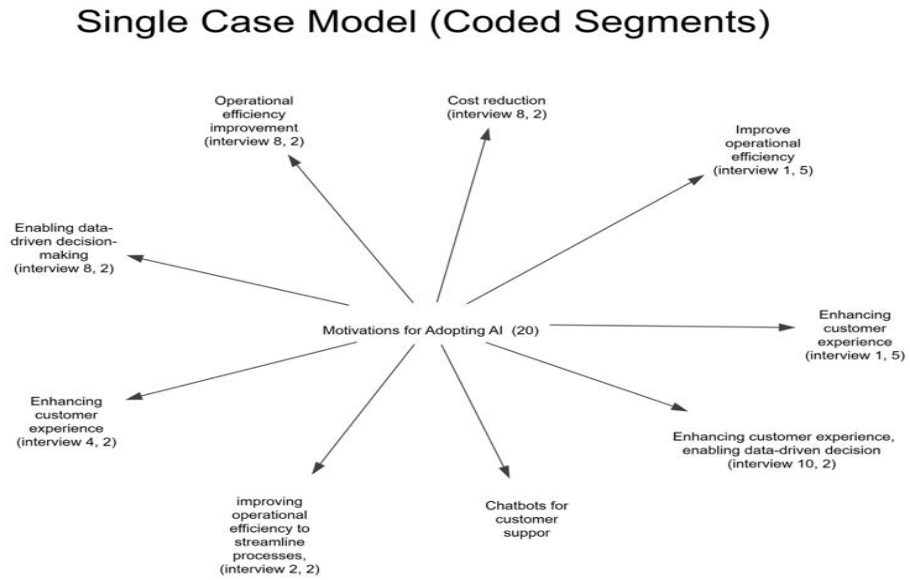


Most participants in the interviews emphasized that artificial intelligence (AI) greatly improves efficiency and productivity in foreign trade by enabling faster, more accurate transactions and enhancing operational performance. AI supports market expansion through effective market analysis and customer targeting, increasing trade volumes. It optimizes supply chain and logistics processes, including order management, inventory control, and route planning, while reducing logistics and customs costs, improving regulatory compliance, and enhancing sustainability and auditability. These multifaceted benefits strengthen firms' strategic and operational capabilities, boosting their global competitiveness in international trade.



Interview results highlight that the primary motivation for businesses adopting AI technologies is to enhance operational efficiency by accelerating processes, reducing errors, and optimizing resources. Other key drivers include enabling data-driven decision-making for improved

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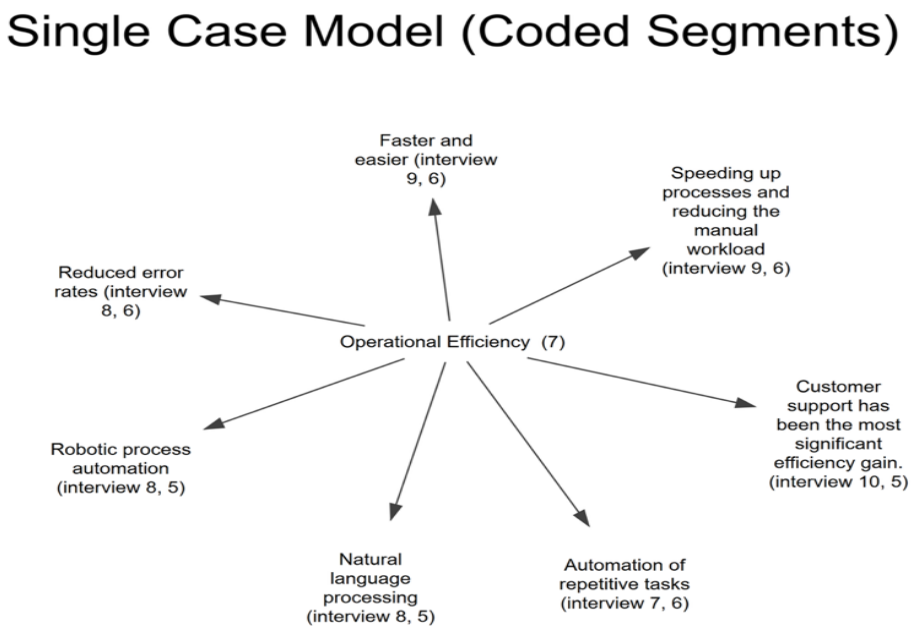
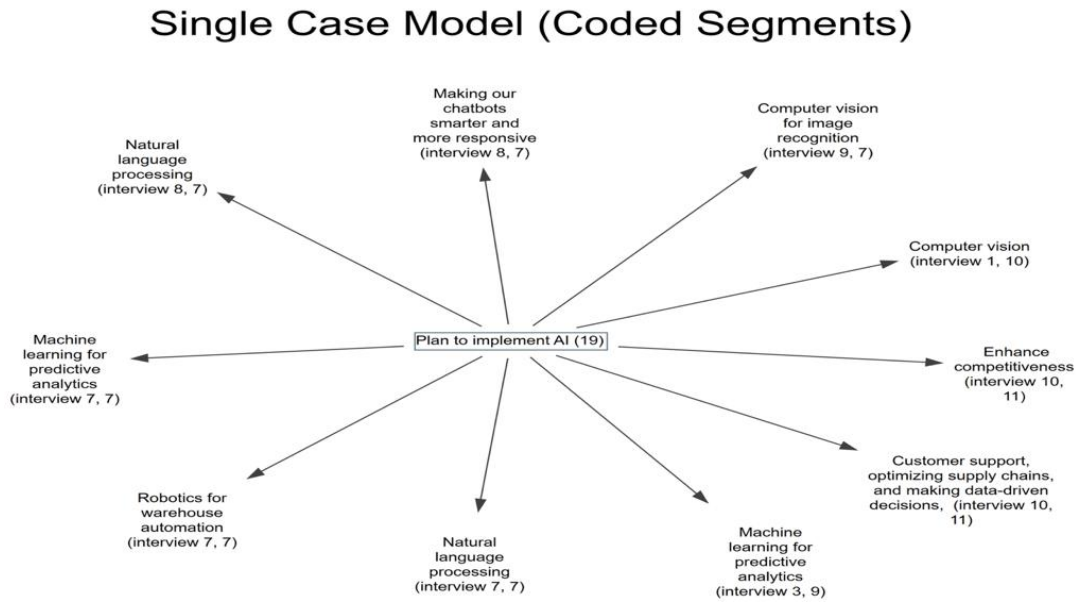
strategic planning and forecasting, enhancing customer experience through personalized and faster services, and achieving cost reductions and competitive advantages, particularly in highly competitive industries. Overall, AI is viewed as both a technological and strategic asset, crucial for market differentiation and organizational success.



Interviews reveal that AI adoption significantly enhances operational efficiency by automating repetitive, time-consuming tasks, reducing manual workloads, and improving process speed and accuracy while lowering error rates. AI-powered chatbots in customer support boost satisfaction and service quality with fast responses. By shifting employees to strategic, value-added roles, AI enhances overall business performance. Despite some applications being in development, accuracy improvements, such as in flight planning, were noted. AI streamlines processes and improves time management, delivering substantial operational benefits.



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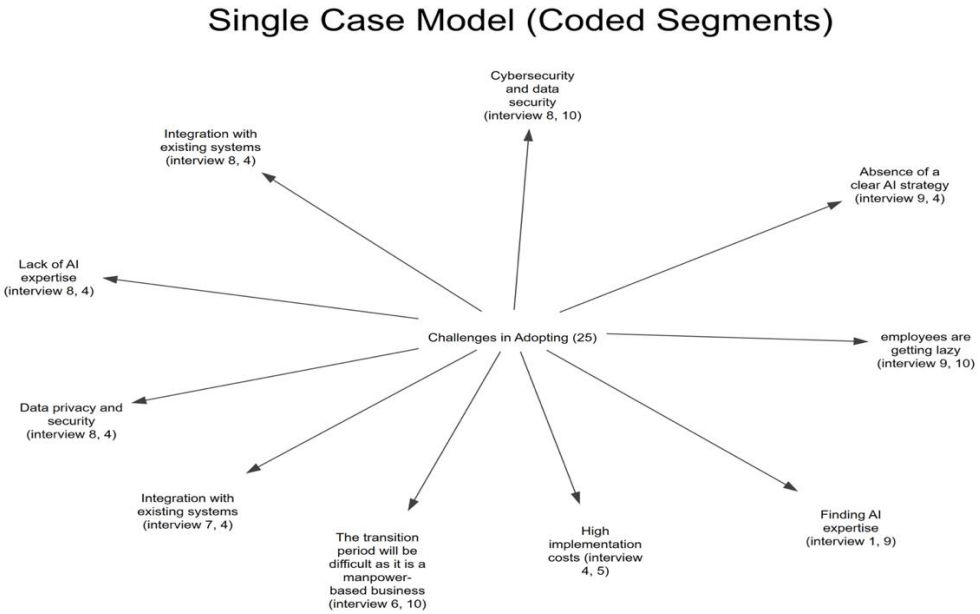
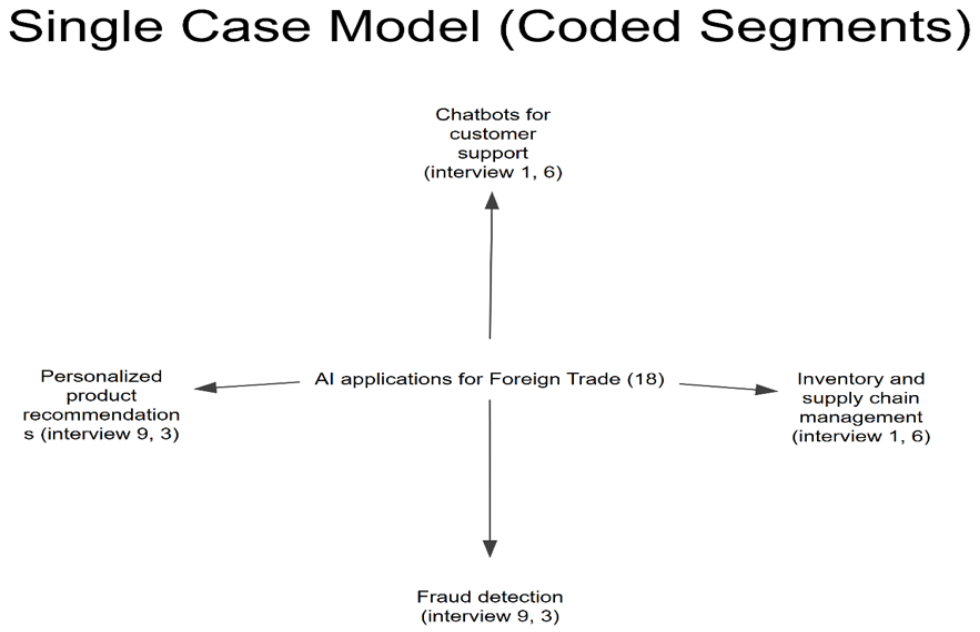
Interview data shows businesses prioritizing AI technologies: NLP (75%) for chatbots and customer service, Predictive Analytics (60%) for forecasting and decision-making, Computer Vision (45%) for image recognition, and robotic automation (35-40%) for logistics. Blockchain is considered for secure transactions. Focus areas include customer interaction, analytics, and automation to enhance efficiency.



Interview results highlight data security, privacy concerns, and GDPR compliance as major challenges in AI adoption, alongside difficulties integrating AI with existing systems. Other barriers include a lack of technical expertise, high costs (especially for SMEs in developing countries), and ethical transparency issues. Cultural and organizational challenges, such as employee motivation loss, further hinder adoption. Key obstacles are technical, financial, legal, and human resource-related.



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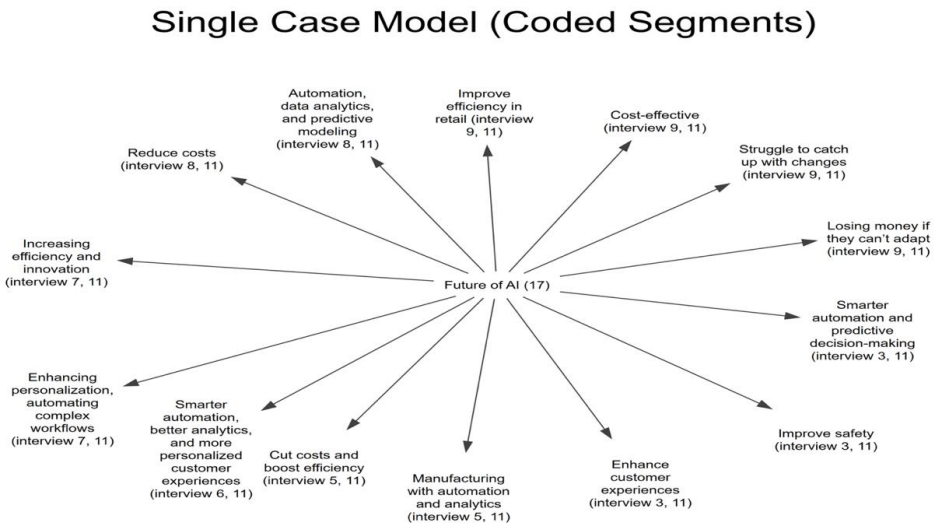
Interviews show that personalized recommendation systems (72% adoption), inventory and supply chain management (68%), and chatbots (60%) are the most used AI applications in e-commerce, enhancing customer satisfaction, demand forecasting, and cost reduction. Dynamic pricing (44%) and fraud detection (36%) are also prevalent. Most participants use multiple AI tools in an integrated, multidimensional approach.



Most participants believe AI will transform industries within five years, driving automation, data analytics, and predictive modelling. AI is expected to boost operational efficiency, optimize logistics with real-time tracking and route planning, and enhance personalized customer experiences. It will enable faster, data-driven decisions, reduce production waste, and improve supply chain management. While AI integration across departments is seen as a competitive advantage, concerns include employee adaptation challenges and potential income declines. Companies not adopting AI risk falling behind, positioning AI as a catalyst for strategic transformation.

6. CONCLUSION

This thesis provides an in-depth exploration of the transformative impact of artificial intelligence (AI) on e-commerce within the context of international trade, with a particular focus on the experiences of Turkish firms. As global digital transformation accelerates, businesses engaged in cross-border trade face multifaceted challenges, including fragmented international payment systems, diverse legal and regulatory frameworks, cultural and linguistic disparities, logistical complexities in global supply chains, and the need for secure and compliant data sharing. The study investigates how AI technologies—encompassing machine learning (ML), natural language processing (NLP), predictive analytics, computer vision (CV), and robotic process automation—address these challenges, enhancing operational efficiency, customer engagement, and global competitiveness. Conducted using a qualitative methodology, the research leverages semi-structured interviews with managers and decision-makers from Turkish firms involved in international trade, with data systematically analyzed using MAXQDA software to identify key themes, trends, and insights. The findings illuminate AI's pivotal role in streamlining e-commerce processes, while also highlighting significant barriers to adoption, particularly for small and medium-sized enterprises (SMEs), and propose actionable strategies to foster digital transformation in Türkiye's e-commerce ecosystem.

The research demonstrates that AI-driven solutions significantly enhance e-commerce operations in international trade. Machine learning algorithms improve inventory management through accurate demand forecasting, reducing overstocking and stockouts, while predictive analytics optimizes

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logistics networks by enabling real-time route planning and cost-efficient delivery systems (Kumar et al., 2021). NLP technologies facilitate multilingual customer service and automated translation, breaking down language barriers and enabling firms like Alibaba and Amazon to offer seamless cross-border shopping experiences (Jurafsky & Martin, 2023). AI-powered chatbots, used by 60% of interviewed firms, provide 24/7 customer support, enhancing satisfaction and loyalty, while personalized recommendation systems, adopted by 72% of participants, drive sales through tailored product suggestions. In cross-border transactions, AI streamlines document management, automates customs processes, and supports fraud detection (36% adoption rate), reducing errors and ensuring compliance with regulations like GDPR and the EU AI Act. These applications collectively accelerate decision-making, reduce operational costs, and strengthen competitive positioning in global markets.

Despite these benefits, the study identifies significant challenges to AI adoption, particularly for SMEs. High implementation costs, including investments in infrastructure and talent, pose a major barrier, with SMEs in developing markets like Türkiye facing financial constraints (247Commerce, 2024). A shortage of qualified AI professionals, noted as a global issue, limits firms' ability to develop and maintain AI systems (Ashfaq, 2023). Data privacy and cybersecurity concerns are critical, as compliance with varying international regulations complicates cross-border operations (Ocampo, 2024). Ethical uncertainties, such as algorithmic bias risks in pricing or recommendations, further challenge adoption, necessitating transparency and fairness in AI systems (Gomez, 2024). Integration with legacy systems also requires costly custom development, and cultural resistance within organizations, including employee motivation loss, hinders smooth transitions. These barriers risk widening the digital divide, leaving SMEs at a competitive disadvantage.

The thesis bridges theoretical and practical dimensions by integrating frameworks like the Technology Acceptance Model, Diffusion of Innovations Theory, and digital transformation models with real-world case studies of Turkish firms. For example, case studies illustrate how AI-driven logistics and CRM solutions have enabled Turkish e-commerce firms to expand into global markets, reinforcing the practical applicability of theoretical insights. The findings highlight that AI is not merely a technological tool but a strategic driver, with 75% of participants planning to prioritize NLP for customer service and 60% focusing on predictive analytics for forecasting. Over the next five years, AI is expected to transform industries through widespread automation, data-driven business models, and personalized services, though adaptation challenges for employees were noted as a concern.

The study offers actionable recommendations for stakeholders. For businesses, it suggests strategic AI integration through investments in digital infrastructure, employee training in AI competencies, and adoption of scalable solutions like cloud-based platforms to reduce costs. For policymakers, it recommends aligning with international standards like the EU AI Act, developing a national AI strategy, and offering incentives such as grants and training programs to support SME digitalization. For technology providers, the focus is on developing user-centric, ethically compliant AI systems, particularly NLP solutions tailored to Türkiye's linguistic diversity. For academia, the study advocates for cross-sectoral research on AI's economic and social impacts, including labor market effects and consumer behavior. For education, integrating AI and digital transformation into business and IT curricula, alongside professional training programs, is proposed to enhance workforce readiness.

By addressing both the opportunities and challenges of AI adoption, the thesis contributes to the academic literature on digital commerce while providing practical guidance for stakeholders. It underscores AI's role as a catalyst for economic development, digital inclusivity, and sustainable trade, particularly in emerging markets like Türkiye. Through evidence-based insights and strategic recommendations, the study aims to enhance the global competitiveness of Turkish firms, positioning AI as a cornerstone of the future of international e-commerce.

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REFERENCES

247Commerce. (2024). AI-Powered E-Commerce: Benefits and Challenges - 247 Commerce. AI-Powered E-Commerce.

Alicke, K., Dilda, V., Görner, S., Mori, L., Rebuffel, P., Reiter, S., & Samek, R. (2021). Succeeding in the AI supply-chain revolution. New York: McKinsey & Company.

Amazon. (2024, October 09). Amazon unveils the next generation of fulfillment centers powered by AI and 10 times more robotics. Retrieved from Amazon: https://www.aboutamazon.com/news/operations/amazon-fulfillment-center-robotics-ai

Ashfaq, S. (2023). Artificial Intelligence in E-commerce: Benefits, and Challenges. Artificial Intelligence in E-commerce.

Babatunde, S. O., Odejide, O. A., Edunjobi, T. E., & Ogundipe, D. O. (2024). The Role Of Ai In Marketing Personalization: A Theoretical Exploration Of Consumer Engagement Strategies. International Journal of Management & Entrepreneurship Research, 936-949.

Bawack, R. E., Wamba, S. F., Carillo, K. D., & Akter, S. (2022). Artificial intelligence in E-Commerce: a bibliometric study and literature review. Electronic Markets, 297–338.

Bertovich, Y. (2025, May 1). Ethical AI in Ecommerce: Best Practices for Building Trust and Ensuring Transparency. Retrieved from Salsify: https://www.salsify.com/blog/what-is-ethical-ai-in-ecommerce

Brachman, R., & Levesque, H. (2004). Knowledge Representation and Reasoning. Elsevier.

Brown, J. (2024, November 26). AI-Driven E-commerce Development: What to Expect in 2025 and Beyond. Retrieved from Kozak Group: https://kozak-group.com/ai-driven-e-commerce-development-what-to-expect-in-2025-and-beyond/

Chen, D., & Wang, J. P. (2022). The Impact of Artificial Intelligence on Firm Performance: An Application of the Resource-Based View to e-Commerce Firms. Frontiers in Psychology, 1-14.

Chaturvedi, N., Martich, M., Ruwadi, B., & Ulker, N. (2021). The Future of Retail Supply Chains. Retail Insights, 59-67.

Codiant. (2024, March 18). AI to Scale E-Commerce Platforms : Challenges and Solutions. Retrieved from Codiant: https://codiant.com/blog/ai-to-scale-e-commerce-platforms-challenges-and-solutions/

DHL. (2024). Logistics Trend Radar. Leipzig: DHL International .

Downie, A., & Finn, T. (2024, May 20). What is AI in supply chain? Retrieved from IBM: https://www.ibm.com/think/topics/ai-supply-chain

Dr. N. VENKATESAN, B. P. (2025). Ethical Implications of Ai In E-Commerce: Balancing Innovation With Data Privacy And Fairness. South Eastern European Journal of Public Health, 1655-1666.

Easdon-Smith, C. (2024). Firework | How AI Is Changing Ecommerce Personalization. Retrieved from Firework: https://www.firework.com/blog/how-ai-is-changing-ecommerce-personalization

Atıf/Citation: Ekinci Furtana T. Abdelmalik, A. A. A. O. (2026). Using artificial ıntelligence for enhancing e-commerce ın foreign trade. *ASSAM International Refereed Journal* (28), 17-32. https://doi.org/10.58724/assam.1748821

ESCAP. (2025, February 18). Shaping AI Rules Through Trade Agreements. Retrieved from ESCAP: https://www.unescap.org/blog/shaping-ai-rules-through-trade-agreements

European Commission. (2025, February 18). AI Act. Retrieved from Shaping Europe's digital future: https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

Girimurugan, B., V.Kumaresan, Nair, S. G., Kuchi, M., T., M. S., & Kholifah, N. (2024). AI and Machine Learning in E-Commerce Security: Emerging Trends and Practices. In Strategies for E-Commerce Data Security: Cloud, Blockchain, AI, and Machine Learning (pp. 29-53). IGI Global Scientific Publishing.

Gomez, G. (2024, July 4). The Benefits and Challenges of AI in E-commerce. Retrieved from AJAW: https://ajawmrp.com/the-benefits-and-challenges-of-ai-in-e-commerce/

Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. London: MIT Press.

Hengesbaugh, B., & Denham, E. (2024, November 5). A glimpse into the future of cross-border data regulation. Retrieved from IAPP: https://iapp.org/news/a/a-glimpse-into-the-future-of-cross-border-data-regulation

Jakkula, A. R. (2022). Challenges in Implementing AI in E-Commerce and How to Overcome Them. Journal of Artificial Intelligence & Cloud Computing, 1-3.

Javier López González, M.-A. J. (2017). Digital trade: Developing A Framework For Analysis. Paris: OECD Publications.

Jurafsky, D., & Martin, J. H. (2025). Speech and Language Processing. California: Stanford University.

Keohane, D. (2025, May 16). Japan weighs privacy rules against treatments in healthcare. Retrieved from Financial Times: https://www.ft.com/content/f4e81b4c-d0b6-40ef-89c5-3f69a6a26574

Konrad Meier, R. S. (2024, March 15). The EU AI Act: What it means for your business. Retrieved from Ernst & Young Limited: https://www.ey.com/en_ch/insights/forensic-integrity-services/the-eu-ai-act-what-it-means-for-your-business

LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. Nature, 436–444.

McCarthy, J. (2007). WHAT IS ARTIFICIAL INTELLIGENCE? California: Stanford University.

Medida, L. (2024, July 30). The Rise of Conversational Commerce: Revolutionizing Customer Support and Boosting Conversion Rates. Retrieved from kensium: https://www.kensium.com/blog/the-rise-of-conversational-commerce-revolutionizing-customer-support-and-boosting-conversion-rates

Mishova, A. (2025, January 23). AI Regulations and the Future of Global Data Protection. Retrieved from GDPR Local: https://gdprlocal.com/ai-regulations-and-the-future-of-global-data-protection/

Ocampo, D. (2024, June). CCPA and the EU AI ACT. Retrieved from California Lawyer's Association's: https://calawyers.org/privacy-law/ccpa-and-the-eu-ai-act/

OECD. (2019). Unpacking E commerce: BUSINESS MODELS, TRENDS AND POLICIES. Paris: OECD publications.

Ozturk, O. (2024). The Impact of AI on International Trade: Opportunities and Challenges. Economies, 1-13.

Ren, Q., Jiang, Z., Cao, J., Li, S., Li, C., Liu, Y., . . . Chen, Y. (2024). A survey on fairness of large language models in e-commerce: progress, application, and challenge. New York: Cornell University.

Russell, S. J., & Norvig, P. (2022). Artificial Intelligence: A Modern Approach. Harlow: Pearson Education Limited.

Atıf/Citation: Ekinci Furtana T. Abdelmalik, A. A. A. O. (2026). Using artificial ıntelligence for enhancing e-commerce ın foreign trade. *ASSAM International Refereed Journal* (28), 17-32. https://doi.org/10.58724/assam.1748821

Schulz, M. (2025, May 6). Could ChatGPT fix online shopping? Retrieved from Vogue Business: https://www.voguebusiness.com/story/technology/could-chatgpt-fix-online-shopping

Sherman, N. (2024, January 25). AI Regulations around the World - 2025. Retrieved from Mind Foundry: https://www.mindfoundry.ai/blog/ai-regulations-around-the-world

Singla, A. (2024 , May 30). The state of AI in early 2024: Gen AI adoption spikes and starts to generate value. Retrieved from QuantumBlack AI by Mckinsey: https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-2024

Szeliski, R. (2021). Computer Vision: Algorithms and Applications. Springer.

The Australian. (2024, April 1). AI filtering out women in job searches: Nuix. Retrieved from The Australian: https://www.theaustralian.com.au/business/technology/ai-filtering-out-women-who-have-taken-maternity-leave-in-job-searches-nuix/news-story/446ea0e1f5bd02868fca242b38d7efba

The OECD Observer. (1999). Six Aspects of Electronic Commerce. Paris: OECD Publications.

Thornhill, J. (2025, May 15). US AI laws risk becoming more 'European' than Europe's. Retrieved from Financial Times: https://www.ft.com/content/aed82f47-b441-4bb3-930e-eca10585fc6d

Tiwari, S., Wee, H., & Daryanto, Y. (2018). Big data analytics in supply chain management between 2010 and 2016: Insights to industries. Computers & Industrial Engineering, 319-330.

Tomitza, C., Ibrahimli, U., & Herm, L.-V. (2024). AI-Based Methods of Dynamic Pricing in E-Commerce: A Systematization of Literature. AI-based Pricing Methods in E-Commerce (pp. 1-13). Cyprus: European Conference on Information Systems (ECIS).

Toorajipour, R., Sohrabpour, V., Nazarpour, A., Oghazi, P., & Fischl, M. (2021). Artificial intelligence in supply chain management: A systematic literature review. Journal of Business Research, 502-517.

UN ESCAP. (2007). Single Window for Trade Facilitation: Regional Best Practices and Future Development. ESCAP, 23-26.

UN/CEFACT. (2021). UNECE. Retrieved from Trade Facilitation and E-business(UN/CEFACT): https://unece.org/trade/uncefact

UNCTAD. (2021). Digital Economy Report . New York: United Nations Publications.

United Nations. (2021). Covid-19 And E-Commerce: A Global Review . New York: United Nations Publications.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., . . . Polosukhin, I. (2017). Attention Is All You Need. Neural Information Processing Systems, 5998 - 6008.

VirtuBox. (2025, February 07). AI in Ecommerce: Application, Benefits and Challenges in 2025. Retrieved from VirtuBox: https://www.virtubox.io/blog/ai-in-ecommerce

White & Case . (2025, March 31). AI Watch: Global regulatory tracker - United States. Retrieved from Whitecase: https://www.whitecase.com/insight-our-thinking/ai-watch-global-regulatory-tracker-united-states

Wikipedia. (2025, April 30). Framework Convention on Artificial Intelligence. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Framework_Convention_on_Artificial_Intelligence

World Bank Group. (2022). Digitalizing SMEs to Boost Competitiveness. Washington DC: World Bank Publications.

World Trade Organization. (2020). E-COMMERCE, TRADE AND THE COVID-19 PANDEMIC. Geneva: WTO Publications.

Atıf/Citation: Ekinci Furtana T. Abdelmalik, A. A. A. O. (2026). Using artificial ıntelligence for enhancing e-commerce ın foreign trade. *ASSAM International Refereed Journal* (28), 17-32. https://doi.org/10.58724/assam.1748821

Wu, Y., Schuster, M., Chen, Z., Le, Q. V., Norouzi, M., Macherey, W., . . . etc. (2016). Google's Neural Machine Translation System: Bridging the Gap between Human and Machine Translation. arXiv preprint.

XENA Intelligence Inc. (2024). AI in E-commerce: Applications & Use Cases in 2024. Retrieved from XENA: https://xenaintelligence.com/blog/ai-in-e-commerce-applications-use-cases-in-2024

Yadav, K. (2024, August 24). AI-Driven Visual Search: Enhancing Product Discovery in E-commerce. Retrieved from Quytech: https://www.quytech.com/blog/ai-driven-visual-search-in-ecommerce/

Yangyang Lu, J. Z. (2025). Balancing identity diversity and product contexts: Understanding consumer trust in AI-enhanced chatbot services. Retailing and Consumer Services.

Zwass, V. (1996). Electronic Commerce: Structures and Issues. International Journal of Electronic Commerce, 3-23..