Can Crypto Currencies Challenge Sovereign Currencies? A Multidisciplinary Overview of Opportunities and Risks

Hicham Sadok[1,*] and Mohammed El Hadi El Maknouzi[2]

[1]*FSJES-Souissi, Mohammed V University of Rabat, Morocco*

[2]*College of Law, University of Al Dhaid, UAE*

Abstract: Considered as a niche phenomenon, a kind of technological folklore, which could disappear overnight, cryptocurrency has been the subject of few multidisciplinary analyses to understand how a series of numbers, supported by no power to impose its use, could constitute a currency? The review of the available literature reveals a state of knowledge scattered in the different disciplines that are interested in it. The objective of this article is to remedy this by aggregating essential historical, economic, legal and technological knowledge developed in the study and analysis of this technical-financial innovation. The aim is to examine the opportunities, challenges and risks of using cryptocurrencies as an alternative to sovereign currency, through a nuance between the optimism of those who see in cryptocurrencies liberation from the monetary constraints of States, and the hostility of those who see in these innovations a utopian monetary system or a lever of incitement to crime. A concluding discussion will expose the trend and some recommendations for supporting eventual implementation with the least criminogenic effect.

Keywords: Cryptocurrency, blockchain, sovereign currency, money issuance, risks.

INTRODUCTION

Money is a central part of everybody's life and every society and has been the greatest innovations in our history. It is currently being radically transformed in a way that has not happened in centuries. From the shells, stones, coins to virtual currencies, we now see that the concept we call money is challenged (Sadok and El Maknouzi, 2021).

Cryptocurrencies, or rather called "crypto-assets" in some references, are virtual digital assets that are based on blockchain technology through a decentralized register and an encrypted computer protocol. Its value is determined solely based on supply and demand.

Cryptocurrencies do not rely on a trusted third party, such as a central bank for a sovereign currency. As of March 2024, there are 13,217 cryptocurrencies. However, not all cryptocurrencies are active or valuable. Excluding the many "dead" cryptocurrencies, there are only about 8,985 active cryptocurrencies left and there are about 420 million users worldwide (Benazzouz and Sadok 2024). The best known are bitcoin, ripple, ether, litecoin, nem and dash. The bitcoin remains the leader among them, even if it seems to be nothing more than a bizarre little project dreamed up by an enigmatic computer programmer, disillusioned by the post-financial crisis world. More than a decade has passed and despite many skeptical opinions, this experiment has survived, enjoyed great popularity and found many followers. Cryptocurrency have not disappeared and, on the contrary, have continued their expansion and found followers all over the world. They have become a popular topic of discussion among historians, lawyers, economists, financial markets, regulators and even politicians (Laaouina *et al*., 2025).

However, it seemed impossible that a string of numbers backed by nothing and without an army could ever meet the accepted definition of a currency as a plausible medium of exchange, store of value, or unit of account. Mainstream Economists have hesitated to define cryptocurrency as a currency because its price is too volatile and you cannot convert it easily into a goods and services.

This article examines the challenges of using cryptocurrencies as an alternative to sovereign currency. Most discussions about cryptocurrencies focus on existing laws and regulations, their purported economic benefits, financial risks, and technological design issues. Few articles focus on how these elements can be aggregated to discuss the potential overthrow of sovereign currencies by new technological and financial innovations. This article engages in this multidisciplinary analysis.

In this analysis, we tried to find a nuance between the optimism of those who see in cryptocurrencies a liberation from the monetary constraints of States, and the skepticism, even hostility, of those who see in these innovations a utopian monetary system or a means of

*Address correspondence to this author at the FSJES-Souissi, Mohammed V University of Rabat, Morocco; E-mail: h.sadok@um5r.ac.ma

E-ISSN: 1929-4409/25

laundering money. Any creation in its early stages is, of course, imperfect, but over time, the flaws, limitations and risks will be gradually overcome. But it seems certain that the idea of decentralization and disintermediation that cryptocurrencies draw within monetary transactions is a need buried in users that is just waiting for a trigger. Victor Hugo said "*Nothing can stop an idea whose time has come*".

Thus, and in order to proceed with this analysis through interrelated multidisciplinary issues, this article begins with a discussion on the monetary status of cryptocurrencies in relation to sovereign currencies to examine, subsequently, whether cryptocurrencies meet all the criteria to deserve the qualification of currency. Then, the analysis focuses on the regulatory approach to cryptocurrencies in the main jurisdictions before being able to expose the opportunities, advantages and disadvantages of cryptocurrencies. A concluding discussion will allow at the end of this article to outline the trend and some recommendations.

PRIVATE CURRENCIES VERSUS SOVEREIGN CURRENCIES

Private money is a liability issued by a private commercial entity, such as a financial institution, private bank or other that is accepted as a means of payment by other economic agents. Proponents of digital currencies believe that a combination of ubiquitous smartphones, innovative cryptography and vast computing power means it is possible to remake the financial and monetary system (El Maknouzi et Sadok, 2021).

The future of money, in other words, is attracting attention. Brzezinski *et al.* (2024) urge researcher to pay close attention to money's long history. It is capable of "delightful surprise", they point out. It also contains some parallels to the supposed novelties of today. In modern economic history, private money was quite popular between the late 18th and early 20th centuries, particularly in parts of the British Empire and the United States. The issue of private money was associated with the era of free banking, when banks were subject to no or relatively light regulation and were allowed to issue notes as a means of payment for the general public.

Several factors contributed to the development of private money in the past, particularly in the early industrial era. First, it was necessary to finance bankrupt governments in times of war, as well as to meet the rapid increase in demand for credit that could not be met by traditional means of payment such as the minting of gold or silver coins. Second, the dominant school of free market economics largely supported banking freedom and the issuance of private money; Adam Smith was one of their advocates. Third, in some cases there was no political consensus to establish a centralized monetary authority and banking regulation. This was particularly true in the United States in 1836 after the expiration of the mandate of the Second Bank of the United States as the federal central bank.

However, since the mid-19th century, the opposite trend has begun. Countries have created central banks one after another. They have gradually granted them regulatory power over private commercial banks, the role of lender of last resort and the central monetary authority with the dominant, if not exclusive, right to issue sovereign currencies. The era of private money and free banking[1] was closed to make its new eruption at the beginning of this millennium with the emergence of digital and blockchain technologies. But even before this technological dictate, in the 1970s, with the resurgence of inflation following the first and second oil shocks, the idea of a free banking system and a private currency was again raised by Friedrich August von Hayek (Hayek, 1990) and his followers. But in the absence of concrete technological propulsion and widespread communication, the idea of private currencies did not attract greater interest as a challenge to sovereign currencies. This lack of interest is mainly due to the weakness of the network that could strengthen the issuance of private currency, which seems to be the case, years later, for cryptocurrency, more particularly for the case of bitcoin (Sadok, 2023). The externality of the network means that if a currency is widely accepted by other economic agents in a given market it would have a better chance of fulfilling the functions of sovereign currency. This allows the creation of a sufficiently deep and liquid financial market for users. Unfortunately, this was not possible in an environment where several private currencies circulated in parallel and competed with each other. The multiplicity of private currencies meant higher transaction costs for all economic agents in a given territory, which not only increased transaction costs, but also initiated a cycle of distrust that could turn into a

[1]The bank Charter Act of 1844, which gave the bank of England nearly full control over issuing banknotes in the UK, and the US National Banking Act of 1863(similar content but without establishing the central bank, which happened only in 1913).

recession. This consequence played a role in the prohibition of the issuance of private currencies. Sovereign currencies, on the other hand, eliminated this multiplicity and helped create single internal markets for goods and services with centralized monetary jurisdictions. This constituted a significant network externality for all economic agents using the same currency.

Beyond the constraint of network externalities that private currencies encounter in relation to sovereign currency, there is another major problem, namely the information asymmetry inherent in the financial intermediation of private currencies[2]. This risk lies in the possibility of the issuer of private currencies making decisions against the holders of this currency, or even a risk of intentional abuse for devaluation or a drop in value. However, this shortcoming of private currencies is not necessarily exclusive to them. Sovereign currencies have also had a similar attitude throughout history. As they recall Brzezinski *et al.* (2024), the king's council in France in the 1720s decided – what you might call an Inflation Reduction Act-, without warning, that coins would be worth less than before. From 1723 to 1724, it cut their value by 45%. The policy resembles the kind of thought experiment beloved of economic theorists. David Hume, for example, once imagined what would happen if £5 was "slipt" into the pockets of every man in Britain, doubling the money in the kingdom. Would this miracle make everyone twice as rich? He assumed that it would only increase the price of everything without further consequences.

Moreover, contrary to Hayek (1990) arguments, free competition in the issuance of private currencies does not always lead to the selection of the best money suppliers. Thus, the need to address the problem of information asymmetry and adverse selection serves as the main argument in favor of government monopoly on the issuance of sovereign currency. This monopoly serves as a stabilization mechanism through monetary policy rules such as inflation targeting (Eichengreen, 2008), which does not, however, prevent abuses by monopolies in the exclusive issuance of this sovereign currency (Reinhart et Rogoff, 2011). In addition to devaluation policies, these abuses are widely perceptible in some developing countries that restrict financial exchanges of their residents with the rest of the world. Transactions of the latter with non-residents often require the use of currencies other than the sovereign currency, which the legislation only authorizes under constraints. This lack of freedom in the convertibility of currencies is another argument for defenders of cryptocurrency in order to free holders of sovereign currency in their transactional decisions.

To a modern observer, it seems strange to allow sovereign money to become hostage to regulation at the expense of freedom of circulation and trade. Already in the 18th century, some visionaries believed that money should break its link with regulation, as is the case with metals. The most striking example is that of John Lowe, a Scottish banker and chancer who succeeded in persuading France to reform its monetary system in 1716.

Law was ahead of his time- his experiment with fiat money ended in disaster and inflation. In the future, money could change form. It could lose all physical form, with coins and notes becoming obsolete; the bank deposit could be replaced by a claim on the monetary authority itself through the Central Bank Digital Currency (CBDC). But some economists argue that such a transition also carries risks, facilitating bank runs or even shortages of physical currency (Mahboub et Sadok, 2024b). While the forms that money takes may be new, their effects will rarely be neutral. And as Brzezinski *et al.* (2024) point out, it is less costly to learn from past mistakes than to make instructive mistakes in the present.

IS VIRTUAL CURRENCY A REAL CURRENCY?

Virtual currencies, perhaps most notably bitcoin, have captured the imagination of some, struck fear among others, and confused the heck out of many of us. Until 2013, the cryptocurrency lived in the realm of coding enthusiasts and criminals. In addition to the nefarious reputation, the speculative activity earned cryptocurrency the label of Ponzi scheme and Tulipmania 2.0.While cryptocurrency have seen increased attention from regulators, law enforcement, investors and entrepreneurs in recent years, there are still many unanswered questions and unresolved issues.

One of the first characteristics of cryptocurrency is that they represent a peer-to-peer network, a sophisticated computer language that allows wealth to be transferred to anyone, anywhere, instantly, securely

[2]Information asymmetry refers to the informational advantage that the financial services provider may have over its customers, and the latter's inability to fully assess the quality of the service provided.

and above all without a trusted intermediary. The concept behind this financial innovation is as old as commerce itself: it works quickly and eliminates the cost of intermediaries to offer cheaper goods or services (Mahboub and Sadok, 2023). Cryptocurrency can be described as digital money that allows money to be sent and received over the Internet without the help of a third party. The transaction is validated by the community of miners responsible for verifying that the transaction is not counterfeit in exchange for fees and newly created VC units. At the heart of cryptocurrency is a global ledger, or balance sheet, called block chain. This global ledger records every transaction and this block contains a reference to the previous file and the security of cryptocurrency depends on the process of linking all transactions. The act of mining involves using powerful computers to solve a complex mathematical equation. Obviously, the financial incentive has attracted an abundance of miners, much like gold did in the 18th century. The cost of fees is hard to estimate due to a lack of reliable data, but evidence announced by Europeen Banking Authority (EBA) suggest that the reward given to miner tend to be less than 1% of the transactions amount, compared to 2-4% traditional online payment systems[3].

Another important feature of cryptocurrency is the greater degree of anonymity of transactions compared to traditional banking services. Although all transactions are recorded in a public ledger, they are linked to electronic addresses, not private or legal persons. Like some of us, cryptocurrency have a public persona and private persona. The public persona is known as an address, while the private persona is called the private key which is a secret piece of data that is protected by cryptographic algorithms[4]. Bitcoin for example employs two cryptographic schemes: digital signatures and cryptographic hash functions. Digital signatures ensure that the recipient can verify that the message came from a particular sender, who cannot deny sending a message, and finally the message has not been tampered with. Cryptographic hash functions enforce discipline in writing transaction records in the public ledgers. As long as the owner/user of a particular electronic number is not disclosed, the transaction remains anonymous.

However, attempts to develop cryptocurrency and the methodologies used to exchange them are not recent but have existed for several decades. This evolution is no different from that of the founders of American Express, Henry Wells and William Fargo, who created a banking services company in 1852, or that of Adrian Ashfield who invented the basic idea of a card combining the key and the identity of the user in February 1962, then that of automatic teller machines (ATM). In the 1990s, the attempt to create an electronic payment card by NatWest Mondex was seen at the time as an alternative to coins and banknotes. As were the initiatives of David Chaum[5] through the creation of Digi CashInc specialized in electronic banking. The regulatory community has since started to think about this subject. Already in September 1996, the United States Department of the Treasury held a conference entitled "Toward Electronic Money and Banking: The Role of Government" which explored this issue without success.

Nowadays, different aspects of our environment increase the possibilities of success in launching and developing cryptocurrency: the libertarian ideology that some attach to the concept and developments on the fringes of guardianships and authorities; the growing desire for confidentiality; a growing interest in having an international currency free from financial and exchange constraints; consumers are increasingly accustomed to making immaterial transactions and computer systems are increasingly egronomic, accessible and secure. Except that to qualify as money, cryptocurrencies must traditionally meet the usual conditions described in the economic literature, first by Jevons (1875), and which later became dogma. Money must fulfill three basic functions:

1. Instrument of exchange: Money is a means of payment that can be exchanged for goods and services. In a barter system, goods and services are exchanged for other goods and services. Money therefore has an immediate “liberating” power;

2. Unit of account: money is used to establish the price of goods and services, that is, to measure their value using a defined and commonly recognized unit, which is guaranteed by the

[3]https://eba.europa.eu/eba-consults-on-draft-technical-standards-on-supervisory-disclosure.

[4]Cryptography has been used since antiquity to secure information; but in Cryptocurrency case, it serves to create and control the supply of units of currency.

[5]Widely recognized as the inventor of digital cash, David Chaum is currently leading Elixxir and Praxxis to provide scalable digital sovereignty. He is also known for other fundamental innovations in cryptography, including privacy technology and secure election systems.

central bank and which makes values immediately comparable with each other;

3. Store of value: Money is an asset that can be saved for later use. Other financial assets can be used for this purpose, but have no liberating power.

The question of whether cryptocurrency share the characteristics of full-fledged money remains, in this regard, very controversial. Sodeberg (2018), the Bank of Canada (2014), the Bank of England (2014), and Yermack (2015) argue, among others, that cryptocurrency do not satisfy the traditional definition of money discussed in the literature. In their opinions cryptocurrency have no intrinsic value in the sense that they are not linked to any underlying commodity or sovereign currency or entity. Furthermore, as a store of value, cryptocurrencies have too volatile a value with a risk of total loss of value that should not be overlooked, unlike sovereign currency which is backed by the legal protection of the issuing State. But perhaps we are too attached to the conventional definition of a currency as a means of exchange, store of value and unit of account, but this argument misses a larger opportunity, often experienced during technological revolutions. Ultimately, fiat money and crypto currencies are only valid as money if their acceptance is widespread or required. It is the condition of acceptance that ultimately weighs in the legitimacy of a currency. If the definition of crypto currencies as money is controversial, we must keep in mind that in the air of digital transformation that we are experiencing, any message or posting on a system can gain value if it is accepted by users through "retweets" or "likes". If the network accepts that this message has value, then it is accepted and allowed to be transferred. The same concept occurs with cryptocurrency, so we cannot exclude the possibility that the number of users and transactions will increase to the point where cryptocurrency have the potential to serve as a full-fledged means of payment (Sadok, Mahboub, *et al*. 2023), internationally and free from any controlling authority.

By considering cryptocurrency as an accepted means of payment, they can force their admission as a technological currency, especially since they are reliable, safe and efficient. The strength of cryptocurrency lies in the security of their database which is distributed across an infinite number of computers. If hackers manage to find a way to access some computers, no attack can paralyze the entire blockchain hosted on all the computers adhering to the blockchain system. They are economical and fast because they remove the intermediary, in this case the banker who needs time, paperwork and tasks to verify, withdraw, clear and deliver, and all along this path, many friction points generate transaction fees. In short, this redefines the role of the intermediary in the financial services sector, just as emails allowed messages to be exchanged and replaced letters with faster, safer and more economical communication. Cryptocurrency can make this same role monopolized by sovereign currency prevail, and from this fact, some proponents believe that cryptocurrency may prove particularly interesting for populations in developing countries with limited access to financial systems (Sadok *et al*., 2023).

Beyond a currency, there is also another way to think about cryptocurrency as an efficient solution to everyday problems. The next generation of cryptocurrency involves smart contracts without a central authority. All information is stored on the blockchain and enforced through the verification process of mining. Miners do not operate on the contract; they simply verify that the parties agree and process the contractual transaction without going through an authority or intermediary. Cryptocurrency become the decentralized and trustless executor of the smart contract, again generating more reliability, security, and savings in transaction costs. So the potential uses of cryptocurrency are endless. Applications are being developed to disrupt the legal profession, financial markets, banking, contractual relationships and even voting. So, given these facts, how do regulators approach this innovation?

REGULATORY APPROACH TO CRYPTO-CURRENCY IN MAJOR FINANCIAL JURISDICTIONS

Cryptocurrency regulation is not only a controversial topic. It can be downright provocative for cryptocurrency purists. As a relatively recent innovation, it is increasingly attracting the attention of financial regulators who are increasingly going beyond their expectations. Law enforcement, tax authorities, and financial market regulators have all expressed interest in defining the rules for cryptocurrency. Countries have different attitudes toward cryptocurrency. Depending on the geographic location, regulation ranges from outright bans to laissez-faire approaches. The Internal Revenue Service in the USA has assigned cryptocurrency as barter on the grounds. Finland considers its as priced commodity. Germany

has recognized it as private currency. Iceland, China, Vietnams bans them[6]; while others countries, like Switzerland, are trying to attract cryptocurrency scheme investors and operators. Some others, like Venezuela, plan to issue their own national cryptocurrency based on blockchain technology "the petro", which was widely interpreted as an attempt to circumvent the economic sanctions imposed by the USA. In most countries, especially in major jurisdictions, authorities have adopted the "wait and see" attitude, while closely monitoring developments in cryptocurrency markets. Many financial authorities like Singapore, UK, US, Poland, Morocco and the European Banking Authority have issued formal warnings to the general public, advising of the dangers of involvement in cryptocurrency.

However, there should be no illusions: even the strictest regulations and bans cannot completely eliminate the use of crypto currencies as a means of payment in private transactions, especially cross-border ones, or as a store of value. This is the main reason why many representatives of monetary and financial authorities and international financial organizations emphasize the need for supervision and regulation. In this perspective, two most influential countries on cryptocurrency regulation are China and the United States. In the United States, the Financial Crimes Enforcement Network of the US department of Treasury (FinCEN) does not recognize cryptocurrency as a real currency, but recognizes the administrators and exchangers of cryptocurrency that are convertible into sovereign currencies as "money services businesses" (MSB), which means that they are subject to FinCEN's registration, reporting, and record keeping regulations for MBSs. At the G20 meeting in Argentina in March 2018, central bank governors and finance ministers agreed to monitor cryptocurrency closely. Mark Carney, then Chair of the Financial Stability Board (FSB) and Governor of the Bank of England, wrote in a letter to the G20 that, given their limited use, the FSB's initial assessment is that crypto assets do not pose risks to global financial stability at this time.

Regulators and governments in the European Union and the United States have undertaken regulatory work on cryptocurrency. The EU Regulation on markets in cryptocurrency (MiCA) represents a major step forward in the regulation of crypto-assets in the European Union. This legislation was adopted to protect holders of these assets, ensure financial stability and support innovation in the blockchain ecosystem. MiCA aims to create a harmonised framework for cryptocurrency in the EU, ensuring consumer protection while providing some freedom for crypto businesses.

However, public authorities seem to be more decisive when it comes to the taxation of cryptocurrency. In the United States, the Internal Revenue Service has issued guidance on the tax treatment of cryptocurrency. Indeed, these guidelines treat cryptocurrency as property, like stocks, rather than as a currency. Similarly, in several countries such as Sweden, Singapore, Australia, Germany, Israel, Norway, and Poland, cryptocurrency are recognized by tax authorities as a form of financial asset or property. Therefore, tax authorities require the payment of capital gains tax on profits made on VC transactions (Mahboub and Sadok, 2024a).

It can therefore be expected that, given the time needed to learn and understand the new phenomenon and its potential economic and legal consequences, all major jurisdictions will attempt to regulate the use of cryptocurrency. But given their immaterial, free and internationalized nature, efforts to regulate cryptocurrency financially must be harmonized. Except that, as history teaches us, cross-border harmonization of financial and tax regulations and cooperation of financial regulatory authorities are never perfect, this will leave room for cross-border arbitrages of use in light of legislation and legal constraints. Furthermore, financial regulations always lag behind financial innovations (Dabrowski, 2017), while cryptocurrency are new inventions with a great potential for further technological development. Therefore, financial supervisory or monetary authorities will not be able to regulate in advance all new potential variants of cryptocurrency which may appear. Ideally, regulations should be flexible enough to encourage cryptocurrency players to voluntarily comply with regulation. The proposed cryptocurrency laws proposed by the New York State Department of Finance, called BitLicense, could provide a buffer of legitimacy that operators seek. Moreover, critics of the regulation will likely point to the risk of increased costs and may seem anathema to libertarians, those who subscribe to the purest form of the concept of open source creation free from guardianship.

[6]These bans seem more about the international capital flows than banning technology. Auroracoin is a legal virtual currency in Iceland because it is specified to be used only in Iceland.

The open-source nature of cryptocurrency provides a built-in self-regulation mechanism, but this mechanism does not protect against human greed. For cryptocurrency to thrive, they need a set of rules that allow for continued monetary innovation while protecting users. Well-enforced regulation can not only expand the user base, but also lend credibility to digital currencies.

Without risking guessing the unpredictable future, we cannot however expect that in the short term cryptocurrency will play the role of a generalized means of payment accepted by the general public, which does not prevent us from preparing the legal bases of good practices. If, as Victor Hugo said "*No army can resist the force of an idea whose time has come*", we must therefore prepare for cryptocurrency to remain an element of the global monetary and financial architecture. But is this revolution that is being prepared really something new? As we have shown above, despite their technological originality, if cryptocurrencies are not simply a contemporary form of private money, what contributions do they bring?

THE POTENTIAL OPPORTUNITIES AND CHALLENGES OF CRYPTOCURRENCY

An important feature of cryptocurrency transactions is that cryptocurrency units are sent directly from one place in the electronic system to another, without the intervention of an intermediary. The three pillars on which cryptocurrency are based are blockchain, private keys, and mining. Blockchain is the record of all transactions, private keys are the security system, and mining is the process of verifying transactions. Cryptocurrency units are usually stored in electronic ledgers that have unique public identifiers in the form of an unreadable string of letters and numbers. This alphanumeric is unique and all cryptocurrency transactions are usually recorded chronologically in a decentralized public ledger, called blockchain (Badev and Chen, 2014)

Another supposed advantage of cryptocurrency is that transactions are cheaper and faster than traditional bank transactions in sovereign currencies. In 2014 already, 30,000 merchants accepted cryptocurrency with the same ease as credit cards. According to coinmap.org, over 15,000 businesses worldwide currently accept bitcoin or offer bitcoin ATMs (Sadok *et al*., 2023). This indicates that bitcoin is becoming more mainstream and businesses are recognizing its importance as a payment option.

Cryptocurrency adoption is on the rise globally, with over 420 million cryptocurrency users worldwide and an average global cryptocurrency ownership rate of 4.2% projected for 2024. Cryptocurrency adoption is happening at a rapid pace, with more and more people around the world using them as a means of payment for goods and services. According to Statista[7], by 2023, virtual currency wallets accounted for about half of global e-commerce payment transactions, making digital wallets by far the most popular online payment method in the world. This figure is expected to grow by 14.9% between 2023 and 2027. Credit cards rank second with a 22% market share in 2023(Mahboub and Sadok, 2024c)

On the BitPay website, there is a handy calculator that determines how much money a merchant can save by using cryptocurrency with the same ease as credit cards. A typical merchant processing $100,000 in payments each month might pay $3,255 in credit card processing fees. The same merchant accepting cryptocurrency pays only $300 to act as a virtual currency processor, which translates into savings of nearly $3,000 per month. The merchant could increase their profit margin by 3%, or they could use the savings to lower their service prices, creating a competitive advantage. Additionally, this payment system is described as near-instant and validated 24/7, whereas traditional payment systems typically experience delays and do not work during holidays and weekends.

Another potential benefit of cryptocurrency is greater financial inclusion; this means extending basic financial accessibility rights to all to access and participate in essential financial networks and services in order to increase everyone’s productivity. This requires access to formal financial services for 2 billion people underbanked and also for a lot of micro, small and medium enterprises (MSMEs). Before the advent of cryptocurrencies, financing was the prerogative of the discriminatory banking system. It conditions financing by the principle of solvency which consists of financing only those who already have stable income, guarantees, mortgages and securities. These conditions discriminate against those who are not endowed despite the potential of their projects and the energies likely to be deployed to catch up with the privileged.

[7]https://www.statista.com/statistics/1111233/payment-method-usage-transaction-volume-share-worldwide/

In addition to their potential benefits, cryptocurrencies have many drawbacks and create many potential risks for users, traders, governments, financial market regulators, and financial stability in general. Cryptocurrencies are in the early stages of development, and as with any new technology, the landscape is changing rapidly and both good and bad actors can emerge overnight. Due to a lack of prudential regulation, the EBA (Europeen Banking Authority) identified 70 potential risks associated with cryptocurrencies[8]. They may mainly be subject to intentional fraud, misconduct or hacking, as well as significant and unexpected fluctuation in the exchange rate. Although this is not a unique feature of cryptocurrencies and there are many historical episodes of extreme volatility in sovereign currency exchange rates, the intensity (probability and magnitude) of this risk appears to be more profound in the case of cryptocurrencies, especially compared to major sovereign currencies. Exchange rate fluctuations can vary by more than 20% per day and can be the result of involvement in a Ponzi scheme or the creation of a price bubble. To this end, and to explain this volatility, there are two main drivers: speculators and miners. Since miners have to pay high electricity bills, they are constantly selling and converting cryptocurrencies into fiat currency.

As mentioned above, one of the main advantages of cryptocurrencies is increased anonymity. But from this perspective, cryptocurrencies seem to help hide the identity of private and legal persons making transactions. This feature of cryptocurrencies can be exploited by those involved in illegal and criminal activities. Foley *et al* (2018) estimated that about a quarter of Bitcoin users and half of transactions are associated with illegal activities and may be subject to hacking. In 2022, cryptocurrency hacks resulted in the theft of a total of $3.8 billion across multiple exchanges, up from $3.3 billion in 2021 (Chen *et al.*, 2023). The most infamous cryptocurrency hacks are those of FTX, Binance, Coincheck, Poly Network, Mt. Gox and Bitmart.

So, the main legal issues of a cryptocurrency: (1) risk of loss; (2) protection against counterfeiting; (3) privacy and data retention; (4) anti-money laundering; and (5) consumer protection.

1) Risk of loss which includes at least three risks: transferring funds by mistake to the wrong person; fraud risk, including fraudulent transfer of funds to the wrong person; and credit risk, including the risk that the “receiving person” receives payment before providing the corresponding service (Nobanee *et al*., 2024).

2) Counterfeiting protection is defined as “*the reproduction or manufacture of a financial instrument […] with the intent to defraud an individual, entity, or government*.” Traditionally, the risk of currency counterfeiting is the illicit production of physical representations of sovereign currency, such as the unauthorized reproduction of U.S. bank notes. When it comes to cryptocurrencies, there are two possible ways to counterfeit them, although both can also be classified as fraud: double spending and unverified account transfers. A double spend can occur when a payer uses the same cryptocurrency in one account to make two purchases before the transactions are cleared in the payment system. Unverified account transfers can occur when a payee forces the cryptocurrency wallet company to credit money from a phantom account, which only appears to exist, to the payee’s account, and then quickly withdraws the cryptocurrency from one wallet to another. These counterfeiting risks should be comparable to the counterfeiting risks of current electronic banking services.

3) Privacy and data retention: while cryptocurrencies rely on blockchain technology to store and distribute data, these data is accessible to anyone in the world. Anyone who makes a transaction, participates in the block validation process, can obtain a copy of the blockchain. In practice, several types of blockchain coexist, implementing different levels of authorization for different categories of participants. The General Data Protection Regulation (GDPR), which governs data processing equally throughout the European Union (EU), uses the following classification : Public blockchain are accessible to anyone in the world. Anyone can make a transaction, participate in the block validation process, or obtain a copy of the blockchain; Permissioned blockchain have rules defining which people can participate in the approval process or even make transactions. They can, depending on the case,

[8]https://eba.europa.eu/eba-consults-on-draft-technical-standards-on-supervisory-disclosure.

be accessible to everyone or have limited access; "private" blockchain are under the control of an actor who alone ensures control of participation and validation (Benkhayat *et al*., 2015). According to some experts, these uses do not respect the classic properties of the Blockchain, in particular decentralization and distributed validation. In any case, they do not pose any particular question of compliance with the GDPR, they are simple "classic" distributed databases.

4) The cryptocurrency sector, due to its innovative nature and rapid pace of change, presents unique regulatory and compliance challenges. These challenges are exacerbated by the relative anonymity offered by some cryptocurrencies and the complexity of transnational transactions, making anti-money laundering particularly difficult.

One of the main challenges is the anonymity and transnationality of cryptocurrency transactions. Unlike traditional financial systems where transactions can be traced and parties identified through identity verification (KYC) mechanisms, cryptocurrencies often allow anonymous or pseudonymous transfers of value across borders without centralized control (El Alami *et al*., 2015). This creates an opportunity for malicious actors to exploit these assets for money laundering and terrorist financing purposes.

Recent incidents highlight the need for enhanced regulation. For example, cryptocurrency exchange Binance was fined $4.3 billion “deliberately high” for violating the U.S. Bank Secrecy Act, among other violations (IDnow). These cases highlight the risks associated with a lack of adequate controls and the need for cryptocurrency exchanges to adopt robust compliance measures.

The European Union has taken significant steps to regulate the cryptocurrency sector and strengthen the fight against money laundering and terrorist financing. At the heart of these efforts is the Fifth Anti-Money Laundering Directive (5AMLD), which represents a turning point in the regulation of cryptocurrencies within the EU.

The 5AMLD, adopted in July 2018, imposes customer due diligence obligations on providers offering cryptocurrency services, similar to those of traditional financial institutions. This includes identifying and verifying the identity of their customers, monitoring transactions and reporting suspicious transactions to the competent authorities. This directive was transposed into French law by the PACTE law of 22 May 2019 and the ordinance of 12 February 2020.

Finally, in line with these texts, the MiCA (Markets in Crypto-Assets) regulation, which aims to regulate crypto-asset markets in the European Union, came into force on June 29, 2023. The MiCA regulation complements the aforementioned anti-money laundering directive by providing a specific regulatory framework for crypto-assets.

Currently, cryptocurrency users are not covered by consumer protection rules and are often poorly informed about the risks, which can cause them to lose money. The new 2024 EU cryptocurrency legislative package voted in the European Parliament introduces better consumer protection. However, further action is needed to offset the risks of this rapidly developing market. Furthermore, from an ecological perspective, the heavy carbon footprint of cryptocurrencies remains a concern. They consume as much energy as all electric cars combined. In 2021, bitcoin mining alone emitted 41 megatons of CO2 into the atmosphere, or 0.08% of the planet’s emissions. That may not seem like much compared to other sectors, but the growing interest in cryptocurrencies has raised fears that emissions could skyrocket (Papp *et al*, 2023). Furthermore, a study conducted by Selectra[9] estimates that a single transaction is equivalent to 168.9 tonnes of CO2. To better visualize the scale of this figure, it is equivalent to 90 flights from Paris to New York.

CONCLUSION AND DISCUSSION

Despite all the speculations about the prospects of the crowding out of sovereign money by private currencies such as cryptocurrencies, the available statistics do not confirm such a trend. On the contrary, since the beginning of the global financial crisis in 2008, a rapid increase in the share of sovereign money by all other forms of money can be observed in the major currency areas (Dabrowski, 2018). Other analyses such as those of Jobst and Stix (2017), Gros (2017) also confirm a growing demand for the use of liquidity, the main prerogative of central banks.

[9]https://greenly.earth/fr-fr/blog/actualites-ecologie/cryptomonnaie-et-pollution-ce-qu-il-faut-savoir

More than a decade after their creation, and despite their acceptance by some digital platforms and their high market value, their role remains marginal. In April 2024, the total market capitalization of all cryptocurrencies was around $330 billion, while the money supply (M3) in the United States was only approaching $1.6 trillion at the end of 2023, while those issued by the European Central Bank represented $1.2 trillion. The differences in the number of transactions are even more striking in favor of sovereign currencies.

The monetary power of major central banks and major currencies therefore does not seem to be challenged in the near future. However, the outlook could be different in smaller monetary jurisdictions, particularly in countries where the sovereign currency remains inconvertible or does not enjoy the confidence of economic agents. The lack of monetary stability of the sovereign currencies of these countries, as well as political and economic uncertainty, convertibility constraints and restrictions on freedom of movement and trade, make these currencies vulnerable to the phenomenon of substitution and liberation promised by cryptocurrencies. They could offer another avenue of monetary substitution to economic agents seeking freedom, convertibility and global acceptability; characteristics that their sovereign currencies cannot offer.

Nevertheless, the seeds of a decentralized monetary system and peer-to-peer networks are beginning to germinate, which should soon change monetary policy. Financial globalization and the increasing sophistication of financial services facilitate increased competition between currencies (Hayek, 1990). If a given country suffers from macroeconomic or political instability and uncertainty, or both, there are strong incentives to abandon its sovereign currency and seek refuge in other intangible monetary alternatives that are easily accessible on the Internet. The legal monopoly of sovereign currencies in individual countries is fundamentally incompatible with a free society. There is therefore no doubt that the current system must eventually change to avoid its failure under the weight of its internal inconsistencies, but also at the international level in view of the emergence of Global South, and the challenge to the hegemony of the US dollar and the euro as the main currencies of exchange and reserve.

Policymakers and regulators should neither ignore cryptocurrencies nor attempt to ban them. Both extreme approaches are overblown. It is difficult to assess the chances that cryptocurrencies will be adopted by the general public as a depoliticized and free monetary system. This would require profound ideological changes, and it is not excluded that future advances in information technology could bring more attractive variants of cryptocurrencies that address all current risks, and that can compete effectively with sovereign currencies. As Winston Churchill said "*If you don't take change by the hand, it will take you by the throat*"

FUNDING

The authors received no direct funding for this research.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

REFERENCES

Bank of Canada. 2014. Briefing on Digital Currencies. Remarks by Grahame Johnson and Lukasz Pomorski Funds Management and Banking Bank of Canada Senate of Canada Ottawa, Ontario. Available at https://www.bankofcanada.ca/wp-content/uploads/2014/04/Senate_statement.pdf.

Bank of England. 2014. Innovations in payment technologies and the emergence of digital currencies. Quarterly Bulletin, Vol 54, No 3, 2014 Q3.

Badev, Anton I., and Matthew Chen. 2014. Bitcoin: Technical Background and Data Analysis. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2544331

Benazzouz, Safa, and Hicham Sadok. 2024. Financement de la R&D par l'industrie et production des brevets dans trois pays MENA. *Maghreb - Machrek* N° 256(4):31-48. https://doi.org/10.3917/machr.256.0031

Benkhayat, Aouatif, Abdellah El Manouar, and Hicham Sadok. 2015. Firm business strategy and IT strategy alignment: A proposal of a new model. P. 172-78 in *2015 Xth International Scientific and Technical Conference « Computer Sciences and Information Technologies » (CSIT)*. Lviv, Ukraine: IEEE. https://doi.org/10.1109/STC-CSIT.2015.7325460

Brzezinski, Adam, Nuno Pedro G. Palma, and Francois R. Velde. 2024. Understanding Money Using Historical Evidence. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4788004

Chen, Yu-Lun, Ting, Yung, Yang Chang, J, Jimmy. 2023. Cryptocurrency hacking incidents and the price dynamics of Bitcoin spot and futures, Finance Research Letters, Volume 55, Part B. https://doi.org/10.1016/j.frl.2023.103955

Dabrowski, Marek. 2017. Potential Impact of Financial Innovation on Monetary Policy. https://doi.org/10.2139/ssrn.3009307

Dabrowski, Marek. 2018. Economic Recovery and Inflation. IN-DEPTH ANALYSIS. https://doi.org/10.2139/ssrn.3168510

Eichengreen, Barry J. 2008. *Globalizing capital: a history of the international monetary system*. 2nd ed. Princeton: Princeton University Press. https://doi.org/10.2307/j.ctt7pfmc

El Alami, Abdelhamid, Hicham Sadok, and Naima Elhaoud. 2015. Cloud computing & the organizational performance different approach of assessment. P. 1-5 in *2015 International Conference on Cloud Technologies and Applications (CloudTech)*. Marrakech, Morocco: IEEE. https://doi.org/10.1109/CloudTech.2015.7337007

El Maknouzi, Mohammed El Hadi, and Hicham Sadok. 2021. Regulation of Virtual Currencies in the United Arab Emirates: Accounting for the Emerging Public/Private Distinction. *Development Studies Research* 8(1):346-55. https://doi.org/10.1080/21665095.2021.1980413

Foley, Sean, Jonathan R. Karlsen, and TTlis J. Putniii. 2018. Sex, Drugs, and Bitcoin: How Much Illegal Activity Is Financed Through Cryptocurrencies? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3102645

Hayek, Friedrich A. von. 1990. *Denationalisation of Money: The Argument Refined ; an Analysis of the Theory and Practice of Concurrent Currencies*. 3. ed. London: Institute of Economic Affairs.

Laaouina, Soukaina, Mimoun Benali, Abdelhamid El Bouhadi, and Hicham Sadok. 2025. Modeling Funding Decision of Industrial Projects Using Boosting Machine Learning Algorithms. P. 17-29 in *Digital Economy. Emerging Technologies and Business Innovation*. Vol. 531, *Lecture Notes in Business Information Processing*, édité par M. A. Bach Tobji, R. Jallouli, H. Sadok, K. Lajfari, D. Mafamane, et H. Mahboub. Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-76368-7_2

Mahboub, Houda and Hicham Sadok. 2023. Contribution to a Better Digital Transformation Implementation: An Integrative Approach. in *Frontiers in Artificial Intelligence and Applications*, édité par J.-L. Kim. IOS Press. https://doi.org/10.3233/FAIA230773

Mahboub, Houda, and Hicham Sadok. 2024a. Barriers to Digital Transformation: The Case of Moroccan Companies. *Journal of Telecommunications and the Digital Economy* 12(1):261-77. https://doi.org/10.18080/jtde.v12n1.814

Mahboub, Houda, and Hicham Sadok. 2024b. The Digital Banking Evolution: An Opportunity or a Pitfall? P. 44-53 in *Digital Synergy*. London: CRC Press. https://doi.org/10.1201/9781003440406-6

Mahboub, Houda, and Hicham Sadok. 2024c. Transformation digitale de l'économie marocaine : une approche comparative des performances. *Maghreb - Machrek* N° 256(4):49-68. https://doi.org/10.3917/machr.256.0049

Nobanee, Haitham, Mohammed El Hadi El Maknouzi, Hicham Sadok, and Ahmad Yuosef Alodat. 2024. Analysis of Insurance Entrepreneurship as a Hedge in Times of Crisis: A Literature Review. *Sustainable Technology and Entrepreneurship* 3(2):100065. https://doi.org/10.1016/j.stae.2023.100065

Papp, Anna, Almond, Douglas, Zhang, Shuang. 2023. Bitcoin and carbon dioxide emissions: Evidence from daily production decisions. Journal of Public Economics, Volume 227. https://doi.org/10.1016/j.jpubeco.2023.105003

Reinhart, Carmen M., and Kenneth S. Rogoff. 2011. *This Time Is Different: Eight Centuries of Financial Folly*. 13. printing and 1. paperback printing. Princeton: Princeton Univ. Press.

Sadok, Hicham. 2023. The Initial Coin Offering: Is It a Profitable Tool for Investment? P. 185-94 in *Digital Economy. Emerging Technologies and Business Innovation*. Vol. 485, *Lecture Notes in Business Information Processing*, édité par R. Jallouli, M. A. Bach Tobji, M. Belkhir, A. M. Soares, et B. Casais. Cham: Springer International Publishing.

Sadok, Hicham, Hasna Chaibi, and Rachid Saadane. 2023. An Exploratory Study on the Contribution of Artificial Intelligence in Improving the Bank Credit Analysis Process. P. 1-4 in *Proceedings of the 6th International Conference on Networking, Intelligent Systems & Security*. Larache Morocco: ACM. https://doi.org/10.1145/3607720.3607784

Sadok, Hicham, Houda Mahboub, Hasna Chaibi, Rachid Saadane, and Mohamed Wahbi. 2023. Applications of Artificial Intelligence in Finance: Prospects, Limits and Risks. P. 145-49 in *2023 International Conference on Digital Age & Technological Advances for Sustainable Development (ICDATA)*. Casablanca, Morocco: IEEE. https://doi.org/10.1109/ICDATA58816.2023.00034

Yermack, David. 2015. Is Bitcoin a Real Currency? An Economic Appraisal. P. 31-43 in *Handbook of Digital Currency*. Elsevier. https://doi.org/10.1016/B978-0-12-802117-0.00002-3

Received on 12-12-2024 Accepted on 03-01-2025 Published on 10-02-2025

https://doi.org/10.6000/1929-4409.2025.14.04