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Cryptocurrency and The Transition Towards the Digital Economy What Prospects for Algeria?

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Abstract

Digital transformations are currently a means of transition towards a digital economy allowing for state-of-the-art sustainable development. Therefore, entire economy is adapting to innovative digital transformations. Among the modern technologies, it is worth mentioning the blockchain that could have revolutionized the financial and economic sectors. Thus, several big-tech economic entities or banks are thinking of adopting it for their infrastructural uses of their societies. This technology is intended for the banking sector and the energy sector, although its best-known use remains the crypto currency: Purely digital, designed on the basis of the blockchain and which self-regulates without any central authority. This article analyses the relationship between digital transformations and the evolution of crypto currency in the development of the digital economy. In order to address this issue, we analyzed the evolution of fintechs and the position of large tech companies in the digital economy. Besides, the present study also focuses on the impact of crypto-In this context. The European Commission has published a report on the growth of the digital economy, based mainly on statistics, reports from banks and financial institutions, and the results of previous research. This study will specify Algeria to study its positioning in the transition to the digital economy We studied the argumentative results of the place of blockchain technology, and crypto currency in the digital economy and demonstrate if there is a risk of uberization of the economic sector through this blockchain technology.

Keywords: *Digital Economy, Blockchain, Crypto currency.*

INTRODUCTION

Since the emergence of the Internet, numerous searches have succeeded in the field of modern technologies; digital today represents the most important sector of activity for the improvement of other sectors of activity. Digital transformations are now taking place in all areas.

The use of digital technologies in all aspects of economic life is the expression that determines the true meaning of the digital economy. Many companies are trying to integrate the digital economy and to adapt to new information and communication technologies.

In recent years, few time after its creation, crypto currency has managed to disrupt the traditional economy thanks to the blockchain technology on which it relies, this procedure allows access to important elements related to the digital transformation of the digital economy, thus creating new opportunities for innovative companies.

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The objective of this article is to evoke the importance of new technologies in the promulgation of the digital economy given cryptocurrencies, and to define the relationship between the use of crypto-currencies in digital exchanges and the development of the digital economy. In order to achieve our research objective, we will address the following issue: **The use of cryptocurrencies, what impact on the development of the digital economy?**

The research is presented in five parts; the first provides a general overview of the fundamental foundations of the digital economy and discusses cryptocurrency and blockchain technology. The second part is dedicated to the development of digital technologies that promote the evolution of the digital economy

The third part represents an estimate of the level of development of the digital economy; the fourth part aims to strengthen the digital economy thanks to the emergence of new technologies and cryptocurrencies. in the fifth and last part deals with Algeria's position with regard to the use of digital and modern technologies as well as its capacity to transition to the digital economy.

I. The Basics of Expanding the Digital Economy: Digital Data, and Digital Platforms:

The digital economy is constantly growing. This state of fact is primarily based on the use of digital data through digital tools that allow the production of new data, the data in this case of production represents the raw material exploited to achieve the objectives traced by the user, or the collection of already existing data, which, according to (Grumbach, novembre 2015), thanks to the efficient processing of these, that is, the collection of previously existing data, the analysis and transformation of these are done in order to generate a first category of services, subsequently collect traces of use of services generated by the first data collection and transform them in order to generate new services and put them at the service of companies, investors and the digital individual (Cusolito, Gévaudan, Lederman, & Wood, 2021). In a company, the use of digital tools such as mailboxes and attachment to electronic platforms allows public servants and managers a better work organization, Companies included in the digital economy can easily improve their reputations and expand their customer base, such as the YASSIR company specializing in transport and home delivery, «North African leader in on-demand services and multi-service technological solutions with a strong impact on populations, confirms its status as an international company by establishing itself in several other African countries» (yassir entreprise, 2020), launched in Algeria and expanded to other countries: Canada, France, Morocco, Tunisia, Germany, Senegal (yassir entreprise, 2020). This company draws its strength from its relationship of trust with its customers estimated at more than 5 million of users and more than 50,000 partners in the Maghreb, thanks to the use of data published by customers as a personal evaluation of the reliability and professionalism of drivers and evaluation of the services provided by the company. The productivity of companies in the digital economy is directly related to the number of customers they have, large is the number of customers, plus is productivity (Cohin , laudier, mohnen , & Perrot, 2015).

The previously existing data are generally constituted by the web pages and platforms of intermediation which is responsible for collecting, transmitting, and monetizing the data. The collection of evidence of the overall functioning of the entire intermediation system used in intermediation platforms can be effectively improved.

It is important to note that digital intermediation platforms “open up opportunities for entrepreneurs, start-ups and companies in many different sectors by instantly connecting them with existing and potential customers” (La banque européenne d’investissement, 2021).These

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platforms serve as a virtual market where the digital individual can captivate more customers in the best possible conditions by offering them quality services. Their operation is based on two modes: as first operation the catalog type model used until the current time, offering customers access to the largest number of supplier profiles with a possibility of filtering according to the desired modalities. However, the limit of this model is the time constraint, it requires a lot of time to achieve the profiles that meet their requirements, as a solution to this constraint intermediation has been dematerialized, it has relied on algorithmic intermediation. This model represents the object of study of (Grumbach, novembre 2015) and (Bucher, 2017)to recommend the use of algorithms as a solution to information overload in digital life. Although this model is still under study regarding the use of algorithms in economic and social life, according to (McKelvey & Hunt, 2019) some countries such as Canada, the United Kingdom, and the United States have proposed developing tools to assess the likely social impact and risks of using algorithms.

The data generated over the last two years exceeds that generated throughout human history (Dutta & Lanvin, The Network Readiness Index 2022: Stepping into the new digital era, How and why digital natives will change the world, 2022), A recent IDC 2025 study (Rydning, 2022)predicts that global data creation will reach 163 ZB (The zetabytes represents the volume of data that exists on a global scale, this represents 1,000,000,000,000,000,000,000 Bytes, in other words a trilliard of Bytes) by 2025, knowing that The Global IDC DataSphere is a measure of the amount of data created, captured, replicated and consumed each year, this IDC 2025 study presents a five-year forecast for the global IDC DataSphere,this figure represents 10 times the amount of data produced in 2017. This data explosion needs as much computing power as possible which is why engineers today are focusing on exploring cloud computing (an infrastructure in which computing power and storage are managed by remote servers to which users connect via an Internet link,it automatically adapts computing power and storage capacity to user needs) and artificial intelligence (AI).

These IT advances are seen as a transitional bridge to a digital transformation, considered by (ROGER A, 2016) as essential in economic practices given the positive changes generated in the creation of added value in an entity.

II. Development of digital technologies in favor of the evolution of the digital economy:

The digital economy is based on old technologies, thanks to the ARPANET network deployed from 1969 by the American Department of Defense, subsequently developed thanks to the launch of the first personal computers, that is to say the exploitation of digital technologies in the sector of Finance has improved significantly from the 1980s to the present(GAVIN , 2017). Nowadays it is based on: Blockchain; Data analysis; Artificial intelligence; 3D printing; Internet of Things; Automation and Robotics; and finally on cloud computing.

In our article, we will particularly deal with blockchain technology, which is the basis of the ecosystem of cryptocurrencies, at the same time the latter represent a real example of the first application of this technology in the creation process published for the first time by (Nakamoto, 2008) by proposing blockchain as a solution to the double spending problem encountered in online transactions.

Blockchain, an open source technology which “offers a paradigm shift in current governance systems which start from the principle that only a hierarchical and centralized order makes it possible to maintain the cohesion of a human society” (livre blanc, 2017)which allows

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data to be stored and transmitted in a decentralized and secure manner. According to (Díez, 2019), blockchain is the first distributed ledger or DLT (distributed ledger technologies) or DAO (Decentralized Autonomous Organization). There are hundreds of variations of DLT or DAO that mimic how Blockchain works for other uses. Although the operation of Blockchain has been the subject of numerous criticisms linked mainly to scalability problems due to its particular design.

This does not prevent this database (public or private) from having several characteristics, namely:

- The immutability of exchanges and information recorded in the blockchain stored permanently and cannot be modified.
- User anonymity: the user connects anonymously; he or she is identified by an account number only.
- Transparency of exchanges thanks to the free access offered to users allowing them to consult all the exchanges carried out.
- Block security: all blocks are replicated across all network nodes.

Here is a simplified diagram of the steps of a blockchain transaction:

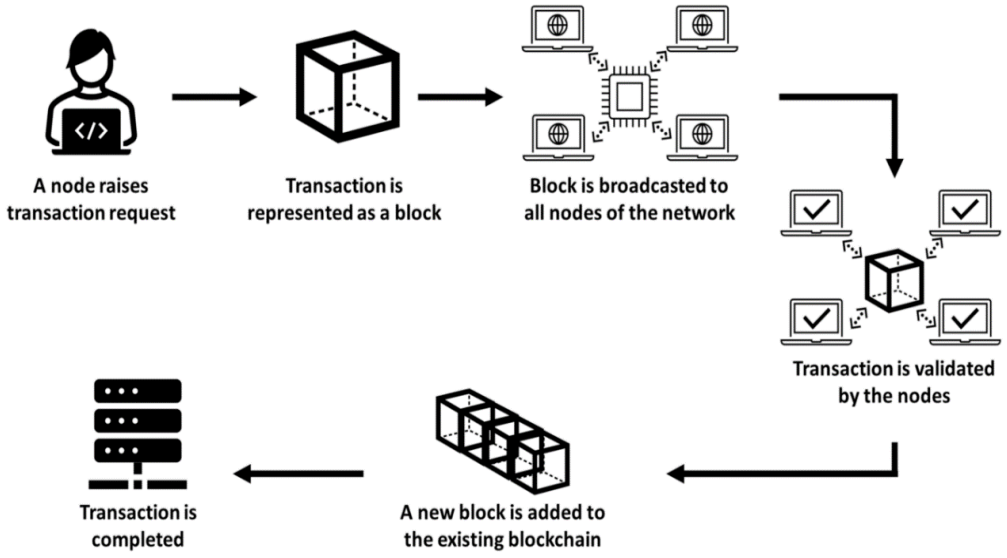

Fig 1: Transaction flow in a blockchain network

Source: (Abirami & Padmakumar , Logistics 2022)

An open access blockchain where the user can participate in consensus (a mechanism guaranteeing that a transaction is not fraudulent and also guarantees the validation of a block in a blockchain) is included in the framework of a public blockchain. This is the case of the Bitcoin Blockchain, and Ethereum, the best known in the world of cryptocurrency.

Unlike the private blockchain, where governance is provided by an organization, and the participants in this case are all known because they do not have access to this blockchain without having been invited.

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For greater attractiveness, there are consortium blockchains where the blocks are controlled by a precise and limited number of nodes. Except that access can be private for some nodes and open to the public for other nodes.

In 2014 and 2015 several blockchain use cases were recorded (livre blanc, 2017):

- Peer-to-peer energy exchange in the electricity production sector: "solar coin" has launched into the electricity production sector based on a system encouraging the production of solar electricity by their facilities with the aim of creating a market share allowing the buyer and seller to transact on the market. Thanks to this maneuver, prices are now set by the market itself and not by the agencies of guardianships.
- In order to encourage the membership of autonomous producers in the peer-to-peer solar energy sector, tokens with a fiduciary value called solar coins are distributed at the value of one token for each 1 MWH (megawatt/hour) of electricity produced. The acquisition of these tokens is accessible to the general public without any membership fees.
- In London in 2015, the Everledger company was founded and specialized in the certification and tracking of diamonds that can prove their provenance and identify their owners by relying on the HyperLedger Fabric blockchain which offers tracking solutions, traceability and authentication of products and goods.
- After generating a serial number for diamonds from data such as size, purity, location of extraction, etc, this number is added to the blockchain. Thus, the data is protected against attacks and against falsification then insert this data on the Bitcoin blockchain in order to ensure the monitoring of private information and the fluidity of exchanges.
- The same blockchain is used in China by the company WALMART with the aim of ensuring food safety in the consumption of pork, with the same principle. This blockchain ensures the traceability and certification of the quality of this meat, thanks to recorded data: storage temperature, place and manner of storage, expiration date, etc.
- In the process of running a blockchain, adding a new block requires 10 minutes of time, except with the new innovations, a new version of instant blockchain exists at present, named TechPay blockchain Coin features 300,000 TPS (transactions per second) as well as a transaction completion/finality time of just 15 seconds.

III. Degree of development of the digital economy:

"The digital economy accounts for 15.5% of global GDP and has grown two and a half times faster than global GDP over the past 15 years" (Banque mondiale , 2023) regarding the degree of development of the digital economy, it is measured above all by the relevant use of innovative technologies in daily life in different sectors, the following diagram presented by (LEMOINE , LAVIGNE , & ZAJAC , 2011) exposing the general composition of the digital economy:

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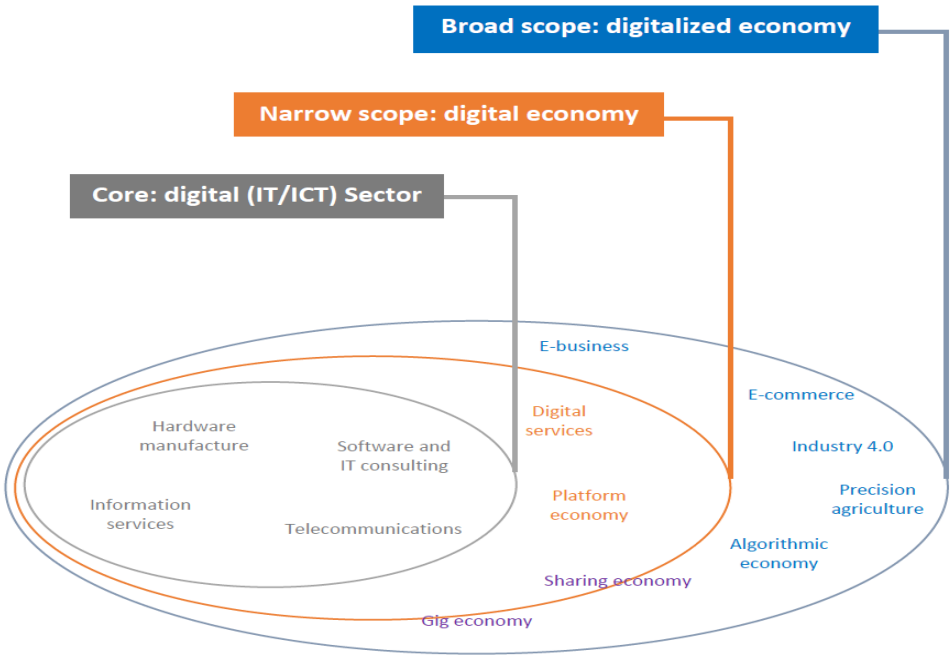

Fig 2: General composition of the digital economy

Source: (Bukht & Heeks, 2017)

That said, the deduction of the degree of digital maturity can be made by the analysis of quantifiable phenomena, as a first reflex, the use of the internet, representing the very basis of the existence of the digital economy.

1. Use of the Internet and connection tools:

In a report published by (KEMP, 2022)bringing together a set of statistics linked to the state of digital technology at present, indicating strong activity on social networks as well as in the use of electronic tools linked to the internet: Smartphones, Desktop/Laptop computer, connected TV, Smart Home equipment, Game console, Tablet.

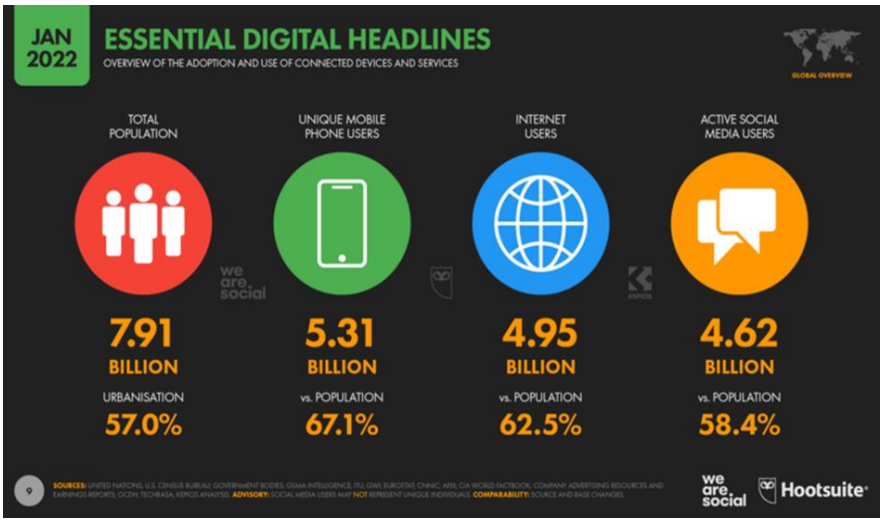

Fig 3: General data on digital growth:

Source: (KEMP, 2022)

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This previous figure represents the evolution of internet use which is continuously increasing. It is evolving in the same direction as the evolution of the world population which, in January 2022, amounts to 7.91 billion people, with an annual growth rate of 1%, 61.1% of this population owns a Smartphone, and 62.5% of the world population is already connected to the internet.

4.62 billion people are connected to social networks, which pushes companies to review their marketing strategies, the use of the latter allows companies to outline new objectives, determined in the (Rapport de Datamind Tendances 2022-2023) as following :

- Attract new customers
- Build customer loyalty
- Improve customer knowledge
- Improve brand image, mitigate risks
- Convert online (leads, purchases, product information requests)
- Improve the competitiveness of the company.

2. The Network Readiness IndexNRI: (The Network Readiness Index is one of the world's leading indices on the application and impact of information and communication technologies (ICT) in global economies):

In the INR report (Dutta & Lanvin, The Network Readiness Index 2022: Stepping into the new digital era, How and why digital natives will change the world, 2022)which profiles the network readiness of 131 economies based on their performance in four different pillars: technology, people, governance and impact:

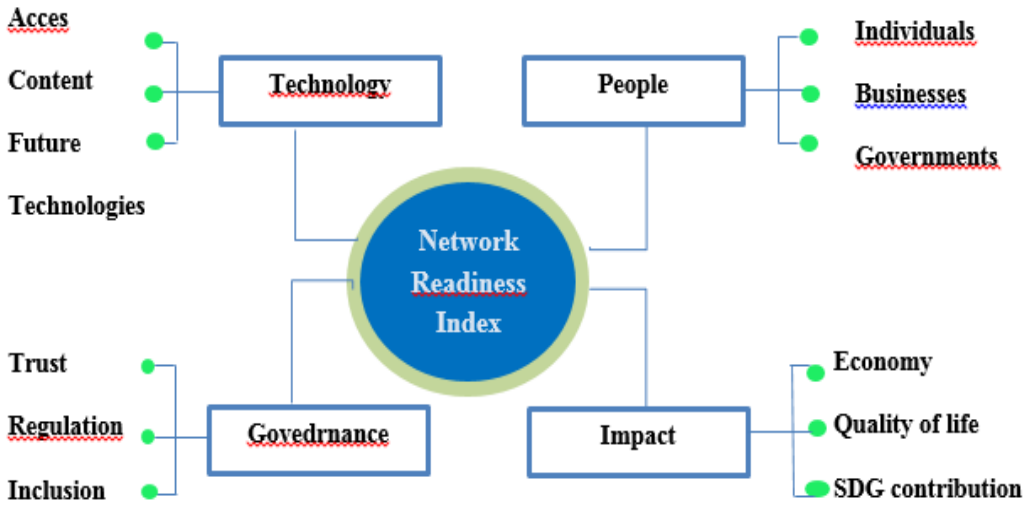

Fig 3: The NRI 2022 model

Source: (Network Readiness Index 2022, 2022)

The Network Readiness Index is an index published each year by the World Economic Forum (International non-governmental organization Based in Cologny, Switzerland, the WEF also has offices in New York, Beijing and Tokyo, created with the aim of improving the state

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of the world by engaging business, politics, academics and other societal leaders to shape global, regional and industry agendas, which then developed with the opening of a new center intended for the study of the fourth industrial revolution which serves as a platform for interaction, insight) in collaboration with INSEAD (European Institute of Administration of business)

It is defined as « the degree to which a community is ready to participate in the networked world»(Osorio, Sachs, & Kirkman, 2002), it aims to measure the degree of preparation of countries to exploit the opportunities offered by technologies information and communications by integrating the behaviors of the three main actors: households, businesses and governments. «This index takes into account 53 indicators such as: the political, social and regulatory environment of the countries, the state of infrastructure, skills, individual and professional use of new technologies» (SLIMANI-AKACEM , 2016).

3. Information Technology Production Sector Development:

- Concerning the number of industrial companies and IT service companies, software publishers and others, having a certain economic power in any country.
- The capacity of a country to develop technologies, measured by the level of application and physical infrastructure (CORNIOU , 2011).
- Contribution of a country's regulations to facilitating the use and adoption of innovative digital tools in public administrations and other sectors of activity through the relaxation of the laws in force.

IV. Use of cryptocurrencies, what impact on the development of the digital economy?

In order to resolve the problem of double spending encountered during traditional transactions,(Nakamoto, 2008)proposes a payment protocol operating thanks to the proof of work mechanism which consists of carrying out complex calculations for the addition of a new blockchain block carried out by miners (Miners are those who take care of the mining activity in the consensus of a blockchain).

Although the cryptocurrency model was designed with the aim of solving the problem of double spending, and keeping users' privacy during transactions, different researchers are still debating on their subject, and trying to better understand them and explain this phenomenon, a priori even the definition assigned is not uniform today, considered as an IT product (Degos, 2017)and (Lansky, 2018), and a system that brings together specific conditions that allows it to strengthen its cryptographic status. Listed by (DELHAYE, le bitcoin, première crypto-monnaie, 2014) as follows:

- A robust, tamper-proof account files system
- Based on a peer-to-peer system based on blockchain technology
- The addition of new blocks every 10 minutes which allow new transaction pages to be created.
- Each new block is validated by the participants in account management and their decentralized monitoring (every 10 minutes a draw is made to designate the participants who will generate the addition of the new block)

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However, the position of the federal financial market supervisory authority is clear, and defines them as a means of payment in the form of a payment token. This position is shared by the Office of Science and Technology Policy (OSTP) of the White House which considers that «the term "cryptocurrencies" refers to a digital asset, which can be a means of exchange, for which the Generation or ownership records are supported through distributed ledger technology (DLT) that relies on cryptography, such as a blockchain» (united states government, 2023).

Nevertheless, cryptocurrency is now seen as a real alternative to traditional currencies (Grinberg, 2011) and is taking up more and more space in the daily lives of individuals given the facilitations it offers: instantaneous transactions, security of transactions as well as free service. The positioning of cryptocurrency in the growth process of the digital economy varies according to the volume of consumer transactions which, according to (YERMACK, 2013), are meager given the limited number of merchants who accept them in exchanges in 2013. Its high volatility imposes significant short-term risks on users, which is why it considers Bitcoin to be a speculative investment rather than a currency.

The volume of transactions has improved significantly since 2013, cryptocurrencies have become more or less more popular in developing economies where conventional currencies are subject to strong fluctuation in exchange rates (KEMP, 2022) (Case of Turkey, after the devaluation of the local Lira, possession of the cryptocurrency increased from 10% to 18.6% in 2021 in the space of one year). According to the report by (KEMP, 2022, p. 77) the number of digital individuals owning cryptocurrencies increased by more than 37.8% in 2022 with an average of 1 internet user/10 (of working age) currently has a form of cryptocurrency. See the 2022 cryptocurrency ownership graph by country as follows:

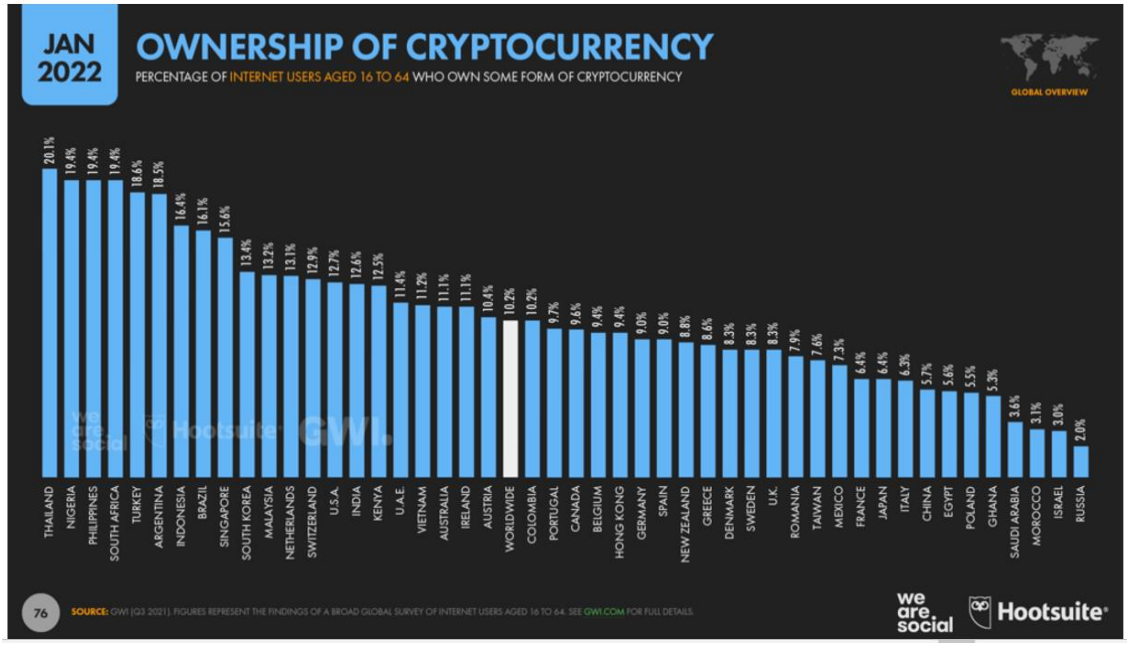

Fig 4: ownership of cryptocurrency in the word:

Source: (KEMP, 2022, p. 76)

One of the factors in the emergence of cryptocurrency transactions is the emergence of facilities promoting its circulation and facilitating transfer procedures, (HALZOUN & KARA , 2023) believe that the possession of cryptocurrencies increases thanks to, in addition basic

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characteristics linked to blockchain technology in terms of decentralization, security of exchanges thanks to cryptography, and free access to the latter allowing online payment at the lowest costs, the growth of the crypto ATM industry -currency (ATM) and TPE. The more installations there are, the more the number of ownership and use increases. Following this, several merchant sites have put themselves to the test by adopting payment by cryptocurrency on digital platforms which are essential elements of the digital economy and on which the recent evolution of electronic commerce is based, including«the global value would have reached 29 trillion dollars in 2017, which is equivalent to 36% of GDP […] and a growth of 13% compared to the year which preceded it» (Rapport des Nations Unies, 2019, p. 16). In addition to the already existing monetary instruments, the inclusion of cryptocurrencies as a monetary instrument then becomes a necessity according to (PFISTER, 2017), in the following table we have presented some of the first companies to have accepted cryptocurrencies as a means of payment:

Table n°1: The first companies to have accepted payment in crypto-currencies drawn up by us based on data collected on the website (The business news, 2023):

Companies accepting payment in cryptocurrencies	Description of use of cryptocurrencies	Date of acceptance
Microsoft	Users could purchase games and applications with digital currencies,	First accepted in 2014, and then stopped accepting BTC in 2016. Resumptedcryptocurrency payements on 2018
Home Depot:is a large hardware store chain in the United States	Opens payment to its customers in Bitcoin but requires them to be immediately converted into US dollars using the BTC/USDT conversion	
Twitch: A streaming video platform	Accepting Bitcoin payments in 2014, and added other cryptocurrencies to its acceptance list in 2020.	Started in 2014 but stopped in 2019 without explanation. Thenresumedon 2020
Whole Foods: A supermarket company	allowed customers to pay in bitcoin while converting to USD (just like home depot)	
Gyft: A gift card company	allows users to transact in Bitcoin	
Benfica: A popular sports brand	Users can purchase everything from merchandise to match tickets and pay with their digital assets	
Save the Children: is an international Non-Governmental Organization that fights for the right of children to be healthy, educated and protected	accepted donations in Bitcoin and other cryptocurrencies in 2013	On 2013
Virgin Atlantic Airways: is a British airline created by the Virgin group	accepts Bitcoin as a payment method	2014
Wikipedia	Accepts cryptocurrencies, including Bitcoin, as payment	in 2014 but no longer accepts donations in cryptocurrencies since 2022

Source: (The business news, 2023)

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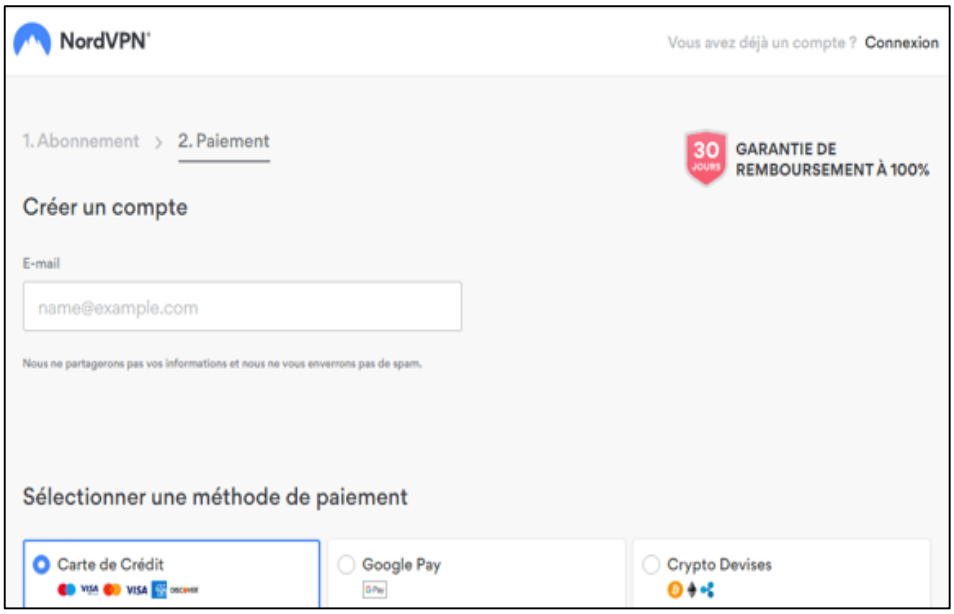
Alongside companies that offer services in return for cryptocurrencies, some online stores accept both fiat and digital currencies. The most important are: Décathlon, Séphora, Maison du Monde, Norauto, Foot Locker, Intersport, Boulanger, Cultura, Conforama, Some IT companies are rushing to offer unique services of their kind to attract more customers and stay one step ahead of their competitors, such as the company Nord VPN which allows its customers to browse the anonymity by providing them with an IP address different from the one they have.



Source:(Nowak, 2020)

A successful digital transformation strategy encourages the implementation of the necessary infrastructures and tools to simplify transactions and thus set up an automatic conversion system integrated into the different exchange platforms, the cryptocurrencies will be automatically converted into different currencies.The purchase of goods and services in exchange for cryptocurrencies opens up new perspectives in terms of transactions and promotes the expansion of digital currency.

V. Current state of development of the digital economy in Algeria:

As a developing country, Algeria is leaning towards digital technology, and is attempting to make the leap into this technological revolution, particularly in light of the changes it is undergoing as a result of a number of economic and socio-economic factors, that's why a number of studies have looked into the subject, and questioned the level of development of digital use in Algeria compared with their counterparts in developed and developing countries, (NOUAR , 2021) considers that the digitalization of Algerian companies is progressing at a snail's pace, given its ranking in relation to its counterparts in North African countries, in terms of download speeds, availability of 4G, time spent on various mobile technologies, Internet speeds, etc...

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1. Algeria's position according to "The Network Readiness Index NRI»:

Algeria ranks 100th out of the 131 economies included in the NRI 2022. According to the same report (Dutta & Lanvin, Network Readiness Index 2022: Algeria, 2022), the indicators for which Algeria scores particularly well include:

- E-commerce legislation,
- Income inequality
- Prevalence of gig economy
- Gap in use of digital payments in rural areas,
- Mobile broadband internet traffic within the country
- Domestic market size
- Government promotion of investment in emerging technologies
- Good Health and Well-Being
- Annual investment in telecommunication services

In contrast, the weakest economic indicators include:

- E-participation,
- Online access to financial accounts.
- Computer software expenditure
- Regulatory quality,

2. Algeria's openness to the use of innovative technologies:

- **Concerning the use of the Internet network and connection tools:**

The state of digital technology in Algeria is characterized first and foremost by the number of Internet users. According to the report (Kemp, 2023), there were 32.09 million Internet users in the country in early 2023, for a population of 45.26 million in January 2023. This represents an increase of 553 thousand (+1.8%), Internet users between 2022 and 2023, when the Internet penetration rate stood at 70.9%.

Figure 5: The number of social network users in Algeria:

Source: (Kemp, 2023, p. 37)

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According to the same report, Internet users in Algeria could have expected the following Internet connection speeds by early 2023:

- Median mobile Internet connection speed via cellular networks: 13.40 Mbps.
- Median fixed Internet connection speed: 11.01 Mbps.

The same report reveals that the median mobile Internet connection speeds in Algeria increased by 1.97 Mbps (+17.2%) in the twelve months to early 2023. Wired Internet connection speeds in Algeria increased by 1.23 Mbps (+12.6%) during the same period.

- **Concerning digital data and digital platforms:**

Like any other developing country, Algeria attaches great importance to scientific research in the field of innovative technologies, as can be seen from its support for young people. The General Directorate for Scientific Research and Technological Development (DGRSDT, 2023) has 20 technology platforms, 42 incubators and 404 projects with socio-economic impact.

In support of teaching and national education, "Algérie télécom" is lending its support, and launching its new digital platform providing tutoring through interactive content in accordance with the national education program called “Moalim” (Algérie Télécom , 2023) for the start of the 2023-2024 school years. Offering a multitude of services including: “J’MChallenge” and “J’Mévalue”.

“Algérie Télécom” has also taken the initiative to create its online store and inaugurates its entry into the world of electronic commerce with ‘Idoom Market’ (Algérie Télécom , 2023) accessible from Monday September 25, 2023, the store offers its customers a diverse selection of more than 100 products and solutions, divided into categories such as telephony, IT, business solutions, e-learning.

The company is planning a nationwide online payment and delivery service to guarantee even greater customer convenience.

In order to strengthen and improve the value chain of the new information and digital technologies sector, consolidate existing markets and access new markets while optimizing the services offered by trade support institutions, the national foreign trade promotion agency ALGEX (ALGEX, 2023) in collaboration with the International Trade Center (ITC) in collaboration with the Ministry of Digitization and Statistics and the Ministry of Trade and Export Promotion is launching a new project to “Strengthen the export competitiveness of the Algerian new information and digital technologies sector” financed by the International Islamic Trade Finance Corporation (ITFC) through the Aid for Trade Initiative for Arab States, the call for projects is launched in April 2023.

ALGEX was able to join the electronic platform Euromed Trade Helpdesk (Euromed Trade Helpdisk, 2017) at the end of 2022. The trade ministers of the Mediterranean region approved the Helpdesk as a pioneering tool for comprehensive regional trade intelligence. After modification and improvement, the platform provides policy makers and economic operators with better access to data for better informed business and investment decisions.

This platform is supported by the public and private sectors in all partner countries, including Algeria.

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Whereas the Big Data market in Algeria is still in the take-off phase, and the companies at the forefront of this trend are in the discovery phase, there is an awareness of the importance of Big Data and institutions in the telecommunications sector have led the process of storing and transferring large amounts of data as part of services provided to institutions, telephone companies in Algeria, characterized by intense competition between the three existing operators (Djezzy, Ooredoo and Mobilis) are expressing interest in the development of bigdata.

"Among the Big Data service providers in Algeria is the Algerian press agency, as well as Mobilis Corporation, which provides hosting services and storage through the "Solution Startup" service intended for emerging companies, in addition to "Algérie Télécom" which provides hosting services. It is free and offers to obtain disk space with a capacity of 1 GB and can reach 100 GB or more, ensuring daily backup of data (Backup), and it also guarantees updates at any time on request or according to a predetermined duration, in addition to benefiting from the security of the site against all types of attacks or malware" (kacem & Larioui , 2022).

Concerning e-commerce and electronic payment:

Following the COVID 2019 pandemic, e-commerce is experiencing a major change in Algeria; it is being developed thanks to the adoption of products integrating this technology.

As part of promoting electronic commerce in Algeria, the state has amended Law No. 18-05 of May 10, 2018 relating to electronic commerce governing all e-commerce approaches in the country, by designating the set of instructions concerning the obligations and responsibilities of all parties concerned, also governing the electronic payment method and the sanctions in the event of violation of the legislation in force.

As for electronic payment, it is strongly encouraged by the legislator, except for crypto currency, which was prohibited according to Article 117 of the 2018 finance law published on December 28, 2017 which stipulates that "The purchase, sale, use and possession of so-called virtual currency is prohibited. Virtual currency is that used by Internet users across the web. It is characterized by the absence of physical support such as coins, notes, payments by check or bank card. Any violation of this provision is punishable in accordance with the laws and regulations in force."

The transition to electronic commerce requires some modifications to administration systems, published in the official journal of the Algerian Republic n° 21, executive decree n° 18-112 of April 5, 2018 setting the model of the extract from the register of commerce delivered in electronic format which was previously non-existent, and again the State has carried out the extract from the trade register issued in electronic format, holding an electronic commerce register code "RCE" for all traders, it calls on all traders not holding the "RCE" code to request the modification of their commercial register extracts, from the branches of the national center of the territorially competent commercial register.

In the same principle, the Algerian State created, in early 2023, the first public fund dedicated to startups named Algerian Startup Fund ASF (startup.dz, 2023) (in collaboration with the Ministry of Startups and the 6 public banks) is a public venture capital company, which supports the financing of companies with the Startup label, in equity and quasi-equity. Thanks to which the leaders of new startup projects benefit from tax exemptions and many other advantages by obtaining and holding an institutional document which will serve as a passport called "the startup label" to access all the facilitations that the State makes available to startups,

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it engages in helping startups under certain conditions which includes first of all innovation: the company's business model must be based on innovative products and services.

Concerning the use of blockchain technology:

Blockchain has not yet seen the light of day in Algeria, Algerian companies and businesses are using traditional fundraising systems for businesses in need of financing, through bank loans. The opening of Algeria to blockchain innovation can generate several favorable effects for economic growth, 'The blockchain raises important questions, particularly with regard to network security. The execution of applications on the blockchain is done autonomously and automatically, no operator can intervene alone to stop its operation, blockchain represents an alternative financing opportunity for companies with promising projects facing financing problems, thanks to crowdfunding, a form of financing more independent from the banking sphere, it is a call to all via the internet aimed at obtaining financial resources. The first crowdfunding platforms were born in 2005, in England and the United States, in the areas of micro-credit and donations (AMIAR, 2022) a financing method that will be very beneficial for Algerian companies.

Recommendations

- Above all, we must prepare young internet users and provide them with digital education appropriate to their profile.
- Opening up to e-commerce to take advantage of the opportunities offered by the Internet to access larger markets and broaden the scope of action in order to develop exports.
- Regulation of economic activity linked to the use of cryptocurrencies and ensuring that they are given a certain freedom to access these products: freedom of movement, possession and transaction.
- Consider cryptocurrencies as competing products with banks, in a competitive market, all competing parties are trying to satisfy and retain customers, expand their market shares and increase their profits.
- Strengthen the digitalization of purchases in several sectors, and enable payment in cryptocurrency for better growth of the digital economy.
- In order to promote the safe use of cryptocurrencies in electronic exchanges, particularly in electronic commerce, it is preferable to implement different solutions to reduce criminal activities, strengthen the security of sites and exchange platforms, blacklist malicious addresses that attempt to act on these platforms (A study has already been launched in the USA on this subject, according to an article published by BIDEN's administration, available on the White House website (THE WHITE HOUSE, 2023), the best solution remains raising public awareness of the risks linked to the use of cryptocurrencies

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Recommendations for Algeria:

- For a better digital transformation strategy, an implementation of infrastructure and tools necessary to simplify transactions and mandatory, as well as the establishment of an automatic conversion system integrated into the different exchange platforms will be very beneficial, in particular by promoting electronic means of payment, and promoting electronic commerce without forgetting that the country must open up to new ICT technologies such as blockchain and virtual currencies.
- Create an organizational model and an administrative method adapted to the era of digitalization
- Promote the development of Big data infrastructure, and develop appropriate software
- Provide more support for fundamental research in new technologies.
- The acquisition of new technologies does not mean the success of a digital transformation, it also requires the use of digital technology and mastery of ICT. The State must still make a lot of effort to successfully transition to a solid digital economy.

CONCLUSION

Cryptocurrency plays a vital role in the revolution of digital exchanges, and those thanks to the unique characteristics that it possesses, linked firstly to their decentralized character guaranteeing a certain respect for the privacy of users since it is devoid of all central control.

Secondly, the use of cryptocurrency in economic transactions guarantees the security of exchanges by relying on cryptography which gives access only to the owners of funds on a blockchain using their own private or public key to the owners.

The transaction registers for their part are previously stored on a significant number of computers which makes the alteration of the registers very difficult but unfortunately not impossible, however the level of exposure to risks is not zero, but the central authorities can help reduce or avoid the risks.

Free access to blockchain technology, the basis of cryptocurrency, also promotes the development of the digital economy; it provides access to various financial services for unbanked users or who do not wish to go through the banking services. This technology is beneficial even for developing countries like Algeria, this opens the doors of financing to new companies wishing to finance themselves through this technique.

Finally, the use of cryptocurrency also helps to narrow economic inequalities because it offers the possibility of participating in the digital economy for any individual wishing to do so.

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