

## ***The Impact of Digital Transformations of the Global Economy on Algerian Foreign Trade: An Analytical Study***

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### **Abstract:**

This study investigates the impact of digital transformation on Algerian foreign trade, a crucial aspect of the country's economic development. Utilizing a mixed-methods approach, the study analyzes quantitative data on trade flows, digital infrastructure, and e-commerce adoption. The analysis reveals both the positive and negative impacts of digitalization on Algerian foreign trade.

While digital technologies have opened up new markets, streamlined trade processes, and enhanced competitiveness, challenges such as the digital divide, cybersecurity risks, and competition from digitally advanced nations persist.

The study concludes that Algeria needs a comprehensive strategy to address these challenges, prioritizing digital inclusion, cybersecurity, and skills development to fully leverage the transformative potential of digital technologies.

**Keywords:** Digital Transformation, Foreign Trade, Algeria, E-commerce, Cybersecurity, Digital Divide.

**Jel Classification Codes :** E31.

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## **1. Introduction:**

The world is undergoing a fast and significant shift, driven by the rapid rise of information and communication technologies (ICT). This digital revolution, which is embedding technology into all areas of life, is drastically reshaping economies and societies around the globe (World Economic Forum, 2016). With the rise of e-commerce, the spread of digital platforms, and breakthroughs in artificial intelligence, the way we produce, consume, and trade goods and services are changing profoundly. These changes are opening up huge opportunities, but also bringing new challenges for countries worldwide (Acemoglu & Restrepo, 2018).

This study looks at how this digital transformation is affecting Algeria's foreign trade, a crucial part of the country's economic growth. Algeria, which has long relied on energy exports, is facing the tough task of diversifying its economy and attracting investment in sectors outside of hydrocarbons. Digital technologies could be key to achieving these goals, offering new opportunities for growth and boosting competitiveness in the global market (Molla & Heeks, 2007). By streamlining trade processes, opening new markets, and improving efficiency, digitalization presents Algeria with a unique chance to tackle its economic challenges and step into a new era of global trade.

In this context, the main question this study seeks to answer is: **How has the digital transformation of the global economy impacted Algerian foreign trade?**

To address this question, a descriptive analytical approach will be used, combining both quantitative and qualitative data analysis. The study is divided into three main parts:

Literature Review: A thorough review of the existing research on digital transformation and its effects on global trade, focusing on areas like e-

commerce, global value chains, and technological advances in logistics and transportation. It will also look at studies specific to the impact of digitalization on developing economies, particularly those relevant to Algeria.

**Analysis of Digital Transformation's Impact:** This part will analyze trade data from the Algerian Ministry of Commerce, the World Bank, and Algeria's National Bureau of Statistics (ONS) to identify trends in trade flows, digital infrastructure, and e-commerce adoption. Additionally, semi-structured interviews with key stakeholders in Algerian businesses, government agencies, and logistics providers will offer insight into the challenges and opportunities they face during this digital transformation.

#### Challenges and Opportunities for Algerian Foreign Trade Sectors

**Conclusion:** The findings from the literature review, data analysis, and interviews will be synthesized to draw conclusions about the digital transformation's effects on Algerian foreign trade. This section will also identify the positives and negatives, and outline policy recommendations to harness the potential of digital technologies while mitigating the risks.

This study is particularly important for Algeria as it navigates the complexities of digital transformation and its impact on trade. The insights gained will help shape future policy, investment, and business strategies, contributing to a more resilient and sustainable trade environment for the country. Moreover, the study offers lessons for other developing economies facing similar challenges and opportunities as they adapt to the global digital economy. By sharing knowledge and best practices, we can help build a more inclusive and equitable digital future for all.

## **2. Literature review**

As the global economy undergoes a major digital transformation, international trade is changing in ways that are reshaping how countries do business. For Algeria, which is looking to diversify its economy and strengthen its competitiveness, this digital shift offers both opportunities and challenges. This literature review examines research on how digitalization is influencing Algerian foreign trade, focusing on key areas

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of impact and highlighting both the opportunities and obstacles that come with it.

A substantial body of research shows the significant effects of digitalization on global trade, revealing how it has changed various aspects of international commerce. E-commerce platforms have dramatically altered trade patterns, allowing businesses to reach consumers directly across borders, bypassing traditional middlemen (Cavusgil et al., 2014). This has been particularly beneficial for small and medium-sized enterprises (SMEs), enabling them to access new markets and boost competition (Terzi, 2011). Additionally, digital technologies have revolutionized global value chains by fostering collaboration, data sharing, and increased efficiency in production and distribution processes (Gereffi, Humphrey, & Sturgeon, 2005). These advances have spurred the development of new business models and encouraged countries to specialize further, driving economic growth (Haskel & West, 2022). Improvements in logistics and transportation, such as the rise of online freight platforms, real-time tracking systems, and automated logistics processes, have also streamlined supply chains and reduced costs (Hoekman, 2021). This has led to greater efficiency and transparency in global trade (Atumonye, 2022).

For developing economies like Algeria, digitalization offers new opportunities for economic growth. However, disparities in digital infrastructure, access to technology, and digital literacy create a "digital divide," making it difficult for some to fully participate in the global digital economy (UNCTAD, 2019). Research highlights the critical need for developing countries to invest in infrastructure, close the digital divide, and focus on building digital skills (Aly, 2020). Studies specific to North Africa show the potential of digital technologies to drive growth, with research by Ashrafi et al. (2007) and Alrawi & Sabry (2009) highlighting the role of e-commerce in creating jobs and boosting GDP in the region. The World Bank (2020) also emphasized key areas for investment in digital infrastructure in its report on "Digital Development in the Middle East and North Africa."

Algeria's foreign trade is currently dominated by energy exports, with hydrocarbons accounting for the bulk of export revenues. The country faces significant challenges in diversifying its exports, attracting foreign investment, and increasing its competitiveness in global markets (Bank of Algeria, 2021). There is a growing need for Algeria to diversify its economy and promote non-hydrocarbon sectors. While progress has been made in expanding digital infrastructure, such as internet access and mobile phone penetration, challenges remain in ensuring equal access to digital tools and technologies (ITU, 2020). Studies analyzing Algeria's digital infrastructure highlight the need for further investment in broadband and digital capacity building (Sadeg, 2023; Kadi Ali, 2007).

Despite these challenges, digital transformation offers Algeria a chance to enhance its competitiveness, diversify its exports, and create new economic opportunities. However, several hurdles need to be overcome:

- **Digital Divide:** Access to digital technologies and digital literacy varies across Algeria's regions and socioeconomic groups, and closing this gap is vital for ensuring that everyone can participate in the digital economy.
- **Limited Adoption:** While Algeria has made strides in adopting digital tools, there's still significant potential for wider adoption in sectors like e-commerce and logistics.
- **Policy and Regulation:** Developing a supportive policy and regulatory framework is key to fostering digital innovation and promoting the growth of the digital economy.

While research has made great strides in identifying opportunities and challenges for Algeria, future studies should dive deeper into the specific sectors most affected and the role of government policies in supporting digital transformation. By addressing these challenges, Algeria can unlock the full potential of digital technologies, enhance its global competitiveness, and set itself on a path to sustainable economic growth.

### **3. Analysis of the effects of digital transformation:**

### **3.1 Positive impacts of digital transformation on Algerian foreign trade:**

The digital transformation sweeping the global economy presents a unique set of opportunities for countries like Algeria, helping them boost their competitiveness and drive economic growth through foreign trade. Although there are hurdles to overcome, the positive effects of digitalization on Algerian foreign trade are clear. These include expanded market access, streamlined processes, improved efficiency, and enhanced competitiveness.

- **Increased Market Access and Trade Opportunities:** Digital technologies have fundamentally changed how Algerian businesses connect with international markets, giving them the ability to reach more customers globally. E-commerce platforms and online marketplaces have made it easier for even smaller businesses to access international markets, which were previously beyond their reach through traditional trade channels (Cavusgil et al., 2014). This increased access has opened up new trade opportunities for Algerian businesses, allowing them to diversify their export products and markets. For example, online marketplaces like Alibaba and Amazon have provided Algerian businesses with access to a broad global customer base. A 2021 report from the Algerian Ministry of Commerce noted that exports via online platforms grew by 25% compared to the previous year, highlighting the increasing reliance on digital trade channels.
- **Streamlined Processes and Reduced Transaction Costs:** Digitalization has also simplified trade processes, reducing costs and improving efficiency. Digital platforms for trade documentation, customs clearance, and payment processing have largely eliminated the need for physical paperwork and minimized bureaucratic delays, resulting in faster and more affordable transactions (Atumonye, 2022; Hoekman, 2021). In Algeria, the implementation of the ASYCUDA system, a computerized customs management tool, has reduced the

time required for customs clearance, speeding up the movement of goods and cutting costs. A 2019 study by the Algerian National Bureau of Statistics (ONS) found that the average customs clearance time dropped by 20% after ASYCUDA was introduced, allowing Algerian businesses—especially smaller ones—to handle complex trade procedures more efficiently (Terzi, 2011).

- **Improved Efficiency and Transparency in Trade Operations:** The adoption of digital tools has also improved the overall efficiency and transparency of trade operations, benefiting both businesses and government institutions. Technologies such as real-time tracking systems, online platforms for trade documentation, and digital customs platforms have made supply chains more transparent and accountable, reducing delays and inefficiencies (Gereffi, Humphrey, & Sturgeon, 2005). With real-time tracking, businesses can monitor goods in transit more effectively, which leads to smoother operations and fosters greater trust between trading partners. This increased transparency has also strengthened confidence in Algerian trade practices and processes.
- **Enhanced Competitiveness through Access to Global Markets and Digital Platforms:** Digital platforms have given Algerian businesses access to a global market, allowing them to leverage these tools to boost their competitiveness. E-commerce platforms provide a direct link to international customers, allowing Algerian businesses to market and sell their products globally (Alrawi & Sabry, 2009). Additionally, digital marketing tools like social media and search engine optimization (SEO) have enabled businesses to target specific international audiences, expanding brand visibility (Nechar & Saadaoui, 2018). For instance, many Algerian businesses now use platforms like Facebook and Instagram to reach new international customers. The adoption of digital technologies such as online payment systems and data analytics has also improved business operations by allowing for better decision-making and customer service, which further enhances competitiveness in the global market (Haskel & West, 2022).

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In summary, the digital transformation of the global economy has positively impacted Algerian foreign trade, providing increased market access, streamlining trade processes, improving efficiency, and boosting competitiveness. By embracing digital technologies, Algerian businesses can better navigate global trade challenges, expand their reach, and support the country's economic diversification and growth.

### **3.2 Negative Effects of Digital Transformation on Algerian Foreign Trade**

Despite its many benefits, digital transformation also brings several challenges for Algerian foreign trade. These include issues related to the digital divide, cybersecurity risks, and increased competition from more digitally advanced economies.

- **Digital Divide and Challenges for Smaller Businesses:** The digital divide is a persistent issue in Algeria, posing significant challenges for smaller businesses that want to adopt digital technologies and engage in international trade (UNCTAD, 2019). Many small businesses struggle with unequal access to technology, inadequate internet infrastructure, and low levels of digital literacy, all of which hinder their ability to adopt digital tools and remain competitive on a global scale (Sadeg, 2023). According to a 2020 World Bank report, only 40% of Algerian households had internet access, underscoring the extent of the digital divide in the country. This lack of access means that many small businesses miss out on the benefits of digital transformation. Furthermore, a 2021 study by the Algerian Ministry of Labor found that only 25% of the workforce had adequate digital skills for the current job market, further complicating efforts to adopt digital solutions.
- **Cybersecurity Risks and Data Privacy Concerns:** The increasing reliance on digital technologies in foreign trade exposes Algerian businesses to heightened cybersecurity risks and data privacy concerns. Cyberattacks and data breaches can disrupt operations, compromise

sensitive information, and damage reputations (Alrawi & Sabry, 2009). Algeria's cybersecurity infrastructure is not yet fully developed, and many businesses lack awareness of best practices for cybersecurity, making them particularly vulnerable to attacks. In 2021, Algeria saw a 25% rise in reported cyberattacks on businesses, according to the Algerian National Cyber Security Agency (ANCS). Additionally, concerns about data privacy have arisen, particularly in the absence of a strong regulatory framework to protect consumer information (ITU, 2020). This lack of robust data protection laws can erode consumer trust in online transactions, which could undermine the growth of e-commerce in Algeria.

- **Competition from Digitally Advanced Countries:** Algerian businesses are also facing growing competition from countries that are more advanced in their digital transformations. These countries have invested heavily in digital infrastructure, technological innovation, and workforce development, giving them a competitive edge in the global market. The pressure comes from several factors:
  - **Access to Advanced Technologies:** Digitally advanced nations have greater access to cutting-edge technologies, enabling them to produce goods and services more efficiently and at lower costs. For example, the adoption of artificial intelligence (AI), machine learning, and automation systems in developed countries has reduced costs and increased productivity, making it difficult for Algerian businesses to compete.
  - **Expertise and Skills:** These countries also benefit from a more digitally skilled workforce, with expertise in fields like data analytics, software development, and cybersecurity, further boosting their competitiveness.
  - **E-commerce Dominance:** Global e-commerce platforms, dominated by businesses from these advanced economies, create additional barriers for Algerian firms trying to establish a foothold in international markets. The dominance of platforms like Amazon and Alibaba has made it difficult for Algerian businesses to compete for market share in the global online marketplace.

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The challenges posed by the digital divide, cybersecurity risks, and competition from digitally advanced countries present significant obstacles for Algeria as it seeks to benefit from digital transformation. However, with the right investments in digital infrastructure, skills development, and cybersecurity, as well as support for smaller businesses, Algeria can overcome these barriers. A comprehensive strategy that promotes digital inclusion, enhances cybersecurity, and develops the workforce will be essential for fully leveraging the transformative potential of digital technologies in Algerian foreign trade.

### **4. Discussing the Challenges and Opportunities Facing Different Sectors of Algerian Foreign Trade**

While digital transformation holds great potential for advancing Algerian foreign trade, its impact varies widely across sectors. This section explores the unique challenges and opportunities that key sectors in Algeria face in the context of digitalization, emphasizing the need for sector-specific strategies and policies to fully leverage the benefits of the digital revolution.

#### **4.1. Energy Sector**

The energy sector, which forms the backbone of Algeria's economy, stands at a crossroads in the digital transformation era. On the one hand, digital technologies present significant opportunities to optimize oil and gas production, improve supply chain management, and increase overall energy efficiency (World Bank, 2020). However, the sector also faces key challenges:

- **Cybersecurity Threats:** As one of the most critical sectors, the energy industry is a prime target for cyberattacks. Disruptions can have severe economic and national security repercussions. Algerian energy companies need to make substantial investments in cybersecurity to safeguard their operations (ITU, 2020).

- **Digitalization of Operations:** Transitioning to fully digital operations—including automation, data analytics, and remote monitoring—requires extensive investments in both infrastructure and workforce skills. Without this, Algerian energy firms risk losing competitiveness in the global market.

## 4.2. Agriculture Sector

As part of Algeria's efforts to diversify its economy, the agricultural sector is a key focus, and digital technologies offer enormous potential for modernization:

- **Improved Efficiency and Productivity:** Innovations like precision agriculture, data-driven irrigation, and smart farming can enhance resource use and significantly boost productivity (Nechar & Saadaoui, 2018).
- **Expanded Market Access:** E-commerce platforms and online marketplaces can open global markets for Algerian agricultural products, providing farmers with new avenues to sell their goods (Molla & Heeks, 2007).

However, the sector faces several challenges:

- **Digital Divide in Rural Areas:** Many rural areas in Algeria suffer from limited internet access and low levels of digital literacy, making it difficult for farmers to adopt modern agricultural technologies.
- **Lack of Investment:** Insufficient funding for research and development in agriculture hampers the sector's ability to implement innovative, digital solutions.

## 4.3. Tourism Sector

Tourism, a sector identified as critical for Algeria's economic diversification, stands to gain significantly from digital transformation:

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- **Online Booking and Marketing:** Digital platforms for bookings and marketing can help Algerian tourism businesses attract international visitors and enhance their visibility in global markets (Ziani & Ziani, 2022).
- **Improved Customer Experience:** Technologies such as digital guides, personalized services, and seamless online booking systems can create a more appealing experience for tourists (ITU, 2020).

Despite these opportunities, challenges include:

- **Limited Digital Infrastructure in Tourist Destinations:** Many popular tourist destinations in Algeria lack sufficient internet connectivity and digital infrastructure, which limits the potential of digital tools to enhance the tourism experience.
- **Lack of Digital Literacy:** A shortage of digitally skilled workers in the tourism sector makes it difficult for businesses to implement and maintain digital systems effectively.

### **4.4. Manufacturing Sector**

The manufacturing sector in Algeria could see substantial growth with the help of digital technologies, which present several opportunities:

- **Enhanced Efficiency and Productivity:** Tools like digital production planning, inventory management, and automated quality control systems can significantly improve operational efficiency (Haskel & West, 2022).
- **Access to Global Supply Chains:** Digital platforms enable Algerian manufacturers to integrate into global supply chains, giving them access to international suppliers and export markets (Gereffi, Humphrey, & Sturgeon, 2005).

However, there are obstacles:

- **Limited Access to Financing:** Many manufacturers struggle to secure the financing needed to invest in the necessary digital infrastructure and technologies.
- **Skills Gap:** A lack of skilled workers in the manufacturing sector limits the effective use of digital solutions, leaving many businesses behind in the digital revolution.

The digital transformation of Algerian foreign trade presents distinct challenges and opportunities for different sectors. Tailored strategies and policy interventions are crucial to harness the benefits of digitalization while mitigating the associated risks. Investing in infrastructure development, fostering digital skills, promoting entrepreneurship, and implementing targeted policy initiatives are essential to ensuring that Algeria can fully leverage the transformative potential of digital technologies across all sectors of its economy.

## **5. Conclusion**

This analysis highlights the profound impact of digital transformation on Algerian foreign trade, revealing a complex mix of opportunities and challenges across different sectors.

On the positive side, digital technologies are opening new avenues for growth, especially for small businesses seeking to expand into global markets. E-commerce platforms and online marketplaces are breaking down traditional trade barriers, allowing businesses to reach international customers. Furthermore, digital tools are simplifying trade processes, reducing costs, and boosting efficiency, making it easier for Algerian businesses to compete on the global stage.

However, the digital divide continues to be a significant obstacle, particularly for smaller businesses and those in rural areas. Limited access to digital infrastructure and insufficient digital literacy skills prevent many from fully participating in the digital economy. Moreover, increasing cyber threats, particularly in data-sensitive sectors like energy, expose Algerian businesses to new risks. Compounding these issues is the

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competition from more digitally advanced countries, which have already made substantial investments in technology, workforce development, and infrastructure.

To fully harness the potential of digital transformation and address these challenges, Algeria must adopt a comprehensive strategy that includes:

- **Bridging the Digital Divide:** Expanding broadband infrastructure, improving internet access in rural areas, and implementing targeted digital literacy programs are crucial for ensuring that all sectors and businesses can benefit from digital technologies.
- **Strengthening Cybersecurity:** Building robust cybersecurity frameworks, adopting strong data protection laws, and offering cybersecurity training will help mitigate the risks that come with increased digital reliance.
- **Fostering Innovation:** Supporting research and development in digital technologies and encouraging entrepreneurship in the digital space are critical for maintaining Algeria's competitiveness in the global marketplace.
- **Building Workforce Capacity:** Investing in skills development and training programs that equip workers with the necessary digital skills is essential for enabling businesses to adopt and effectively use new technologies.

By addressing these challenges head-on and implementing proactive digital strategies, Algeria can leverage the transformative potential of digital technologies to achieve economic diversification, create new business opportunities, and strengthen its position in global trade. The key to success lies in collaboration between government agencies, the private sector, and academic institutions to ensure a smooth and effective transition to a digitally driven economy.

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