



## **The Challenge of Digital Currencies in Enhancing E-Commerce: A Case Study of the Algerian Digital Dinar** **ELBAR Nourelhouda<sup>1</sup>, BEN HAMMOUDA Fatma Zohra<sup>2</sup>**

<sup>1</sup> University Algiers 3 (Algeria), [elbar.nourelhouda@univ-alger3.dz](mailto:elbar.nourelhouda@univ-alger3.dz)

<sup>2</sup> University Algiers 3 (Algeria), [benhammouda.fatmazohra@univ-alger3.dz](mailto:benhammouda.fatmazohra@univ-alger3.dz)

*Received: 11/6/2025*

*Accepted: 22/12/2025*

*Published: 31/12/2025*

### **Abstract:**

Payment methods in online retail have seen significant advancements in recent years, with digital currencies emerging as an alternative to traditional money, particularly on various e-commerce platforms. This study aims to highlight the role of digital currencies in payment systems and financial transactions. The findings show that digital currencies have positively contributed to enhancing e-commerce, due to their transaction speed and ability to operate without clear geographical boundaries. However, digital currencies face implementation challenges, including risks related to their exchange. This paper seeks to examine these challenges through a case study of the Algerian Digital Dinar and its role in boosting e-commerce.

**Keywords :** Digital Currencies, E-commerce, Algerian Digital Dinar .

**JEL Classification Codes :** E42, L81, E58.

---

ELBAR Nourelhouda [elbar.nourelhouda@univ-alger3.dz](mailto:elbar.nourelhouda@univ-alger3.dz)

BENHAMMOUDA Fatma Zohra [benhammouda.fatmazohra@univ-alger3.dz](mailto:benhammouda.fatmazohra@univ-alger3.dz)

## 1. INTRODUCTION

The modern era has witnessed rapid advancements in electronics and communication technologies, transforming the world into a "global village" by eliminating geographical barriers and enabling instant communication. This digital progress has profoundly influenced global trade, leading to the widespread adoption of e-commerce. As a result, transaction methods have evolved, with digital payment systems—particularly digital currencies, which gained prominence after the 2008 financial crisis—playing a crucial role in supporting e-commerce, despite the emergence of new challenges.

The research problem addressed in this paper is: What challenges do digital currencies face in enhancing e-commerce, and how can the Algerian Digital Dinar contribute to revitalizing e-commerce in Algeria?

This study adopts a qualitative research approach, primarily based on a comprehensive literature review. Data were collected from academic journals, central bank reports, publications by regulatory authorities, and other relevant online sources. Selection criteria for sources included relevance to digital currencies and e-commerce, publication within the last ten years (with some foundational older studies included), and credibility of the publishing entity.

Based on this approach, the study critically analyzes the Algerian Digital Dinar model, evaluating its potential benefits, challenges, and implications for financial inclusion in Algeria. The paper is structured into three main sections:

1. The conceptual framework of digital currencies and their legal nature.
2. The theoretical framework of e-commerce and its relationship with digital currencies.
3. A case study of the Algerian Digital Dinar

### **2. The Conceptual Framework of Digital Currencies and Their Legal Nature:**

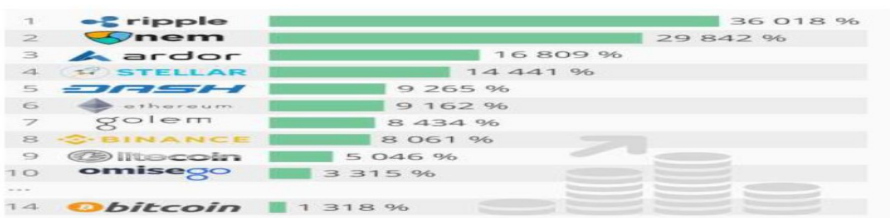
**2.1 The Conceptual Framework of Digital Currencies:** Fiat currencies depend on a central authority to maintain their value, and their stability is largely determined by government macroeconomic policies. Consequently, they are susceptible to significant fluctuations that could potentially lead to a substantial loss of value. Over time, financial innovations have overcome the limitations of physical currencies, evolving from early instruments such as promissory notes in the 12th century to modern tools including debit cards and mobile

payment applications. Digital currencies represent a further step in this evolution, offering new mechanisms for exchange, even though no government has yet formally adopted them (Ayman Ezzeldin Abu Salah, 2018, p 11-12).

Digital currency is a form of medium of exchange that exists exclusively in digital form and has no physical counterpart. These currencies are independent of any tangible currency and are not backed by any government, central authority, or legal entity (Henri Vente, 2024, pp. 4–5). Different institutions define digital currency in various ways: The World Bank considers it a digital value with a defined unit of account, distinct from electronic money. The Financial Action Task Force (FATF) describes it as a tradable digital value functioning as a payment method, unit of account, or store of value. The Bank for International Settlements (BIS) views it as pre-paid or stored value on an electronic device, similar to pre-paid bonds, with its value decreasing as it is spent (Yoseif & Emad, 2022, p. 391). In summary, digital currency is a virtual, non-physical unit issued electronically and traded on platforms without government oversight or connection to fiat currency (Al-Najjar, 2019, p. 32).

Bitcoin, the first digital currency, was launched in 2009 by the pseudonymous Satoshi Nakamoto, employing a unique encryption system. It began at \$0.001 and was soon followed by other cryptocurrencies such as Litecoin and Ripple. By 2020, over 2,000 cryptocurrencies were in existence. In 2017, the market experienced explosive growth: Bitcoin's value increased 15-fold, Ripple surged by 36,000%, the number of users reached 4.7 million, and total market capitalization reached \$572 billion (Ahmed Yahya Mohammed Ali, 2021, pp. 132–137)

**Fig.1: The Most Significant Digital Currencies That Experienced Major Developments in 2017**



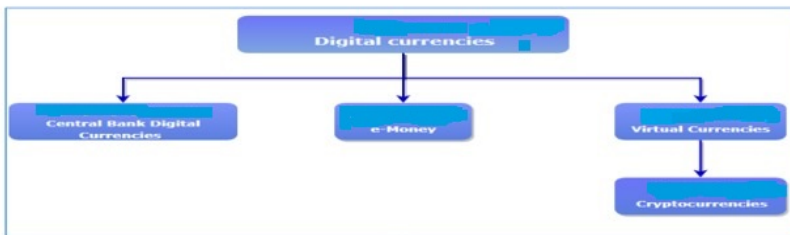
Source: Ahmed Yahya Mohammed Ali, (December 2021), p 137.

There are a set of requirements for using digital currency (Peng & Heninger, p. 2), and they are:

- ❖ **Security:** Digital payment systems must rely on high-quality encryption technologies to ensure a high level of security, preventing fraud or alteration of transactions.
- ❖ **Privacy:** Transactions should be private and accessible only to the contracting parties.
- ❖ **Portability:** Digital currency should be independent of any physical location and easily transferable over the network.
- ❖ **Continuous Access:** Users must be able to spend and receive money at any time.
- ❖ **Divisibility and Exchangeability:** Digital currency should be exchangeable and capable of being divided into smaller units.

Digital currencies can be classified into three main forms: virtual currencies, electronic currencies, and digital fiat currencies issued by central banks or monetary institutions (Central Bank of Jordan, 2020, p. 8), as illustrated in the following figure:

**Fig.2: Forms of Digital Currency**



Source: Central Bank of Jordan, (March 2020), p. 8.

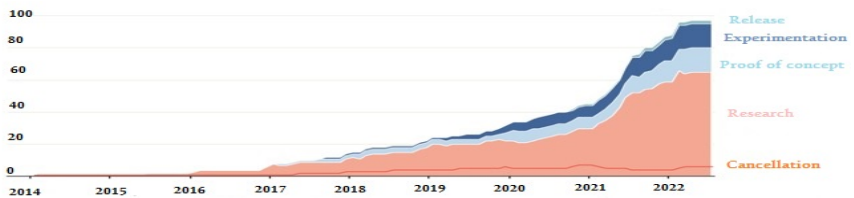
Virtual currencies, which emerged in the 21st century, gained popularity for their low cost, ease, and speed in commercial transactions. They enable direct payments without electronic intermediaries and are created through electronic systems by individuals or groups, whether identified or anonymous. (Al-Ghanami, 2023, pp. 51–52).

Electronic money represents an alternative to traditional payment methods, serving as a digital representation of conventional currency.

Its value is stored as electronic credit units or in the consumer's electronic memory. The term "electronic money" refers to various means with limited value, which can be pre-paid or stored for later use (Bouafia Rachid, 2014, pp. 112–113).

Recently, central bank digital currencies (CBDCs) have garnered increasing interest from central banks around the world. According to the Bank for International Settlements, these currencies represent a new digital form of money issued by central banks, differing from the reserves or settlement balances that commercial banks hold with central banks (yemen-yba.com), CBDCs represent a digital form of money similar to paper and coin currencies. Recently, research and development activities related to these currencies have increased, with experiments currently being conducted on 15 digital currencies globally, along with another 15 in advanced research phases. Central banks aim to evaluate the benefits and risks associated with these currencies and study the best ways to utilize them effectively (Andrew Stanley, 2022), this is illustrated in the following figure:

**Fig.3: Evolution of Digital Currency Issued by Central Banks**



Source: Andrew Stanley, (September 2022), p. 48.

By July 2022, central bank interest in digital currencies had surged, with around 100 in development. Successful launches included Nigeria's eNaira (2021) and the Bahamas' Sand Dollar (2020), while China introduced the Digital Yuan. Algeria also plans to issue the Algerian Digital Dinar under its new monetary and banking law, supporting the adoption of digital currency (Andrew Stanley, 2022).

Articles 3, 4, and 5 of Algeria's monetary and banking law outline the issuance, development, and regulation of the central bank's digital currency. According to a meeting between the Ministry of Finance and the Bank of Algeria, the Digital Dinar will be initially issued and managed by the central bank for transactions between it and financial

institutions, but it will not be available for public use at this stage. (Iman Khamouch, 2023).

**2.2 The Legal Nature of Digital Currencies:** Digital currencies play an important role in e-commerce, but legal uncertainties remain about their status as alternatives to fiat money. The European Banking Authority initially warned of their risks in 2013 but later, in 2014, recognized their benefits and called for further study and regulation. This reflects a growing global acceptance and evolving understanding of digital currencies (Al-Ghanami, 2023, p. 57).

Opinions on the legal nature of digital currencies vary: some see them as real currencies used for payments, while others view them as commodities. Supporters highlight their use as currency substitutes, whereas critics argue they lack legal backing, stable value, and official recognition. They consider digital currencies more like speculative investments influenced by price volatility than true currencies. (Heidi Issa, 2020, pp. 684–685).

Countries vary in their stance on digital currencies: Germany recognizes Bitcoin as "private money," Canada treats it as a taxable commodity, and U.S. states differ between viewing it as a commodity or financial guarantee. These positions reflect national interests like transfer control, taxation, and economic issues. In Iraq, Bitcoin is classified as an intangible asset similar to a patent (Zain & Mohammed, 2021, pp. 152–154).

Digital currencies are viewed by some as a medium of exchange requiring conversion to cash, while others see them as both a medium of exchange and payment. Many legal experts consider them a new type of money because they fulfill traditional monetary roles, leading some businesses to accept them and value them alongside traditional currencies (Al-Ghanami, 2023, p. 59).

### **2.3 Views of Financial Institutions and Countries Toward Digital Currencies:**

#### **❖ Views of Financial Institutions on Digital Currencies:**

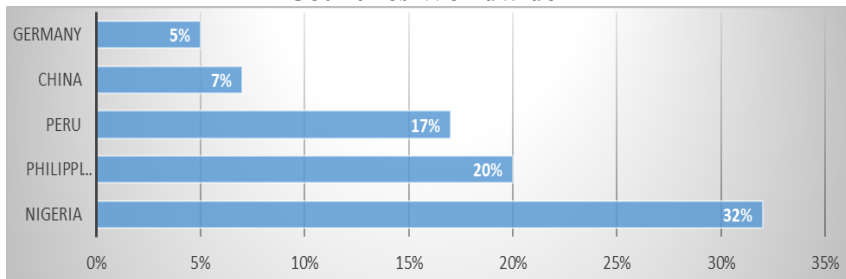
Financial institutions hold diverse views on digital currencies. The World Bank acknowledges both benefits and risks of blockchain, urging its development. The European Central Bank is interested in a digital euro, while the EU report sees no immediate need for regulation due to limited use and low risks, highlighting the advantages of digital currencies (Atheer Salah Ibrahim Ibrahim, 2021, pp. 86–94). The IMF has highlighted both the benefits of digital currencies—such as faster trade—and risks like their use in illegal activities. While not recommending for or against their

adoption, the IMF calls for regulation, thorough study, and international cooperation to manage these risks effectively. (Christine Lagarde, 2018), The Bank for International Settlements reported that digital currencies face major challenges, including price volatility that undermines confidence, especially in Bitcoin. It also highlighted weaknesses in decentralized networks and emphasized the need for issuing authorities to ensure stability and efficiency to build trust among users (Arqam, 2018), The Arab Monetary Fund has yet to take a clear position on digital currencies like Bitcoin, citing uncertainty. The Arab Monetary Council Chairman highlighted challenges for Arab central banks, such as cross-border transfers and financial stability concerns, and noted that many global central banks are already exploring digital currency issuance to address these issues (Al-Zaabi, Abdullah Nasser Obaid Nasiri, 2018).

- ❖ **Countries' Views on Digital Currencies:** Countries like the United States, Germany, and Japan have recognized and regulated digital currencies, including taxing their trading. South Korea and Ecuador support digital currencies to boost their economies, while China has been developing a national digital currency since 2014 to integrate with its banking system (Saliha Bouderia, Aicha Bouhtalij, 2021, pp. 287–290), most Arab countries tend to distance themselves from digital currencies. For instance, Algeria has banned transactions involving these currencies, as stipulated in Article 117 of Law No. 17-11 issued on December 27, 2017, within the 2018 Finance Law, which states, "The purchase, sale, and use of digital currency are prohibited..." The law also outlines penalties for violators in accordance with existing regulations (Yoseif & Emad, 2022, p 396 ), In Jordan, the government has warned against using Bitcoin and similar digital currencies. The Central Bank banned banks, financial firms, exchange houses, and payment services from dealing with them and alerted the public to their risks, declaring these currencies illegal. (Muthana Waad Allah Younis Al-Nuaimi, 2018, p. 25), the UAE experienced a shift in its stance on digital currencies, moving from warning about them in 2017 to recognizing them in 2019. It collaborated with Saudi Arabia to launch a digital currency for banks to study blockchain technology and assess its impact on security and

monetary policy (Heidi Issa, 2020, pp. 707–709), In Iraq, the Central Bank prohibits the use of digital currencies and enforces penalties under anti-money laundering laws for violators. However, this ban applies only to the Central Bank itself and not to individuals transacting privately, as the Bank lacks legislative power to forbid all users from using digital currencies (Zain & Mohammed, 2021, p. 156).

**Fig.4: Proportion of Digital Currency Adoption in Major Countries Worldwide**



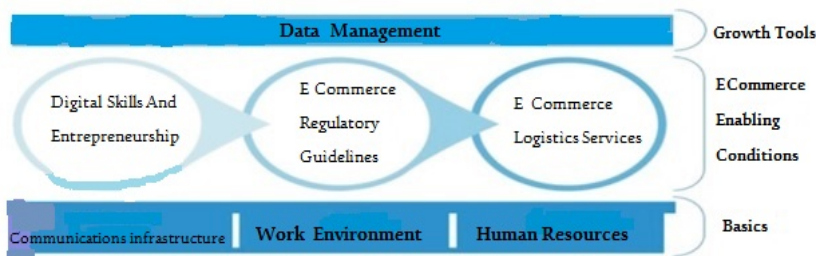
**Source :** Saliha Bouderia, Aicha Bouhtalij, (2021).

### **3. The Theoretical Framework of E-Commerce and Its Relationship with Digital Currencies:**

**3.1 The General Framework of E-Commerce:** E-commerce has become a dominant force in the business landscape, both locally and globally, driven by advances in modern communication technologies. These technologies have transformed how companies operate, enabling transactions via the internet, email, and mobile devices, giving rise to the concept of "electronic business" (Abdel Hafiz Bourlezek et al., 2018, p. 2). Broadly, e-commerce can be defined as commercial exchanges conducted through electronic means, including business-to-business, business-to-consumer, consumer-to-consumer, business-to-government, and consumer-to-government transactions (Stair & Reynolds, 2010, p. 16).

In the Algerian context, Law No. 18-05 defines e-commerce as any activity in which an electronic supplier proposes or guarantees the provision of goods and services remotely to an electronic consumer through electronic communications. In summary, e-commerce refers to buying and selling transactions between consumers and producers or between businesses, facilitated by information and communication technology (Ashhab, 2015, p. 154)

**Fig.5: The Essential Components of E-commerce Architecture**



Source: Arab Monetary Fund, Jamal Qassem Hassan, Mahmoud Abdel Salam, (2021), p. 7.

Over the past two decades, commerce has undergone a significant transformation, with e-commerce emerging as an effective tool for managing complex transactions and operations between businesses. Its impact extends beyond simplifying transactions; e-commerce has become a key driver for the development of new business activities and innovative business models (Aklouf & Drias, 2008, p. 329). E-commerce transactions can be classified according to the nature of the participants involved. This includes digital transactions connecting businesses with one another, businesses with consumers, and businesses with government entities (Kenneth C. Laudon & Jane P., 2012, p. 381). The Coppel Matrix further illustrates the most important types and forms of e-commerce (Bouaafia Al-Rachid, 2014)

**Table 1: Coppel Matrix of E-commerce Forms**

|                     | <b>Government</b>              | <b>Organization</b>          | <b>Consumer</b>              |
|---------------------|--------------------------------|------------------------------|------------------------------|
| <b>Government</b>   | Government to Government (G2G) | Government to Business (G2B) | Government to Consumer (G2C) |
| <b>Organization</b> | Business to Government (B2G)   | Business to Business (B2B)   | Business to Consumer (B2C)   |
| <b>Consumer</b>     | Consumer to Government (C2G)   | Consumer to Business (C2B)   | Consumer to Consumer (C2C)   |

Source: Halimi Hakima, Kermich Amal, Setiti Lazazia, (2021).

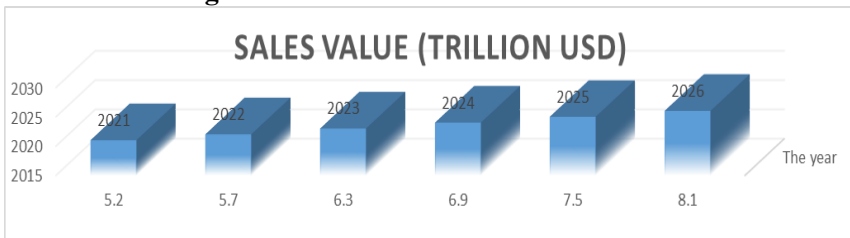
E-commerce offers numerous benefits to organizations, particularly in managing their relationships with customers. Some of the most notable benefits include (Khaleel,2019, p 274) :

- ❖ The use of the internet and email to unify communication points with customers has increased organizations' ability to manage their relationships with clients.
- ❖ Managing communication through email allows for immediate and automated responses to inquiries.
- ❖ The integration of e-commerce in sales and service channels has reduced costs and facilitated information gathering.
- ❖ E-business has contributed to the development of personalized self-service portals, enabling sales and service professionals to update customer profiles and manage new orders.
- ❖ The combination of services, applications, and infrastructure represents a significant step in creating a high-performance work environment for customer service, leading to faster transaction processes and improved relationships with customers.

In addition to its benefits, e-commerce also presents certain drawbacks and challenges, which can be highlighted through the following points (Mouloudi & Abdelkader, 2022, p 411 ) :

- ❖ The risk of hacking poses a significant threat to electronic transactions, where hackers can infiltrate company websites, damage them, or plant viruses, affecting the integrity of online operations and putting the company's reputation at risk.
- ❖ Organizational costs increase due to maintenance and updates, as well as the need for training specialized staff.
- ❖ Time-wasting and addiction to the internet can lead to the loss of vital social relationships.
- ❖ Organizations face competition challenges, as they become more susceptible to being replaced by new competitors in the global online market.
- ❖ Users can be subjected to fraud by unreliable individuals or websites, where someone may hack into their accounts, gain control, and access their account information and credit card details for theft.
- ❖ Failure to maintain the privacy of website customers.

**Fig.6: Global Retail E-commerce Sales**



Source: Jamal Qassem Hassan, Mahmoud Abdel Salam, (November 2023).

The global retail e-commerce market experienced tremendous growth in 2022, increasing by 9.7%. Projections indicate that this upward trend will continue, with the market value expected to reach \$8.1 trillion by 2026, representing 24% of total sales.

**Table 2: E-commerce Sales of the Eight Largest Countries in the World (2020)**

| Countries                | Total E-commerce Sales<br>(Billion US Dollars) | Total E-commerce to<br>Gross Domestic Product (%) | Total E-commerce Sales<br>from Business to Business (Billion US Dollars) | Total E-commerce Sales<br>from Business to Consumers<br>(Billion US Dollars) |
|--------------------------|------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------|
| United States of America | 9580                                           | 45                                                | 8319                                                                     | 1261                                                                         |
| Japan                    | 3416                                           | 67                                                | 3238                                                                     | 178                                                                          |
| China                    | 2604                                           | 18                                                | 1065                                                                     | 1539                                                                         |
| South Korea              | 1302                                           | 79                                                | 1187                                                                     | 115                                                                          |
| United Kingdom           | 885                                            | 31                                                | 633                                                                      | 251                                                                          |
| France                   | 785                                            | 29                                                | 669                                                                      | 116                                                                          |
| Germany                  | 524                                            | 14                                                | 396                                                                      | 111                                                                          |
| Italy                    | 431                                            | 22                                                | 325                                                                      | 35                                                                           |
| World                    | 26673                                          | 30                                                | 21803                                                                    | 4870                                                                         |

Source: Arab Monetary Fund, Jamal Qassem Hassan, Mahmoud Abdel Salam, (2021), p. 20.

B2B e-commerce dominated the global market, reaching a value of \$21.8 trillion in 2020, accounting for 82% of total e-commerce. Additionally, B2C e-commerce grew to \$4.9 trillion, while cross-border trade amounted to \$440 billion, representing 2.1% of the total. The United States, Japan, China, and South Korea together comprised 63% of total global sales.

**Table 3: Ranking of Arab Countries in the Business-to-Consumer E-commerce Index**

Source: Arab Monetary Fund, Jamal Qassem Hassan, Mahmoud Abdel Salam, (2021), p. 31.

| Countries            | Ranking of Countries (2020) | Ranking of Countries (2019) | Percentage of Internet Users (2019) (%) | Percentage of Individuals with a Financial Account (Age 15 and Above) (2017) (%) | Postal Reliability Index (2019) |
|----------------------|-----------------------------|-----------------------------|-----------------------------------------|----------------------------------------------------------------------------------|---------------------------------|
| United Arab Emirates | 37                          | 28                          | 99                                      | 88                                                                               | 64                              |
| Saudi Arabia         | 49                          | 49                          | 96                                      | 72                                                                               | 74                              |
| Qatar                | 50                          | 47                          | 100                                     | 66                                                                               | 50                              |
| Oman                 | 54                          | 60                          | 92                                      | 74                                                                               | 73                              |
| Kuwait               | 58                          | 57                          | 100                                     | 80                                                                               | 50                              |
| Lebanon              | 64                          | 69                          | 78                                      | 45                                                                               | 74                              |
| Bahrain              | 66                          | 67                          | 100                                     | 83                                                                               | 7                               |
| Jordan               | 76                          | 80                          | 67                                      | 42                                                                               | 71                              |
| Tunisia              | 77                          | 74                          | 67                                      | 37                                                                               | 69                              |
| Algeria              | 80                          | 107                         | 60                                      | 43                                                                               | 73                              |
| Libya                | 85                          | 109                         | 75                                      | 66                                                                               | 1                               |
| Morocco              | 97                          | 97                          | 74                                      | 29                                                                               | 27                              |
| Egypt                | 109                         | 107                         | 57                                      | 33                                                                               | 26                              |
| Djibouti             | 125                         | 126                         | 56                                      | 12                                                                               | 10                              |
| Iraq                 | 129                         | 132                         | 49                                      | 23                                                                               | 8                               |
| Sudan                | 132                         | 131                         | 31                                      | 15                                                                               | 26                              |
| Syria                | 133                         | 135                         | 15                                      | 23                                                                               | 26                              |
| Yemen                | 138                         | 141                         | 27                                      | 6                                                                                | 27                              |
| Mauritania           | 145                         | 145                         | 21                                      | 21                                                                               | 0                               |
| Comoros              | 149                         | 149                         | 8                                       | 22                                                                               | 0                               |

In 2020, the UAE led Arab countries in business-to-consumer e-commerce, followed by Saudi Arabia and Qatar. The growth of e-commerce has been driven by globalization and internet expansion,

with Amazon's 1995 launch marking a key milestone in its global rise (Redžović & Novaković, 2016, p 474) , with the development of this industry, the term e-commerce began to refer to business activities related to goods and services conducted over the internet by 2005, e-commerce rapidly spread across most cities in America, Europe, and East Asia (Nanehkaran, 2013, p 190) , E-commerce volume is closely linked to internet usage, which reached 3.3 billion users (40% of the global population) in 2015. As internet usage continues to grow rapidly, global trade is expected to fully shift to e-commerce by 2050 (Redžović & Novaković, 2016, p 474).

### **3.2 The Role of Digital Currencies in Activating E-commerce:**

Since the 1990s, the potential of the internet has been harnessed for commercial transactions, giving rise to e-commerce—business conducted through electronic platforms. The internet functions as a global marketplace where traders can showcase products using multimedia, enabling consumers to compare options and receive purchases directly at home (Sultan Mohammed Abdullah Al-Shahrani, 2023, pp. 3306–3307).

Traditional business contracts are based on offer and acceptance, requiring sellers to deliver goods and buyers to pay. With the growth of e-commerce, which facilitates exchanges between distant parties, there has been an increasing need for efficient electronic and online payment systems. Advanced payment methods have thus become essential, and digital currencies have emerged as adaptable tools aligned with technological progress (Bouafif Al-Rashid, 2014).

The rapid proliferation of digital currencies in e-commerce has both positive and negative economic impacts. They enhance e-commerce as a new payment method, offering merchants and consumers flexible alternatives between digital and traditional currencies. The rising demand has also led to increased cryptocurrency mining activity, helping to meet market needs and mitigate inflation caused by scarcity, thereby promoting their use in e-commerce (Al-Ghanami, 2023, p. 68).

Digital currencies may help compensate for the decline in traditional cash usage in e-commerce, as they are supported by over one hundred thousand commercial websites. Their impact on electronic trade exchange rates is further amplified by technological advancements, which increase product diversity and accelerate access. It is expected that electronic trade will continue to expand significantly as digital currencies evolve (Hakim Yamna, 2019, p. 11).

The main advantages of digital currencies in e-commerce can be summarized as follows:

- ❖ **A Secure Payment Method:** Rising concerns over credit card fraud have made many sellers hesitant about international trade. However, the emergence of digital currencies—with irreversible transactions—has greatly reduced fraud risks, encouraging merchants to accept international payments more confidently.
- ❖ **A Globally Recognized System:** Digital currencies can be used internationally without conversion limits, transfer fees, interest, or global charges, as they operate without intermediaries. Although some countries have issued warnings against them, their adoption continues to rise (Al-Jbour Ghazi, 2018).
- ❖ **Privacy Protection in Electronic Transactions:** Some countries see digital currencies as tools to ease economic pressure. Venezuela launched the "Petro," a digital currency backed by oil and minerals, raising over \$700 million. Russia also plans to issue a "Digital Ruble" to regulate transactions and enhance financial privacy, trust, and stability (Abu Salah, 2023).
- ❖ **Widely Available:** Despite widespread internet access via smart devices and computers, many people still lack electronic payment options—making them a prime market for digital currencies. In Kenya, a mobile money and microfinance system introduced a Bitcoin device that will offer a digital wallet to one in three individuals (Ayman Ezzeldin Abu Salah, 2018, p. 15).
- ❖ **Confidential Transactions:** Bitcoin transactions are typically fast, enabling merchants to ship products without delay. However, increased network demand has led to occasional slowdowns, with recent reports showing transaction backlogs lasting over six hours (Darshit, 2018). Accepting Bitcoin simplifies transactions for merchants by eliminating the need for a traditional bank account. Payments can be made easily through a Bitcoin wallet app on a computer or smartphone by entering the recipient's address and amount, then sending. Technologies like QR codes and NFC further streamline the process by quickly identifying the recipient's address (Sweileh Nour Eddin, 2023, p. 489).
- ❖ **Security and Control:** Bitcoin users fully control their transactions, avoiding unexpected fees common with other payment methods. Payments maintain user privacy, reducing identity theft risks. Users can also protect their funds with backups and encryption, boosting financial security (Sweileh Nour Eddin, 2023, p. 488).  
The use of digital currencies in e-commerce also faces several challenges, which include:

- ❖ **Security:** Regulations have mainly targeted currency services, neglecting the role of miners in blockchain technology. Significant thefts from hacking and potential manipulation by miners threaten the security of digital currencies. Despite these risks, regulatory authorities have yet to adequately address these challenges (Light, 2019).
- ❖ **Privacy:** In a 2017 report, U.S. Federal Reserve Chairman Jerome Powell highlighted privacy concerns as a major risk of digital currencies like Bitcoin. Their decentralized, intermediary-free nature makes fund monitoring difficult, which appeals to privacy-minded users but also raises worries about misuse in illegal activities like tax evasion and money laundering (Abu Salah, 2023).
- ❖ **Legal Status of Digital Currency:** Governments maintain control over digital currency issuance and regulation, with 54 countries permitting Bitcoin while others, like Algeria and Vietnam, ban it. Countries such as China and South Korea impose varying restrictions but plan their own digital currencies. Japan requires formal registration for digital currency activities. Key legal challenges involve decentralized ownership, international disputes, and anonymity of users (Light, 2019).
- ❖ **The use of digital currencies in e-commerce faces four types of risks:** Digital currencies face several risks: technical risks like key theft and software bugs; economic risks including market bubbles; systemic risks from exchange rate volatility and possible government actions; and social risks involving money laundering and misuse of payment loopholes, posing serious societal challenges (Weaver, 2018).

In addition to the aforementioned risks, there are other risks (Saleha Boudhri, Aicha Bouzleija, 2021, p. 288), which include:

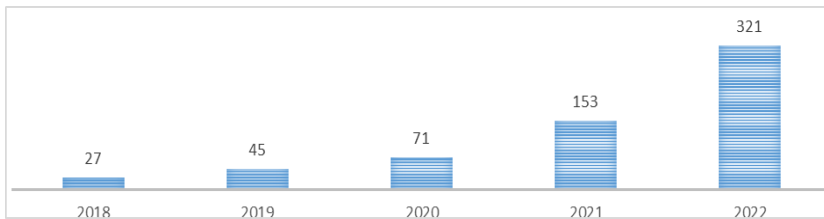
- **Credit Risks:** Cryptocurrency users face these risks regarding the funds held in virtual accounts, as there is no guarantee that the counterparty will be able to meet its full financial obligations when due or in the future.
- **Liquidity Risks:** These risks occur when the counterparty fails to fulfill any obligations it has undertaken to provide liquidity to participants when they need it.
- **Public Acceptance Risks:** These arise when cryptocurrencies are not accepted as a means of payment by all merchants.

- **Fraud Risks:** These risks can result in users losing their digital currencies due to hacking, breaches, theft, or fraud.
- **Legal Risks:** These stem from the legal uncertainties surrounding cryptocurrencies, where the lack of an appropriate legal framework significantly increases other risks, and cryptocurrencies cannot be used to execute monetary settlements through the infrastructures of financial markets.

#### **4. Case Study of the Algerian Digital Dinar:**

**4.1 The Evolution of E-Commerce and Digital Payments in Algeria:** The Algerian authorities sought to promote online payments through Law No. 18-05 (May 10, 2018) governing e-commerce. Electronic payments between consumers and suppliers are processed via platforms managed by commercial banks authorized by the Bank of Algeria and Algeria Post (Jalloul Charara, Leila Ismahan Bekbac, 2023, p. 1102).

**Fig.7: Development of the Number of Licensed E-Commerce Websites in Algeria During the Period 2018 – 2022**



Source : Jaloul Charara, Leila Ismahan Bekbac, (2023) .

Following the 2018 e-commerce law, the number of licensed websites in Algeria grew from 27 to 71 in 2020, boosted by the COVID-19 pandemic and lockdown measures. This growth continued with 153 websites in 2021 and 321 in 2022, showing a rise of 250 websites compared to 2020 (Jaloul Charara, Leila Ismahan Bekbac, 2023, p. 1102).

Algeria struggles to adopt digital payments due to a weak banking system marked by bureaucracy and outdated processes, combined with low trust in financial institutions and limited competition from private and foreign banks. The World Bank's 2021 Financial Inclusion Report highlights Algeria's challenges in banking access and payment technology usage (Othmania Othman, 2022).

**Table 4: Algeria vs. Other Countries in Financial Inclusion and Digital Payments**

| <b>Data (for individuals aged 15 and older)</b>     | <b>Algeria (%)</b> | <b>Kenya (%)</b> | <b>United Arab Emirates (%)</b> | <b>Turkey (%)</b> |
|-----------------------------------------------------|--------------------|------------------|---------------------------------|-------------------|
| <b>Number of Accounts</b>                           | 44.1               | 79.2             | 85.74                           | 74.09             |
| <b>Borrowed from a formal financial institution</b> | 4.55               | 24.73            | 22.05                           | 41.36             |
| <b>Paid digitally</b>                               | 12.76              | 75.8             | 75.05                           | 61.67             |
| <b>Made or received digital payments</b>            | 33.74              | 77.56            | 76.61                           | 67.63             |
| <b>Owens a debit card or credit card</b>            | 23.82              | 24.94            | 72.37                           | 59.59             |
| <b>Used the internet or phone to pay bills</b>      | 3.57               | 44.91            | 15.85                           | 42.07             |
| <b>Used a debit or credit card in-store</b>         | 2.59               | 4.88             | 61                              | 41.48             |

Source: Othmania Othman, Ben Qirat Widad, (December 2022).

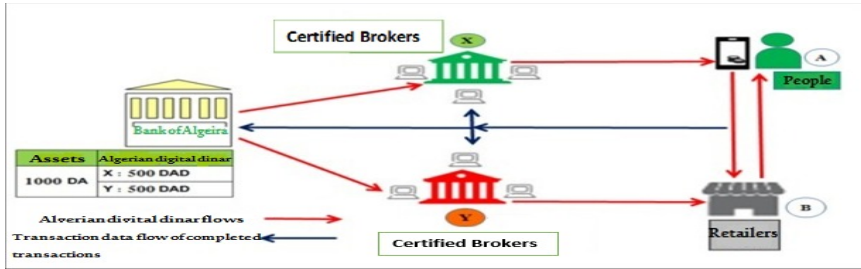
Algeria ranks low in financial inclusion compared to countries like Kenya, the UAE, and Turkey. Only 30% fewer individuals have bank accounts in Algeria than in Turkey, with even larger gaps in digital payment usage—Algeria's rates are one-fifth of Turkey's and one-sixth of Kenya's and the UAE's. Internet use for bill payments and debit/credit card usage in Algeria also remain limited.

**4.2 Project for Issuing the Digital Algerian Dinar:** Algeria's Law No. 23-09 (2023) recognizes the digital Algerian dinar as official currency with full legal status, issued solely by the Bank of Algeria. It prohibits others from creating alternative currencies and gives the Bank exclusive control over the issuance, management, and regulation of digital currency. (Jalloul Chara, Leila Ismahan Bakbak, 2023, pp. 1108–1109). The issuance of the digital currency by the Bank of Algeria requires a set of conditions (Maria Demertzis & Catarina Martins, 2023, p. 14), the most important of which are:

- **Ease of Use:** Users should be able to make payments with the digital Algerian dinar online or offline using reliable and secure devices and technologies.
- **Functions of Traditional Money:** The digital currency must perform the functions of traditional money as a medium of exchange, a store of value, and a unit of account, making it legally recognized and accepted in transactions among all economic units in the country.
- **Exclusive Use for Payments:** The digital dinar should be used exclusively for payments, not as an investment tool, to prevent the outflow of deposits from commercial banks and liquidity disruption, thereby protecting the stability of the financial system. For this purpose, a cap could be imposed on the amounts that can be held in digital currency.
- **Security and Privacy Protection:** Security and privacy protection must be ensured without complete anonymity to mitigate risks related to illegal use, such as money laundering and terrorism financing. Monetary authorities will bear increased operational and supervisory responsibilities regarding the central bank's digital currency system, alongside enhancing cybersecurity to address the growing risks of the internet and cyberattacks (Wang, 2023, p. 123). Therefore, experts from the Bank of Japan propose strengthening the security systems of central bank digital currencies by implementing electronic signatures. This signature will enable the immediate verification of transaction authenticity and the confirmation of user identity, whether using the currency online or offline, thus preventing unauthorized entities from issuing digital currencies for central banks (Bank of Japan, 2023, p. 16).

The proposed model for issuing and managing the digital Algerian dinar, based on the Chinese model of the digital yuan, ensures the central bank's pivotal role in the digital currency issuance process. The model involves the collection and analysis of data related to users and beneficiaries, as well as effective supervision of transactions and management of distributed ledger technology (Othmania Othman, Ben Qirat Widad, 2022, p. 347). Proposing a model for issuing and managing the digital Algerian dinar strengthens the central bank's position as a key entity in the banking and financial system. The model focuses on maintaining the confidentiality of retail transactions by eliminating direct contact between the Bank of Algeria and end users. Instead, digital wallets are managed and funded through accredited intermediaries (Jalloul Chara, Leila Ismahan Bakbak, 2023, p. 1110), as illustrated in the following figure:

**Fig.8: Proposed Model for Issuing and Managing the Digital Algerian Dinar**



Source: Jalloul Chara, Leila Ismahan Bakbak, (2023), p 1110.

This model consists of three main levels (Djekrif, 2023):

**Level One:** The Bank of Algeria exclusively issues the digital Algerian dinar and opens digital dinar accounts for commercial banks and Algeria Post. All transactions are recorded on the blockchain under the supervision of the central bank.

**Level Two:** This level includes financial institutions that hold digital dinar accounts at the Bank of Algeria. Selected commercial banks (National Bank of Algeria, Algerian Foreign Bank, and Algerian Popular Credit) and Algeria Post will pilot the digital currency in a limited number of major cities. These institutions convert cash into digital currency in the customer's wallet upon request, with technology companies like Algeria Telecom participating to support the technical aspects of payment interfaces.

**Level Three:** This level comprises individuals who install digital wallets on their smartphones and convert cash dinars into digital currency through banking institutions. They can then use the digital currency for remote or direct payments using technologies such as QR code scanning or NFC.

In light of the above, the following observations can be made (Othmania Othman, Ben Qirat Widad, 2022, pp. 66–67):

- The Bank of Algeria is the sole authority authorized to issue the digital dinar.
- The digital Algerian dinar will be a digital representation of the traditional Algerian dinar (banknotes and coins).
- The digital dinar wallet will be available for download on smartphones and other devices, allowing the use of the digital dinar even without an internet connection.

- The digital dinar does not require a bank account, enabling individuals who do not deal with banks to convert traditional dinars into digital units.
- The digital dinar will not replace deposits in commercial banks.
- The digital dinar will be based on distributed ledger technology, and the digital dinar's blockchain will be controlled by the Bank of Algeria.

The implementation of the Algerian Digital Dinar, like other central bank digital currencies, faces multiple challenges and opportunities. Key challenges include financial stability risks, operational difficulties for commercial banks, and cybersecurity threats. Limited digital financial literacy among consumers and merchants can hinder adoption, while a lack of clear differentiation from existing digital payment systems may reduce the perceived value of the new currency. On the other hand, the Digital Dinar presents significant opportunities for enhancing financial inclusion, improving transaction efficiency, and modernizing the national payment infrastructure. Successfully addressing these challenges will be critical to maximizing the potential benefits of the Digital Dinar for Algeria's e-commerce ecosystem (Niroula, A, & others, 2024).

**4.3 The Role of the Digital Algerian Dinar in Enhancing E-Commerce in Algeria:** Electronic payment methods are the backbone of e-commerce, as the success of any country in this field is strongly linked to the development and stability of these methods and their immunity to hacking and breaches that threaten individuals' privacy. The more reliable and secure these methods are, the greater the trust of citizens in them, which in turn stimulates e-commerce and leads to significant and rapid successes. This contributes to facilitating commercial transactions, reducing time and costs, and addressing liquidity issues. (Djekrif, 2023)

On the other hand, it is clear that e-commerce in Algeria has not yet reached the desired maturity compared to global countries, and that Law 18-05 regarding e-commerce has not achieved its intended goals so far. Despite the existence of legal online stores and platforms to facilitate electronic payments, the efforts made by the Algerian state to develop and modernize the payment system and issue a law to regulate e-commerce in 2018 have faced various technological and legislative obstacles. However, perhaps its biggest challenge lies in the insufficient reliance on electronic payment methods (Djekrif, 2023).

In light of these obstacles and considering the efforts made by more than 90 countries worldwide to explore the possibility of issuing their own central bank digital currencies, with three countries (the Bahamas, Nigeria, and China) already issuing their digital currencies, it seems impractical for Algeria to remain distant from this necessary trend in the coming years (Othmania Othman, 2022). Given Algeria's advantages, it possesses numerous factors that can enhance digital payments. Additionally, the diverse opportunities available online present good prospects for exploring effective payment mechanisms and methods (Digital 2022: Algeria — DataReportal – Global Digital Insights).

The Algerian government has decided to issue the digital Algerian dinar, aiming to achieve significant progress in the field of e-commerce. This dinar is expected to facilitate payment processes for individuals quickly and easily, even without an internet connection, through an electronic wallet on their phones. It can also assist in facilitating international transfers, thereby supporting the growth of e-commerce in Algeria. This system, backed by blockchain technology, ensures transaction security and privacy protection, and enhances the digital economy in the country. Overall, the digital dinar represents a strategic step towards strengthening the digital economy and facilitating trade both locally and internationally. (Djekrif, 2023)

### 5. CONCLUSION

Information and communication technology is experiencing significant advancements in the modern era, with one of the most notable outcomes being the emergence of digital currencies, which have proven to be a viable medium in e-commerce. Digital currencies, including the digital Algerian dinar, contribute to enhancing e-commerce while also presenting challenges. The following conclusions can be drawn:

- ❖ The development of e-commerce requires a broader adoption of digital currencies, along with necessary measures to mitigate their associated risks.
- ❖ It is essential to address the risks linked to the adoption of digital currencies.
- ❖ The stagnation of e-commerce growth in Algeria can be attributed primarily to the lack of modern electronic payment methods and weaknesses in protecting individuals' data and privacy.
- ❖ Algeria's decision to issue its digital currency, to be named the digital Algerian dinar, under the responsibility of the central bank, signifies

the country's commitment to embracing global technological advancements.

- ❖ It is evident that the digital Algerian dinar will significantly contribute to enhancing e-commerce in Algeria, propelling it towards progress and aligning it with the ranks of leading countries in electronic transactions.
- ❖ The digital dinar is characterized by effective regulations and the ability to be used without the need for internet connectivity, in addition to its reliance on blockchain technology, which is controlled by the central bank, ensuring effective protection of individuals' data privacy.

Recommendations:

- ❖ It is essential to encourage countries and governments to adopt the circulation of digital currencies and establish laws and regulations to govern their use while mitigating associated risks.
- ❖ Raising awareness about digital currencies through international cooperation is crucial. This can be achieved by organizing conferences and seminars and developing joint regulations in this regard.

## 6. Bibliography List:

- 1-Abdel Hafid Bourlzarq et al. (2018). Digital Currencies as a Modern Payment Mechanism in E-Commerce. In Third National Conference on Consumers and the Digital Economy: The Need for Transition and Challenges of Protection, University Center of Abdel Hafid Boulasouf - Mila.
- 2- Abu Salah, Ayman Ezz El-Din. "Digital Currencies and Their Relationship with E-Commerce: A Case Study of the United Arab Emirates (Dubai)," 2018, Master's Thesis, Middle East University, Amman, Jordan.
- 3-Abu Salah Mustafa. "Why Does the Global Financial System Fight Digital Currencies?" 2018, Al Jazeera Net. Retrieved on July 10, 2024, from <https://www.aljazeera.net/blogs/2018/7/17/>.
- 4- Ahmed Hisham Qasem Al-Najjar. Cryptocurrency: An Economic, Legal, and Accounting Study, 1st ed. Dar Al-Nafae, Jordan, 2019.
- 5- Ahmed Yahya Mohammed Ali. "Digital Currencies: Their Origin, Development, and the Risks of Dealing with Them," 2021, Scientific Journal - Faculty of Commerce - Assiut University, Issue 73.
- 6 -Aklouf, Y., & Drias, H. (2008). An Adaptive E-Commerce Architecture for Enterprise Information Exchange: International Journal of Enterprise Information Systems, 4(4), 15–33. <https://doi.org/10.4018/jeis.2008100102>
- 7- Al-Ghanami, Nayef bin Nashi. "Virtual Currencies and their Impact on Electronic Commerce," 2023, Al-Haq Journal for Sharia and Legal Sciences, Issue 12.
- 8- Al-Jbour Ghazi. "The Virtual Currency Bitcoin," 2018, Al-Rai Newspaper. Retrieved on July 10, 2024, from <https://alrai.com/article/10420097>.
- 9- Al-Nuaimi, Muthanna Waad Allah Younis. (2018). Bitcoin: The Electronic Payment System (Peer-to-Peer) and Its Ruling in Islamic Law.

- Retrieved on July 24, 2024, from [https://cp.alukah.net/books/files/book\\_10919/bookfile/albitakwin.pdf](https://cp.alukah.net/books/files/book_10919/bookfile/albitakwin.pdf).
- 10- Al-Zaabi, Abdullah Nasser Obaid Nasiri. The Legal Regulation of Emerging Digital Currencies in UAE and Comparative Legislation: A Comparative Analytical Study, 2018. Master's Thesis, United Arab Emirates University.
- 11- Andrew Stanley. "The Rise of Central Bank Digital Currencies," 2022, Finance and Development, International Monetary Fund.
- 12- Arqam. "Bank for International Settlements: Virtual Currencies Like Bitcoin Cannot Replace Money," 2018. Retrieved on July 27, 2024, from <https://www.argaam.com/ar/article/articledetail/id/554648>.
- 13- Atheer Salah Ibrahim Ibrahim. "The Legal Regulation of Digital Currencies." 2021, Master's Thesis, Middle East University, Amman, Jordan.
- 14- Bank of Japan, 202 Retrieved on July 30, 2024 from <https://www.boj.or.jp/en/paym/digital/dig230529a>.
- 15- Bouaifa, Rachid. "The Role of Electronic Money in Developing E-Commerce," 2014, Algerian Journal of Economics and Finance, No. 02.
- 16- Central bank digital currencies a solution in search of a problem. Retrieved on June 9, 2024, from <https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notice/2022/january-2022/central-bank-digital-currencies-a-solution-in-search-of-a-problem/>
- 17- Central Bank of Jordan. "Cryptocurrencies," 2020, Payments National Supervision and Control Department. Retrieved on June 7, 2024, from <https://www.cbj.gov.jo/EchoBusV3.0/SystemAssets/->.
- 18- Darshit. (February 8, 2018) How is E-Commerce Business Revolutionized by Bitcoin Currency? Medium. [https://medium.com/@darshit\\_parmar/how-is-e-commerce-business-revolutionized-by-bitcoin-currency-d81ff3e761f0](https://medium.com/@darshit_parmar/how-is-e-commerce-business-revolutionized-by-bitcoin-currency-d81ff3e761f0)
- 19- Digital 2022: Algeria—DataReportal – Global Digital Insights. Retrieved on July 12, 2024, from <https://datareportal.com/reports/digital-2022-algeria>
- 20- Djekrif, Z. (May 10, 2023). The digital Algerian dinar as a tool for revitalizing e-commerce in Algeria - A forward-looking perspective in light of the draft monetary and banking law
- 21- Eissa, Haidi. (2020). The Need for a Legislative Umbrella for the Present and Future Digital Payment Giant. University of Sharjah Journal of Legal Sciences, Volume 17, Issue 2.
- 22- Hakim Yamna. The Legal System of the Electronic Contract - A Comparative Study, 2019, Master's Thesis, Abdelhamid Ibn Badis University, Mostaganem, Algeria.
- 23- Henri Vente, Digital currency – A case for standard setting activity, Retrieved on June 8, 2024, from [https://www.aasb.gov.au/admin/file/content102/c3/AASB\\_ASAF\\_DigitalCurrency.pdf](https://www.aasb.gov.au/admin/file/content102/c3/AASB_ASAF_DigitalCurrency.pdf)

- 24- Jamal Qassem Hassan and Mahmoud Abdel Salam. E-Commerce, 2021, IMF Booklet Series, no. 20.
- 25- Hlimi Hakima, Kermiche Amal, and Sititi Lazazia. The Necessity of Activating and Developing E-commerce in Algeria in Light of the COVID-19 Pandemic: Opportunities and Challenges, 2021, Revue Algérienne d'Économie et de Gestion, Vol. 15, No. 02.
- 26- Jelloul, Chara, and Leyla Ismahan Bekbaq. "Central Bank Digital Currencies: Challenges and Requirements of the Algerian Digital Dinar Under Law 23-09," 2023, Tabna Journal of Scientific Academic Studies, vol. 06, no. 02.
- 27- Khamouch, Iman. "New Details on the Algerian Digital Dinar," 2023, Echorouk Online. Retrieved on June 9, 2024, from <https://www.echoroukonline.com/>
- 28-Kenneth\_C.\_Laudon, Jane\_P.\_Laudon\_—  
\_Management\_Information\_System\_12th\_Edition\_.pdf. Retrieved on May 28, 2024, from [https://repository.dinus.ac.id/docs/ajar/Kenneth\\_C.\\_Laudon,Jane\\_P.\\_Laudon\\_--\\_Management\\_Information\\_System\\_12th\\_Edition\\_](https://repository.dinus.ac.id/docs/ajar/Kenneth_C._Laudon,Jane_P._Laudon_--_Management_Information_System_12th_Edition_).
- 29- Khaleel, A. (2019). Digital wallet and e-commerce.
- 30- Lagarde, Christine. (2018). Winds of Change: The Need for a New Digital Currency. IMF. Retrieved on July 27, 2024, from <https://www.imf.org/ar/News/Articles/2018/11/13/sp11418-winds-of-change-the-case-for-new-digital-currency>.
- 31- Light, K. (2019). Cryptocurrencies: Can They Live Together with National Currencies and What Impact Do They Have on National and Global Economies? J. A. S. Kelso, Learning To Live Together: Promoting Social Harmony (223–213). Springer International Publishing. [https://doi.org/10.1007/978-3-319-90659-1\\_23](https://doi.org/10.1007/978-3-319-90659-1_23)
- 32- Maria Demertzis & Catarina Martins,2023, The Value Added of Central Bank Digital Currencies: A View from the Euro Area', (July 16, 2024). Bruegel | The Brussels-Based Economic Think Tank. <https://www.bruegel.org/policy-brief/value-added-central-bank-digital-currencies-view-euro-area>
- 33- Mouloudi, A., & Abdelkader, Y. (2022). Innovation in Financial Technology as A Mechanism for Promoting E-Commerce.
- 34- Nanekaran, Y. A. (2013). An Introduction to Electronic Commerce. 2(4). (PDF) The Geography of Money. By Benjamin J. Cohen. Ithaca, NY, and London: Cornell University Press, 1998. 229p. Retrieved on June 9, 2024, from [https://www.researchgate.net/publication/231982350\\_The\\_Geography\\_of\\_Money\\_By\\_Benjamin\\_J\\_Cohen\\_Ithaca\\_NY\\_and\\_London\\_Cornell\\_University\\_Press\\_1998\\_229p\\_3750\\_cloth\\_1795\\_paper](https://www.researchgate.net/publication/231982350_The_Geography_of_Money_By_Benjamin_J_Cohen_Ithaca_NY_and_London_Cornell_University_Press_1998_229p_3750_cloth_1795_paper)

- 35- Nawal Abdel Karim Al-Ashhab. E-Commerce. 1st ed. Amjad Publishing House, Amman, Jordan, 2015.
- 36- Niroula, A., & others. (2024). Challenges of central bank digital currency implementation: A review of literature. *Journal of Management: Research Journal*, 7(1), 14–26. <https://doi.org/10.3126/jom.v7i1.73517>.
- 37- Othmania Othman, Ben Qirat Widad. (2022). A Proposed Model for a Central Bank Digital Currency in Algeria: The Digital Algerian Dinar (e-DZD). *Al-Bashair Journal*, Vol. 08, No. 03.
- 38- Othmania Othman, Ben Qirat Widad. (2022). The Position of Central Bank Digital Currencies in Relation to Cryptocurrencies and Stablecoins: The Digital Yuan. *Journal of Finance, Investment and Sustainable Development*, Vol. 07, No. 02.
- 39- Peng, S., & Heninger, N. BITCOIN: Cryptography, Economics, and the Future.
- 40- Redžović, M., & Novaković, J. (2016). The Impact of Virtual Money on E-Commerce. *Proceedings of the International Scientific Conference - Sinteza 2016*, 474–478. <https://doi.org/10.15308/Sinteza-2016-474-478>
- 41- Saliha Bouderia, Aicha Bouthelijah. (2021). Virtual Currencies and Their Role in Electronic Payment Transactions: The Bitcoin Model. *Journal of Management and Development for Research and Studies*, 10(2).
- 42- Souilhi Nour Eddine. (2023). The Rise of Digital Currencies: Assessing the Role of Bitcoin and Cryptocurrencies in E-Commerce. *Al-Asil Journal of Economic and Administrative Research*, 2.
- 43 - Stair, R. M., & Reynolds, G. W. (2010). *Principles of information systems: A managerial approach* (9th ed). Course Technology Cengage Learning.
- 44- Sultan Muhammad Abdullah Al-Shahrani. (2023). Digital Currency as a Payment Mechanism for E-Commerce and Its Legality in Saudi Law Compared to UAE Law. *Journal of the Faculty of Sharia and Law at Tuhna Al-Ashraf - Dakahlia*, 27.
- 45- Wang, H. (2023). China's Approach to Central Bank Digital Currency: Selectively Reshaping International Financial Order? 18.
- 46 - Weaver, N. (2018). Risks of cryptocurrencies. *Communications of the ACM*, 61(6), 20–24. <https://doi.org/10.1145/3208095>
- 47 - Yoseif, S., & Emad, A. (November 13, 2022). The Legal Regulation of Digital Currencies
- 48- Zain, M. J., & Mohamed, A. A. J. (2021). Virtual Currency (Bitcoin): Its Legal Adaptation and the Ruling on Dealing with It. *Journal of Legal Sciences*, 35(2), 140–166. <https://doi.org/10.35246/jols.v35i2.328>.