



# THE ARTIFICIAL INTELLIGENCE IN E-COMMERCE

Amina Badreddine

## ► To cite this version:

Amina Badreddine. THE ARTIFICIAL INTELLIGENCE IN E-COMMERCE. The International Forum on Digitalization, Artificial Intelligence, and Digital Transformation in the Arab World The eighth summer university of Fa3ilon Center, Fa3ilon Center, Aug 2023, Monastir, Tunisia. <hal-04379642>

**HAL Id: hal-04379642**

**<https://hal.science/hal-04379642v1>**

Submitted on 8 Jan 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Copyright - All rights reserved

The International Forum on Digitization, Artificial Intelligence, and Digital Transformation in the Arab World  
The eighth summer university of Fa3ilon Center  
from August 21 to 25 2023  
Tunisia

# THE ARTIFICIAL INTELLIGENCE IN E-COMMERCE

**BADREDDINE Amina**

Assistant Professor, Department of Business & Management  
University of M'Hamed Bougara, Boumerdes, Algeria  
Email : *Badreddine.amina@yahoo.fr*

## **Abstract:**

With the rapid progress of science, technology, and our economy, we see artificial intelligence (AI) being used more and more in various areas. It has a significant impact on our work and lifestyle. Artificial intelligence (AI) is a leading technology of the current age of the Fourth Industrial Revolution (Industry 4.0 or 4IR), with the capability of incorporating human behavior and intelligence into machines or systems. In the field of e-commerce, AI is broadly applied and has shown promising results. AI has emerged as crucial driving force for the growth of E-commerce. The proposed paper will shed light on how AI is being applied in the Ecommerce industry and the impact of AI on E-commerce portals. It examines the application of AI in areas such as AI assistants, image research, recommendation systems, and optimized pricing. This research explores how AI greatly affects and benefits the development of E-commerce.

**Keywords:** Artificial Intelligence, E-commerce, chatbots, Online shopping, personalization, inventory management.

## **Introduction:**

Artificial intelligence (AI) has been in development for more than six decades, and its research has reached every part of our economy and society, leading to many impressive achievements. For example, in 1997, IBM's computer Deep Blue defeated the world chess champion, showing that AI was here to stay (De Spiegeleire & al. 2017, p37). Similarly, in 2016, Google's AlphaGo defeated a top human go player, making AI seem like a crucial part of the future (Shashi, 2016,p3).

AI, which has already demonstrated its value in several sectors like marketing, healthcare, finance, and education, is now making its presence known in e-commerce.

In recent times, e-commerce has achieved remarkable feats. While enjoying the convenience facilitated by e-commerce, people are demanding increasingly higher standards. The emergence of AI technology brings forth fresh concepts and paradigms for e-commerce development. As per Gartner, by 2020, more than 80% of customer service roles will be replaced by AI (Xia Song and al, 2019, p2). Companies such as Alibaba, Rakuten, and Amazon will leverage AI technology to perform comment analysis, design chatbots, offer product recommendations, and process big data ( Vaughan Turekian, 2018, p9). Ubisend's report provides intriguing statistics: one in five consumers purchases goods and services from chatbots; consumers spend more than 317.74 pounds through chatbots; and 40% of consumers use chatbots to discover deals. Moreover, Google paid 400 million pounds for DeepMind, an AI firm.

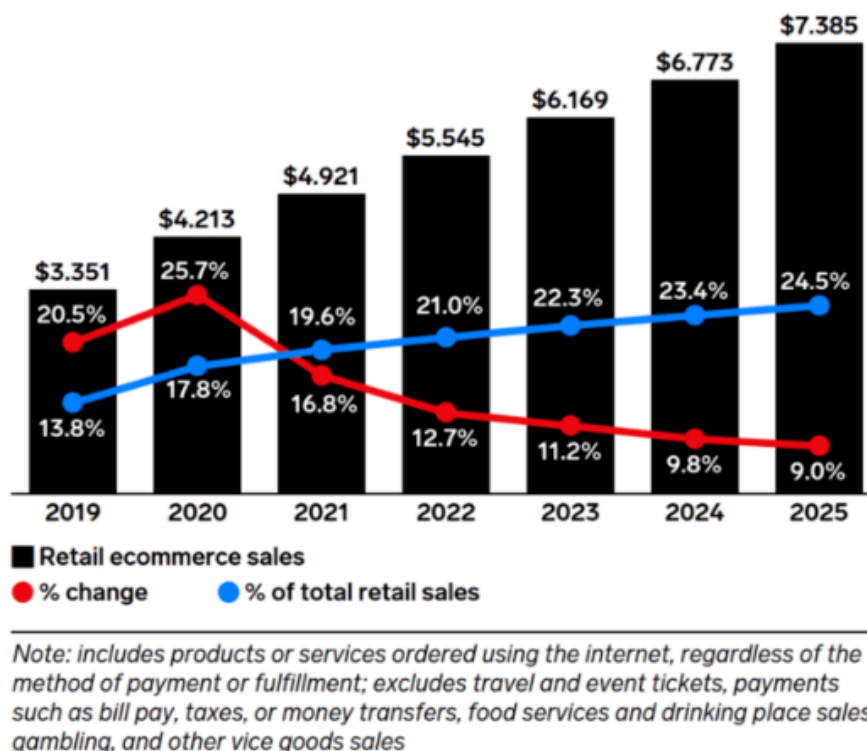
## **1. E-commerce:**

E-commerce, in full electronic commerce, maintaining relationships and conducting business transactions that include selling information, services, and goods by means of computer telecommunications networks (Britannica money, 2023). As the Internet became widely used and the World Wide Web was introduced in 1991, e-commerce started moving online. Then, in 1993, the first web browser made it easier for people to access the Internet, leading to even more e-commerce on the web (Sharma, G. , 2014). Later on, with the popularity of smartphones and the availability of fast Internet connections, e-commerce also shifted to mobile devices like tablets, laptops, and wearable gadgets such as watches.

### **1.1. The Development of E-commerce:**

The enhanced user experience of online shopping is why E-commerce follows an upward trend. The pandemic forced consumers to become more digital, nourishing the natural evolution of shopping. Nearly everything is now accessed digitally. While other industries may have faltered during Covid-19, retail E-commerce sales worldwide surpassed 4.2 Trillion USD in 2020 with a 25.7% surge (UNCTAD, 2023).

**Figure 1.** Retail E-commerce sales worldwide from 2019 to 2025  
(in billion USD).

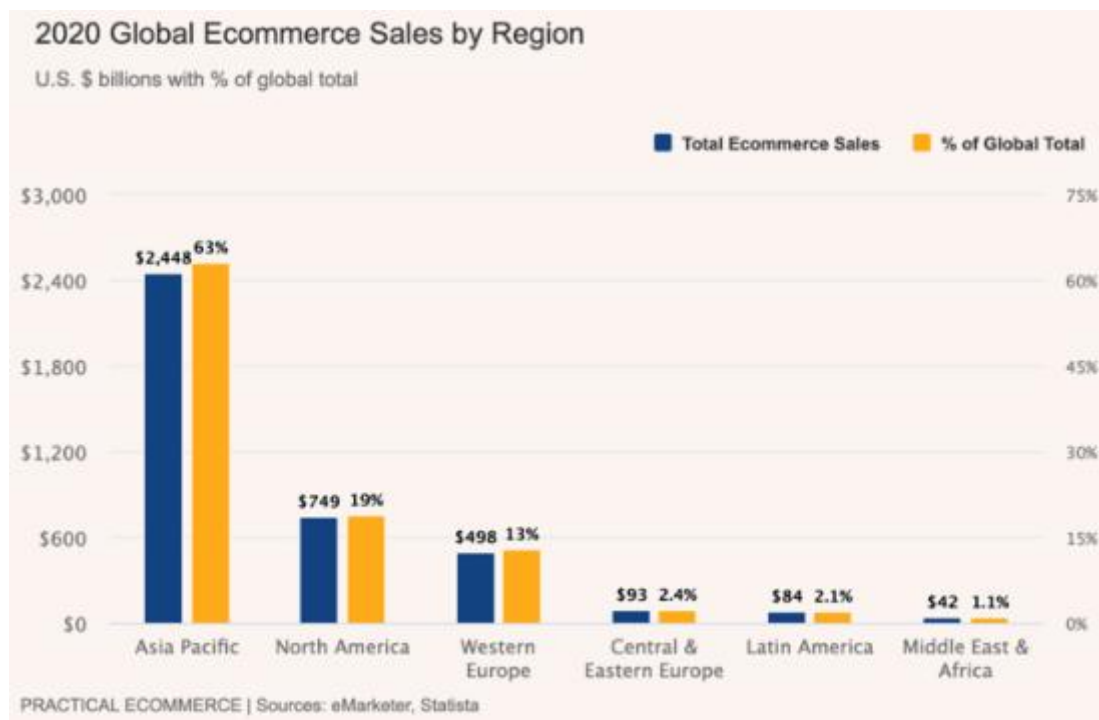


**Source:** eMarketer

However, much of the E-commerce industry will be driven by the Asia Pacific region, with China leading the parade. Although many Asian countries are still developing, they will be highly competitive with enhanced infrastructure and technology.

In the short term, we can attribute this statistic to the fact that Americans typically have more disposable income than their Asian counterparts ( See Figure 2.). However, Asia can experience exponential growth than more developed regions due to its population size in the long run.

**Figure 2.**Global Ecommerce Sales by Region (2020)



**Source:** eMarketer, Statista

## **2. Artificial intelligence:**

Artificial Intelligence (AI) is an emerging field of technology that aims to replicate and extend human intelligence through theoretical methods and practical applications (Mukhamediev R.I. & al. 2022, p 4). It began in 1956 when a group of forward-thinking scientists, including McCarthy, Minsky, Rochester, and Shennong, gathered to explore using machines to simulate

intelligence. They coined the term "artificial intelligence," which marked the formal birth of this interdisciplinary science (Xia Song et al , 2019, p 2).

AI focuses on automating mental tasks by imitating and expanding human intelligence. The core of AI lies in intelligent technology, enabling the development of machines, such as robots, voice recognition systems, and image recognition software, that can respond promptly to control commands.

AI technology involves various disciplines ((Xia Song et al , 2019, p 2), such as computer science, psychology, biology, linguistics, and medicine. Other fields could benefit from intelligent systems such as Transportation, industry, health, agriculture, business, finance, security (Sarker IH. , 2022, p16)

As modern science and technology advance, AI's scope broadens, and intelligent machines become more sophisticated, capable of performing tasks guided by human commands. AI's progress is tightly connected to computer technology, and both fields mutually influence and progress together.

In AI, two key technologies are machine learning and interactive learning. Machine learning is a branch of computer science that includes disciplines like pattern recognition, artificial intelligence, data mining, probability theory, and statistics. It involves numerical optimization and finds extensive application in the field of AI.

### **3. Applications of AI in E-commerce**

As science and technology advance, Artificial Intelligence (AI) technology is getting better and is changing how people do their jobs and live. This is especially true in online shopping, where AI is becoming a strong tool to help businesses sell more and improve how they work. Right now, AI is being used in E-commerce in these ways:

#### **3.1. Chatbots :**

Chatbots are smart and intelligent computer programs that simulate humans via conversation or text (Marjerison, R.K; al, 2022, p3) . Chatbot uses a simple text interface that allows users to access information or provide entertainment via an online messaging platform. (Klopfenstein,2017).

When engaging with Chatbots, users can communicate through different means, such as speaking commands, typing text messages, using graphical interfaces, or interacting with graphical widgets (Carayannopoulos S. , 2018) and (Vincze J., 2017) . Conversational interfaces involve language processing, intelligent conversation, and human-computer interaction, enabling real users to feel, even

if only temporarily, that they are interacting with another human and replicating the experience of conversing with a human partner. (Ahmad N.A., 2018) .

A chatbot can comprehend various human questions and recognize different words. For meaningful and effective conversations with users, it needs to have a diverse vocabulary, similar to how people talk to each other. Additionally, developers can enhance chatbots by incorporating popular internet terms. Consequently, chatbots with chat interfaces have gained popularity and quick adoption due to their wide-ranging vocabulary and speedy responses (Adam M., 2021).

The success of chatbots is attributed to their ability to use algorithms to choose the right answers from a developer-provided database (Ahmad, 2018). In 2020, more than 85% of customer interactions were provided by various forms of Chatbots (Li L., 2021)

### **3.2. Image recognition :**

Image search is a vital aspect of Artificial Intelligence (AI) with significant implications in various domains. The ability of AI to accurately and efficiently search for images enables us to extract valuable insights, recognize objects, and understand visual content at scale (De Spiegeleire & al. 2017, p41). In fields such as healthcare, AI-driven image search aids in medical diagnosis by identifying patterns and anomalies in medical images. Elakkiya & al. develop a cervical cancer diagnostics healthcare system utilizing hybrid object detection adversarial networks in their paper (Elakkiya & al., 2021). Pan & al. demonstrated a visual recognition based on deep learning for navigation mark classification (Pan & al. , 2020). In e-commerce, it empowers users to discover products through visual search, enhancing the shopping experience. Moreover, AI-powered image search contributes to content moderation, copyright infringement detection, and visual content organization. By harnessing the potential of image search in AI, we unlock a wealth of possibilities that enhance decision-making, efficiency, and user experience in a wide range of applications.

### **3.3. Augmented Reality:**

Augmented Reality (AR) plays a crucial role in the domain of E-commerce, offering profound implications for enhancing customer engagement, interactive product visualization, and personalized shopping experiences. By seamlessly blending virtual elements with the physical world, AR technology enables users to perceive and interact with digital information in real-time, augmenting their

understanding of products and their contexts ( Farrugia & Merienne, 2017) . This immersive and interactive nature of AR in E-commerce fosters heightened consumer involvement, bolstering customer satisfaction, and positively impacting purchase decisions. The strategic integration of AR holds significant promise in transforming the E-commerce landscape, optimizing customer interactions, and redefining totally the future of online shopping.

Augmented Reality brings great tangible benefits to your E-commerce business like:

- Enhanced customer engagement
- Significantly fewer returns
- Considerably wider customer reach

This all leads to one conclusion: AR is a perfect solution for different types of eCommerce businesses. Developing this additional feature may result in much higher revenues in the long run, so it's definitely worth the effort.

### **3.4. Recommendation systems :**

Recommendation systems in E-commerce represent sophisticated algorithms that leverage machine learning and data analytics techniques to provide personalized product suggestions to users (Anakkala T. , 2021). These systems analyze vast amounts of user data, including browsing history, purchase behavior, and preferences, to predict and anticipate individual user preferences accurately (Shashi, 2016, p 3). By employing collaborative filtering, content-based filtering, and hybrid approaches, these recommendation systems offer tailored and relevant product recommendations, thus enhancing user engagement and conversion rates. The incorporation of such advanced systems in E-commerce platforms contributes to improved customer satisfaction, increased sales, and the establishment of long-term customer loyalty (Shashi, 2016, p 3) and (Babayev N. & Israfilzade K., 2023, p144) . The application of recommendation systems in E-commerce is a testament to the growing significance of artificial intelligence-driven technologies in optimizing user experiences and fostering seamless interactions between consumers and online retailers (Nimbalkar A., 2022, p 139).

### **3.5. Inventory management :**



Inventory management in E-commerce entails the strategic and efficient control of product stock levels, involving the use of data-driven methodologies and optimization techniques. This process encompasses forecasting demand, tracking inventory levels, and implementing inventory replenishment strategies to ensure adequate stock availability while minimizing excess inventory costs. Using advanced algorithms (Weber FD., Schütte R., 2019) and analytics, E-commerce businesses can analyze historical sales data, seasonality patterns, and market trends to make informed decisions on inventory allocation and procurement (Shashi, 2016, p5).

Employing inventory management systems that integrate with supply chain operations streamlines inventory handling and logistics. By adopting scientific inventory management practices, E-commerce enterprises can optimize (Srivastava A., 2021, p 173) resource allocation, reduce carrying costs, and enhance overall operational efficiency, ultimately elevating customer satisfaction and maximizing profitability .

### **3.6. Cyber security:**

In the domain of E-commerce, Artificial Intelligence (AI) has a critical role in bolstering cyber security measures. AI technology enhances cyber defense by constantly monitoring and analyzing massive volumes of data to identify anomalies and potential security threats. Through advanced algorithms (Weber FD., Schütte R., 2019) , AI can identify patterns indicative of malicious activities, such as unauthorized access attempts or unusual transaction behavior. Moreover, AI-driven systems can swiftly respond to emerging threats by autonomously implementing security protocols and countermeasures. This proactive approach helps safeguard sensitive customer information, financial transactions, and personal data from cyber attacks and breaches. By adapting and learning from evolving threats, AI-driven cyber security solutions provide a dynamic defense mechanism that ensures a safer online shopping environment for both businesses and consumers in the E-commerce landscape. AI and machine learning will be key technologies in cyber security for identifying and forecasting threats (Sarker IH. , 2021) and (Sarker IH. 2020). AI will be a vital tool for financial security because of its ability to analyze large amounts of data, foresee fraud, and identify it. (Sarker IH., 2022, p 16)

### **Conclusion:**

Artificial intelligence (AI) is a part of computer science that focuses on creating smart machines that can do tasks usually done by human. For example, smart helpers like Siri and Alexa, talking bots, and Netflix suggestions are AI. In E-

commerce, AI is used by online stores for things like talking to customers through chatbots, reading their comments, and giving personalized help to shoppers. The most important ways AI is used in E-commerce are: chatbots and helpers that give support all the time, smart suggestions for products based on what people have looked at or bought before, AI personalization that uses information about customers to give better service, and also keeping track of what products are selling well and making sure there's enough of them. In short, AI is really important in E-commerce, and stores are spending a lot to use it well and stay competitive.

## References:

1. Adam M., Wessel M., Benlian A. AI-based chatbots in customer service and their effects on user compliance. *Electronic Markets*. 2021 Jun;31(2):427-45.
2. Ahmad, N.A.; Che, M.H.; Zainal, A.; Abd Rauf, M.F.; Adnan, Z. Review of Chatbots Design Techniques. *Int. J. Comput. Appl.* 2018, 181, 7–10
3. Änäkälä, T. (2021). Exploring value in eCommerce artificial intelligence and recommendation systems
4. Babayev , N. & Israfilzade , K. (2023). Creating complexity matrix for classifying artificial intelligence applications in e-commerce: New perspectives on value creation. *Journal of Life Economics*. 10(3): 141-156, DOI: 10.15637/jlecon.2078. pp 141-156.
5. Britannica money, e-commerce, 2023 available on <https://www.britannica.com/money/e-commerce>, consulted on 08/08/2023
6. Carayannopoulos S. Using chatbots to aid transition. *The International Journal of Information and Learning Technology*. 2018 Mar 5.
7. De Spiegeleire, S., Maas, M & Sweijs, T. Artificial Intelligence and the future of defence : Strategic implication for small and medium-sized force providers, Jan. 1, 2017, pp. 25-42
8. Elakkiya R, Subramaniaswamy V, Vijayakumar V, Aniket Mahanti. Cervical cancer diagnostics healthcare system using hybrid object detection adversarial networks. *IEEE J Biomed Health Inform*. 2021;20:20.
9. Farrugia J-P. & Merienne F., *Augmented Reality, Digital Techniques for Documenting and Preserving Cultural Heritage*, 2017, pp 207-210
10. Klopfenstein, L.C.; Delpriori, S.; Malatini, S.; Bogliolo, A. The Rise of Bots: A Survey of Conversational Interfaces, Patterns, and Paradigms. In *Proceedings of the 2017 Conference on Designing Interactive Systems*; Association for Computing Machinery, New York, NY, USA, 10 June 2017; pp. 555–565.
11. Li, L.; Lee, K.Y.; Emokpae, E.; Yang, S.-B. What makes you continuously use chatbot services? Evidence from chinese online travel agencies. *Electron. Mark.* 2021, 31, 575–599.

12. Marjerison, R.K.; Zhang, Y.; Zheng, H. AI in E-Commerce: Application of the Use and Gratification Model to The Acceptance of Chatbots. *Sustainability* 2022, 14, 14270. <https://doi.org/10.3390/su142114270>
13. Mukhamediev, R.I. et al. Review of Artificial Intelligence and Machine Learning Technologies: Classification, Restrictions, Opportunities and Challenges. *Mathematics* 2022, 10, 2552.
14. Nimbalkar A.A. & Berad A.T. The increasing importance of AI applications in E-commerce. *Vidyabharati International Interdisciplinary Research Journal* 13(1). 2022. pp 388-391.
15. Pan M, Liu Y, Jiayi Cao Yu, Li CL, Chen C-H. Visual recognition based on deep learning for navigation mark classification. *IEEE Access*. 2020;8:32767–75.
16. Sarker IH, Kayes ASM, Badsha S, Alqahtani H, Watters P, Ng A. Cybersecurity data science: an overview from machine learning perspective. *J Big Data*. 2020;7(1):1–29.
17. Sarker IH. Ai-driven cybersecurity: an overview, security intelligence modeling and research directions. *SN Comput Sci*. 2021;20:21.
18. Sarker Iqbal H. AI-Based Modeling: Techniques, Applications and Research Issues Towards Automation, Intelligent and Smart Systems. *SN Computer Science* (2022) 3:158 , pp 1-20
19. Sharma, G., &Lijuan, W. 2014. Ethical perspectives on e-commerce: an empirical investigation. *Internet Research*, 24(4), 414-435.
20. SHASHI Shashi Shekhar Vempati. India and the Artificial intelligence revolution, ED CARNEGIE INDIA, 2016,pp 1-40
21. Srivastava A. The Application & Impact of Artificial Intelligence (AI) on E-Commerce. *Contemporary Issues in Commerce & Management* . Volume 1. Issue 1. Sep 2021, (pp.165-175)
22. UNCTAD, 2023 available on <https://unctad.org/news/global-e-commerce-jumps-267-trillion-covid-19-boosts-online-sales>, consulted on 10/08/2023.
23. Vaughan Turkian & al. Building a smart partnership for the fourth industrial revolution, Atlantic Council, Apr.1, 2018, pp 1-92
24. Vincze J. Virtual reference librarians (Chatbots). *Library Hi Tech News*. 2017 Jun 5.
25. Weber FD, Schütte R. State-of-the-art and adoption of artificial intelligence in retailing. *Digital Policy, Regulation and Governance*. 2019 May 20.
26. Xia Song and al 2019 : The Application of Artificial Intelligence in Electronic Commerce , *Journal of Physics, Conference Series* 1302 (2019) 032030 . pp 1-7