# Impact of using cryptocurrencies on monetary policy: A model of El Salvador[1]

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**Abstract**

In this study, the positive impact of cryptocurrencies on the monetary policy represented by the financial and banking sector of the State of El Salvador is evaluated for being one of the countries that do not have a national currency; in order to measure the extent of confidence and acceptance of banks and their customers in El Salvador to adopt cryptocurrencies in the field of banking and financial work, in addition to the possibility of issuing cryptocurrencies by the Central Bank of El Salvador. The evaluation tool was a questionnaire with two models; the first was for the banking sector, as it was distributed to a group of managers and employees of the 6 largest banks in El Salvador, and the second model was for the financial sector and included a group of companies and individuals dealing in cryptocurrencies.  SPSS26 was used to analyze the answers to the questionnaire. A statistically significant impact relationship was found to adopt of cryptocurrencies and the monetary policy of the banking sector by reducing the costs of banking services and raising operational efficiency, developing and upgrading banking services. It was found that there is a statistically significant influence relationship for the adoption of encrypted currencies, the monetary policy of the financial sector, the development of e-commerce, in addition to the use of the e-wallet. The recommendations encourage the responsible authorities in El Salvador to move towards the application of cryptocurrency trading while strengthening the necessary legal and regulatory frameworks that govern and regulate existing transactions using cryptocurrencies and e-commerce, in addition to developing and promoting the use of their new technologies in a comprehensive manner.

**Keywords:** Cryptocurrencies, Monetary Policy, E-Commerce, E-Wallet, El Salvador

## 1. Introduction

The rapid development of financial technology has had a clear and significant impact on all aspects of economic and financial life, which was represented in the quick completion of transactions and reducing their costs. Cryptocurrencies are one of the applications that this technology has produced. Cryptocurrencies are means of monetary exchange where the value is stored and transferred electronically (S. Nakamoto, 2009). They differ from the traditional concept of money in ensuring security and verifiability (Procházka, 2018). Bitcoin is the first and most famous cryptocurrency, and it is a digital sequence that can be obtained either from exchanging money or selling goods and services through electronic businesses that accept Bitcoin units, making it a fiat currency, or mining using the basic technology "blockchain". It is a secure and distributed database that contains transaction history,  "blockchain" technology is like a ledger that stores all verified exchanges on the network and Bitcoin as financial assets  (N. Nakamoto et al., 2008).  This ledger consists of blocks linked to each other, each block contains a list of transactions for some exchanges, private users (miners) create a block locally by choosing different pending transactions, after which each new block is drawn through a mathematical process similar to Sudoku (Ulusoy and Çelik,2019). When the miner finds the network solution, it wins a predetermined number of Bitcoins, and other participants must start competing again with another network (Tschorsch & Scheuermann, 2016) . Cryptocurrencies rely on a decentralized system where there is no central monetary authority that controls their creation, and they can also be obtained from different platforms. Therefore, they are considered outside the recognized regulated payment systems so the offer of cryptocurrencies is not subject to the approved monetary policy of central

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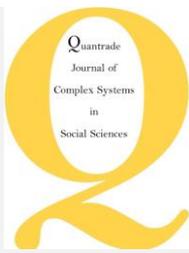
banks, but rather develops based on the activity of users in the cryptocurrency mining process.  This may pose a challenge to central banks, monetary policy represented by the financial and banking sector is the set of measures taken by the state to control the value of the national currency compared to other currencies around the world. It is considered one of the main pillars in the construction of macroeconomic policy is at the forefront of the structure of the country's macroeconomic policies. Monetary policy is used to address economic imbalances, it is an important mechanism used by contemporary economies in a way that enables them to achieve goals. Controlling and regulating the means of payment in the country occupies the most important objectives of monetary policy in the economy, as the central bank can absorb cash in excess of the needs of trading or the financing process and can provide new cash balances according to the prevailing economic conditions  (Bugallo, 2013). The central bank, through monetary policy tools, controls the money supply such as increasing or decreasing the monetary issuance, as well as supervising commercial banks (Goldberg et al., 2020) ,Hence the role of monetary policy emerges in the event of its adoption of cryptocurrencies (especially in the state of El Salvador as it does not have a national currency of its own) in developing banking services, raising the operational efficiency of banks and supporting e-commerce. The study aims at determining the nature of the relationship between cryptocurrencies and monetary policy and its impact on the financial sector and measuring the extent of trust and acceptance of banks and their customers in El Salvador to adopt cryptocurrencies in the field of banking and financial work, as well as trying to come up with recommendations that may contribute to the issuance of encrypted currencies by the Central Bank of El Salvador. As for the study dilemma; it is how it affects cryptocurrencies in monetary policy through the financial and banking sector, and this dilemma raises some questions, including whether cryptocurrencies affect the development of services in El Salvadoran banks and have a role in enhancing operational efficiency, reducing the costs of services and bank transfers, developing e-commerce, and raising the efficiency of portfolio performance in order to address the study dilemma and answer the questions, a set of hypotheses can be built that form answers to the questions posed, and these hypotheses are as follows:

**H0$_1$:** There is no statistically significant impact relationship between the adoption of cryptocurrencies and the monetary policy of the banking sector (banks) of El Salvador and the two hypotheses are subdivided:

**H0$_{1.1}$:** There is no statistically significant impact of adopting cryptocurrencies, reducing banking services costs, and raising the operational efficiency of El Salvadoran banks.

 **H0$_{1.2}$:** There is no statistically significant impact of the adoption of cryptocurrencies in the promotion, development and upgrading of banking services in Salvadoran banks.

**H0$_2$:** There is no statistically significant impact relationship between the adoption of cryptocurrencies and the monetary policy of the financial sector in El Salvador, and the two hypotheses are:

**H0$_{2.1}$:** There is no statistically significant impact relationship for cryptocurrency adoption and e-commerce.

**H0$_{2.2}$:** There is no statistically significant impact relationship to the adoption of cryptocurrencies and e-wallets.

To determine the validity of the hypotheses and to reach the objectives of the study, both the descriptive analytical approach was used in the theoretical aspect by addressing the theoretical literature related to the subject, but this aspect must be attached to an analytical aspect that studies the relationship between the variables of the study, so the questionnaire model that was presented to a group of specialists in this field and at a high level of experience and workers in a number of banks for the State of El Salvador as well as a group of companies and individuals trading in cryptocurrencies was used, and statistical and standard methods were used in the  SPSS26 program   to analyze the data .

## 2. Literature Review

Study  Nakamoto, aimed at presenting the technical dimensions of cryptocurrencies in terms of peer-to-peer principle, digital forecasts and blockchain and introducing Bitcoin for the first time, and solved the problem of double spending facing electronic accounts (S. Nakamoto, 2009) .

Study  Harrison & Mano, concluded that practice makes cryptocurrency money and is used as a mean of payment in commercial transactions (Harrison & Mano, 2015).

Study Franco, dealt with extensive research on the concept of virtual cryptocurrencies, it highlighted more broadly the currency of (Bitcoin) in terms of its origin, composition, the nature of its composition, the mechanisms of its work, and the technique used in its operation. It also concluded that Bitcoin is characterized by a high degree of encryption and security, and the extent to which it is related to monetary policy, global monetary management, and the cancellation of financial intermediation in banks (Franco, 2014).

Study Claeys, dealt with the characteristics of money and the extent to which cryptocurrencies have these characteristics, the possibility of cryptocurrencies playing the same role and replacing funds controlled by the Central Bank, and whether cryptocurrencies have the impact of changing the nature of monetary policy? It concluded the technology of the decentralized ledger of peer-to-peer innovations in transactions that were difficult to imagine a decade ago. This
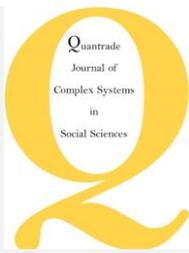
technology has also led to the development of cryptocurrencies and allowed them to challenge the role of money as a mean of exchange. Cryptocurrencies can develop into legitimate private payment methods with a positive impact by acting as a disciplined device that drives central banks (especially in countries that have a history of lax monetary policy) (Claeys et al., 2018).

Study Elhaj & Barakeh, aimed to test the impact of e-commerce on the profitability of the transport sector in the United States of America, identifying differences in this impact according to the size of transport companies. The study relied on the descriptive analytical approach by conducting a qualitative quantitative survey on a random sample of American citizens who benefit from transport services. The study found that there is a strong impact of e-commerce on the profitability of the transport sector in the United States of America, and this impact was greater for small transport companies than for large ones  (Elhaj & Barakeh, 2015).

Study Kareem, aimed to test the impact of e-commerce on the organizational performance of some retail stores in Nigeria. The study relied on the experimental descriptive approach by preparing a special questionnaire and applying it to a sample of 48 workers in 8 retail stores in Nigeria. After collecting data and analyzing it statistically, the study found out that the application of e-commerce and the adoption of its operations has a statistically significant impact on the organizational performance of retail stores in Nigeria, through its contribution to improving operations, reducing costs and increasing profit levels. It also contributes to increasing the demand of foreigners to buy from these stores and thus increasing profits (Kareem et al., 2014). Kendirli et. al (2022) examine the relationship between the CCi30 index, BIST 100, and Nasdaq Indices. Kendirli nd Şenol (2021) study within the framework of Chaos theory, the impact analysis between the large stock market volume and the Bitcoin volume. Uygun (2019)'s study goal is the idea of a coin that will gain value with respect to real economic resources, with high security, which can be mining according to the requirements, using blockchain or derivative technology shaped according to needs.

## 3. Field study (Method and procedures)

The study sample: The study population consists of two categories; the first represents the axis of the banking sector, which is a group of bank employees in El Salvador from 6 major banks, and the second category represents the axis of the financial sector, which is a group of companies and individuals that deal in cryptocurrencies. The statistical data on the study population was collected through two forms of a questionnaire that included a number of questions. Form 1 of the questionnaire included (financial managers and their deputies ,heads of departments, and senior employees) working in banks that were chosen as the community of study of the banking sector axis. Form 2 of the questionnaire included (companies and individuals trading in cryptocurrencies) that were selected as the community of study of the financial sector axis. 200 copies of Form 1 were sent, 170 of which were returned, 8 were excluded because they were incorrect, so that the number of correct forms was 162 of form 1. While 200 copies of form 2 were sent, 164 were retrieved and 28 were excluded due to invalidity, so the number of correct copies of form 2 becomes 136, Table (1 ) shows the number of participants and the demographic distribution of the study sample in the questionnaire for models (1 & 2).

Table (1) the number of participants in the questionnaire for both models and personal data

|  | Type | Model 1 | | Model 2 | |
|---|---|---|---|---|---|
|  |  | Number | Percentage | Number | Percentage |
| Gender | Male | 112 | %82.3 | 103 | %63.5 |
|  | Female | 24 | %17.7 | 59 | %36.5 |
| Age | 25-35 | 61 | %37.6 | 43 | %31.6 |
|  | 36-45 | 76 | %47 | 51 | %37.5 |
|  | 46- And more | 25 | %15.4 | 42 | %30.9 |
| The scientific degree | Bachelor's degree and less | 73 | %45 | 79 | %58 |
|  | Higher Diploma | 25 | %15.4 | 31 | %22.8 |
|  | M.A. | 45 | %27.8 | 17 | %12.5 |
|  | Ph.D | 19 | %11.8 | 9 | %6.7 |
| Experience | 5- and less | 55 | %34 | 89 | %65.5 |
|  | 6-10 | 46 | %28.5 | 47 | %34.5 |
|  | 11-15 | 39 | %24 | 0 | 0 |
|  | 16- And more | 22 | %13.5 | 0 | 0 |

Model 1 contains 42 questions divided into 3 axes, which are the axis of importance of cryptocurrencies, the axis of reducing the costs of banking services and raising the operational efficiency of El Salvadoran banks, and the axis of focus of promoting and developing banking services and upgrading them in El Salvadoran banks. As for Form 2, it contains 33 questions divided into 3 axes: the axis of the importance of cryptocurrencies, the axis of developing e-commerce, and the axis of promoting and developing the use of the e- wallet. The ***Five Likert Scale*** was used, and from its arithmetic average, the importance score was calculated as follows (5-1)/5 = 0.79, distribution becomes as shown in table 2 (Sekaran & Bougie, 2016).

Table (2) Five Likert Scale and degree of importance

| Answer | Degree | limit | Importance |
|---|---|---|---|
| Strongly Disagree | 1 | 1 -1.97 | Very low |
| Disagree | 2 | 1.80 – 2.59 | low |
| Neutral | 3 | 2.60 – 3.39 | Medium |
| Agree | 4 | 3.40 – 4.19 | High |
| Strongly agree | 5 | 4.20 - 5 | Very high |

In order to verify the credibility of the questionnaire, we presented the apparent validity of the questionnaire to eight arbitrators from different specializations, and some paragraphs of the questionnaire were modified based on the proposed observations to become its final form consisting of ( 75) paragraphs based on the variables of the study.  As for verifying the internal stability of the questionnaire and its credibility, it was measured using the Alpha Cronbach coefficient of the SPSS 26 program, as it reached (0.97), and therefore it is acceptable for the purposes of statistical analysis (Bougie & Sekaran, 2019) , Table (3) shows the value of Cronbach's Alpha .

Table (3) Alpha Cronbach stability coefficient. Source: SPSS output

| Cronbach's Alpha | N of Items |
|---|---|
| 0.997 | 75 |

## 4. Results and Discussion

SPSS26 was used to analyze the data and information obtained from the two forms of questionnaire 1 & 2 for the banking and financial monetary policy sectors to identify the arithmetic averages, the extent of deviation of the responses of the study community and the importance of each of the statements of the study variables, and for each of the main axes.

Table (4) shows the descriptive analysis of the responses of the sample form 1 on the paragraphs of the axis of importance of cryptocurrencies. It is apparent from the table that most of the paragraphs related to this variable had a high and very high degree of significance. It obtained an arithmetic mean of 4.005 with a high degree of significance and a relatively low standard deviation of 0.973 indicating the absence of a large dispersion in the answers of the study sample and their agreement to a large extent in their answers. Paragraph 9 reached the lowest ranking with regard to the average answers, where the arithmetic mean was 3.68, a standard deviation of 1.244 and a high degree of importance, which is related to the presence of a sufficient number of offices, companies and brokers in El Salvador for the sale and purchase of cryptocurrencies, followed by the rest of the paragraphs with higher averages, while paragraph 6 reached the highest level of arithmetic mean was 4.43 and the lowest deviation was 0.703, with very high significance, it was related to the ease

and speed of super cryptocurrencies in conversion. This confirms the importance of cryptocurrencies in terms of speed and ease of transfer (Sekaran & Bougie, 2016).

Table (4) The arithmetic mean, standard deviation, and importance of the banking sector axis of monetary policy , paragraph of importance of cryptocurrencies

| | Question | Standard Deviation | Arithmetic Mean | İmportance |
|---|---|---|---|---|
| 1 | There is a good knowledge in the financial markets of El Salvador of the most important cryptocurrencies such as bitcoin, lithium, and others. | 0.818 | 4.33 | Very high |
| 2 | Governmental entities support dealing in cryptocurrencies. | 0.92 | 4.02 | Very high |
| 3 | There is an approved legal framework for cryptocurrencies in El Salvador | 1.131 | 3.89 | High |
| 4 | The state of El Salvador supports cryptocurrencies in Payment operations to Governmental entities | 1.131 | 3.78 | High |
| 5 | Cryptocurrencies are becoming popular in El Salvador | 0.771 | 4.27 | Very high |
| 6 | Cryptocurrencies are characterized by ease and super speed of conversion. | 0.703 | 4.43 | Very high |
| 7 | Cryptocurrencies are characterized by transparency and security in financial operations. | 0.87 | 4.22 | Very high |
| 8 | Regulation and support for cryptocurrencies by the government gives them stability in exchange rates. | 1,237 | 3.72 | High |
| 9 | The presence of a sufficient number of offices, companies, and intermediaries in El Salvador for the sale and purchase of cryptocurrencies. | 1.244 | 3.68 | High |
| 10 | There are competent authorities that have sufficient infrastructure, effective mechanisms and have confidence in managing cryptocurrency operations securely and effectively | 1.093 | 3.80 | High |
| 11 | Companies whose business is based on the use of cryptocurrencies are achieving domestic and international success. | 0.981 | 4.09 | High |
| 12 | There is a large category of individuals who have an awareness of electronic payment and rely on it to complete some online purchases. | 1.186 | 3.80 | High |
| 13 | There are operations for the sale, purchase, or exchange of products, services, and information in cryptocurrencies via the internet. | 1.121 | 3.90 | High |
| 14 | Investing in cryptocurrencies generates profits that positively affect the country's economy. | 0.939 | 4.16 | High |
| Average | | 0.973 | 4.005 | High |

Table (5) shows the descriptive analysis of the responses of the sample form 1 on the paragraphs of the axis of Reducing banking services costs and raising the operational efficiency of El Salvadoran banks. It is apparent from the table that most of the paragraphs related to this variable had a high and very high degree of significance. It obtained an arithmetic

mean of 3.959 with a high degree of significance and a relatively low standard deviation of 1.02 indicating the absence of a large dispersion in the answers of the study sample and their agreement to a large extent in their answers. Paragraph 6 reached the lowest ranking with regard to the average answers, where the arithmetic mean was 3.69, a standard deviation of 1.192, and a high degree of importance, which is related to the contribution to facilitating e-payment processes for local and international trade operations, followed by the rest of the paragraphs with higher averages, while paragraph 13 reached the highest level of arithmetic mean was 4.35 and the lowest deviation was 0.760, with very high significance, it was related to the contribution to reducing the cost related to the administrative operations of banks. This confirms the importance of cryptocurrencies in terms of reducing banking services costs and raising the operational efficiency of El Salvadoran banks (Sekaran & Bougie, 2016)

Table (5): The arithmetic mean and standard deviation of the banking sector axis of monetary policy, paragraph of reducing the costs of banking services

| | Question | Standard Deviation | Arithmetic Mean | Degree Of İmportance |
|---|---|---|---|---|
| 1 | Contributes to reducing the cost of money transfers resulting from the absence of an intermediary. | 1.118 | 3.83 | High |
| 2 | Contributes to reducing the cost of financing for import, .export, and money transfer operations | 1.158 | 3.84 | High |
| 3 | Contributes to reducing infrastructure costs in remote areas resulting from making money transfers without the need to establish new infrastructure. | 1.214 | 3.85 | High |
| 4 | Contributes to reducing the costs of banks and enhancing the efficiency of banking infrastructure by eliminating the need for complex routine operations in the transfer of funds. | 1.051 | 4.01 | High |
| 5 | Contributes to meeting the needs of domestic and international trade very quickly. | 1.130 | 3.80 | High |
| 6 | Contributes to facilitating e-payment processes for local and international trade operations. | 1.192 | 3.69 | High |
| 7 | Contributes to saving the cost of remittances related to import and export operations | .877 | 4.18 | High |
| 8 | Contributes to the acceleration of import and export operations resulting from the provision of instant payments and the speed of transfers. | 1.018 | 4.04 | High |
| 9 | contributes to facing competition from cryptocurrency companies that use e-payment services. | 1.048 | 3.98 | High |
| 10 | Contribute to facing competition with international banks that use cryptocurrencies in their transactions. | .999 | 4.12 | High |
| 11 | The low cost of remittances makes banks gain a competitive advantage and the client does not resort to informal methods. | .798 | 4.25 | Very high |
| 12 | Contribute to the reduction of operational expenses. | 1.225 | 3.73 | High |
| 13 | Contribute to reducing the cost related to the administrative operations of banks. | .760 | 4.35 | Very high |
| 14 | Contributes to the elimination of financial corruption by making data visible and the absence of an intermediary to complete financial transactions. | 1.206 | 3.75 | High |
| | Average | 1.024 | 3.959 | High |

Table (6) shows the descriptive analysis of the responses of the sample form 1 on the paragraphs of the axis of development and raising the efficiency of banking services performance. It is apparent from the table that most of the paragraphs related to this variable had a high and very high degree of significance. It obtained an arithmetic mean of 4.045 with a high degree of significance and a relatively low standard deviation of 0.99 indicating the absence of a large dispersion in the answers of the study sample and their agreement to a large extent in their answers. Paragraph 13 reached the lowest ranking with regard to the average answers, where the arithmetic mean was 3.65, a standard deviation of 1.202, and a high degree of importance, which is related to the contributes to better verifying its customers, as it knows for sure that their personal data is correct and has not been subjected to any kind of manipulation , followed by the rest of the paragraphs with higher averages, while paragraph 14 reached the highest level of arithmetic mean was 4.35 and the lowest deviation was 0.76, with very high significance, it was related to the contributes to increasing the administrative efficiency of the bank by providing and exchanging data with interested parties. This confirms the importance of cryptocurrencies in terms of reducing In increasing administrative efficiency and the significant role of cryptocurrencies in the development of banking services within El Salvador (Sekaran & Bougie, 2016).

Table (6) The arithmetic mean and standard deviation of the banking sector axis of monetary policy, paragraph of reducing the costs of banking services

| | Question | Standard Deviation | Arithmetic Mean | Degree Of İmportance |
|---|---|---|---|---|
| 1 | Contributes to the completion of financial transactions and transactions faster and more accurately | .998 | 4.10 | High |
| 2 | No need to make an administrative effort to keep records or settle disputes related to financial transactions | 1.149 | 3.83 | High |
| 3 | Contributes to increasing administrative efficiency resulting from the speed of data provision and Exchange | .998 | 4.13 | High |
| 4 | Contributes to reducing operational risks and improving the efficiency of banks ' performance | 1.098 | 3.99 | High |
| 5 | Contributes to achieving more transparency for the bank and privacy for the customer | .982 | 4.17 | High |
| 6 | Contributes to achieving more transparency and security to make financial transactions visible and unchangeable | 1.063 | 3.99 | High |
| 7 | Contributes to achieving transparency in the bank's ability to follow up financial transactions | .904 | 4.27 | Very high |
| 8 | Contributes to achieving security for customers through the stability of financial operations,and not changing them | 1.059 | 4.06 | High |
| 9 | Contribute to the elimination of corruption and reduce fraud resulting from transparency and consistency of transactions | 1.095 | 3.93 | High |
| 10 | Contribute to achieving more transparency through the so-called smart contracts that aim to complete transactions without an intermediary | .878 | 4.22 | Very high |
| 11 | Contributes to the shortening of paper transactions, which enhances the levels of security, accuracy and speed in money transfers | 1.054 | 4.03 | High |
| 12 | Contributes to achieving privacy by not disclosing the user's identity because it is not subject to any financial authority at all | 1.109 | 3.92 | High |
| 13 | Contributes to better verifying its customers, as it knows for sure that their personal data is correct and has not been subjected to any kind of manipulation. | 1.202 | 3.65 | High |
| 14 | Contributes to increasing the administrative efficiency of the bank by providing and exchanging data with interested parties. | .760 | 4.35 | Very high |
| | Average | .992 | 4.045 | High |

Table (7) shows the descriptive analysis of the responses of the sample form 2 on the paragraphs of the axis of importance of cryptocurrencies. It is apparent from the table that most of the paragraphs related to this variable had a high and very high degree of significance. It obtained an arithmetic mean of 4.013 with a high degree of significance and a relatively low standard deviation of 0.980 indicating the absence of a large dispersion in the answers of the study sample and their agreement to a large extent in their answers. Paragraph 5 reached the lowest ranking with regard to the average answers, where the arithmetic mean was 3.83, a standard deviation of 1.015 and a high degree of importance, which is related to the large group of individuals who are aware of electronic payment and rely on it to complete some online purchases, followed by the rest of the paragraphs with higher averages, while paragraph 1 reached the highest level of arithmetic mean was 4.23 and the lowest deviation was 0.852, with very high significance, it was related to the a good knowledge in the financial markets of El Salvador of the most important cryptocurrencies such as bitcoin, lithium, and others, This confirms a good knowledge of the cryptocurrency financial markets in El Salvador (Bougie & Sekaran, 2019).

Table (7) The arithmetic mean, standard deviation, and the degree of importance of the financial sector axis of monetary policy, the importance of cryptocurrencies paragraph

| | Question | Standard Deviation | Arithmetic Mean | Degree Of İmportance |
|---|---|---|---|---|
| 1 | There is a good knowledge in the financial markets of El Salvador of the most important cryptocurrencies such as bitcoin, lithium, and others. | .852 | 4.23 | Very high |
| 2 | Governmental entities support dealing in cryptocurrencies. | 1.088 | 3.97 | High |
| 3 | There is an approved legal framework for cryptocurrencies in El Salvador | 1.011 | 4.00 | High |
| 4 | The state of El Salvador supports cryptocurrencies in Payment operations to Governmental entities | 1.058 | 3.85 | High |
| 5 | There is a large group of individuals who are aware of electronic payment and rely on it to complete some online purchases. | 1.015 | 3.83 | High |
| 6 | Cryptocurrencies are characterized by ease and super speed of conversion. | .994 | 4.07 | High |
| 7 | Cryptocurrencies are characterized by transparency and security in financial operations. | 1.031 | 3.94 | High |
| 8 | Regulation and support for cryptocurrencies by the government gives them stability in exchange rates. | .918 | 4.04 | High |
| 9 | The presence of a sufficient number of offices, companies, and intermediaries in El Salvador for the sale and purchase of cryptocurrencies. | 1.221 | 3.89 | High |
| 10 | There are competent authorities that have sufficient infrastructure, effective mechanisms and have confidence in managing cryptocurrency operations securely and effectively | .990 | 4.07 | High |
| 11 | Companies whose business is based on the use of cryptocurrencies are achieving domestic and international success. | 1.046 | 4.10 | High |
| 12 | There is a large category of individuals who have an awareness of electronic payment and rely on it to complete some online purchases. | .990 | 4.07 | High |
| 13 | There are operations for the sale, purchase, or exchange of products, services, and information in cryptocurrencies via the internet. | .903 | 4.08 | High |
| 14 | Investing in cryptocurrencies generates profits that positively affect the country's economy. | .999 | 4.05 | High |

| | | Average | .98067 | 4.0137 | High |

Table (8) shows the descriptive analysis of the responses of the sample form 2 on the paragraphs of the axis of importance of E-commerce development. It is apparent from the table that most of the paragraphs related to this variable had a high and very high degree of significance. It obtained an arithmetic mean of 3.93 with a high degree of significance and a relatively low standard deviation of 1.079 indicating the absence of a large dispersion in the answers of the study sample and their agreement to a large extent in their answers. Paragraph 9 reached the lowest ranking with regard to the average answers, where the arithmetic mean was 3.70, a standard deviation of 1.213 and a high degree of importance, which is related to the online sales, purchases or exchanges of products, services and information in El Salvador, followed by the rest of the paragraphs with higher averages, while paragraph 3 reached the highest level of arithmetic mean was 4.13 and the lowest deviation was 1.01 , with very high significance, it was related to the sufficient awareness among individuals and institutions of the ease and security provided by e-commerce and Information Technology, This confirms the importance of e-commerce in El Salvador (Bougie & Sekaran, 2019).

Table (8) the arithmetic mean, standard deviation, and the degree of importance of the financial sector axis of monetary policy, paragraph on the importance of developing e-commerce

| | Question | Standard Deviation | Arithmetic Mean | Degree Of İmportance |
|---|---|---|---|---|
| 1 | El Salvador has the necessary legal and regulatory frameworks that govern and regulate cryptocurrency-based transactions and e-commerce. | 1.088 | 3.97 | High |
| 2 | El Salvador has the infrastructure and ready-made communication networks and technology necessary for e-commerce. | 1.183 | 3.85 | High |
| 3 | There is sufficient awareness among individuals and institutions of the ease and security provided by e-commerce and Information Technology. | 1.010 | 4.13 | High |
| 4 | The use of cryptocurrencies in e-commerce is widespread for internal and external financial transactions. | 1.033 | 4.00 | High |
| 5 | The use of e-commerce in conducting electronic transactions is widespread in El Salvador. | 1.216 | 3.75 | High |
| 6 | There are a large number of domestic and international electronic markets on which services, goods, and money are exchanged. | 1.060 | 3.87 | High |
| 7 | E-commerce is an effective means of trade exchange between business enterprises, producers, and consumers | 1.046 | 4.10 | High |
| 8 | E-commerce is an effective way to provide demands and needs and facilitate business with less time, cost and effort. | 1.221 | 3.89 | High |
| 9 | There are online sales, purchases or exchanges of products, services and information in El Salvador. | 1.213 | 3.70 | High |
| 10 | Companies in El Salvador that operate based on e-commerce are achieving local and international success. | .990 | 4.07 | High |
| | Average | 1.079 | 3.93 | High |

Table (9) shows the descriptive analysis of the responses of the sample form 2 on the paragraphs of the axis of importance of E- wallet. It is apparent from the table that most of the paragraphs related to this variable had a high and very high degree of significance. It obtained an arithmetic mean of 4.0588 with a high degree of significance and a relatively low standard deviation of 0.894 indicating the absence of a large dispersion in the answers of the study sample and their agreement to a large extent in their answers. Paragraph 7 reached the lowest ranking with regard to the average answers, where the arithmetic mean was 3.83, a standard deviation of 1.015 and a high degree of importance, which is related to

the enough awareness among citizens about the e-wallet and how to use it to conduct financial transactions securely, followed by the rest of the paragraphs with higher averages, while paragraph 6 reached the highest level of arithmetic mean was 4.35 and the lowest deviation was 0.764 , with very high significance, it was related to the E-wallets help their users to keep their personal and financial data and information they need confidential and secure, This confirms the importance of dealing with all kinds of technology available to keep abreast of developments in the world of finance and business to maintain survival in the major global markets (Bougie & Sekaran, 2019).

Table (9) The arithmetic mean, standard deviation, and the degree of importance of the financial sector axis of monetary policy, paragraph on the importance of e-wallet

|  | Question | Standard Deviation | Arithmetic Mean | Degree Of İmportance |
|---|---|---|---|---|
| 1 | The presence of e-wallets that support all cryptocurrencies that investors need to trade. | .999 | 4.05 | High |
| 2 | Cryptocurrencies can be purchased with traditional currencies through an e-wallet. | .903 | 4.08 | High |
| 3 | Financial transactions can be made directly from the e-wallet easily and securely. | .850 | 4.25 | High |
| 4 | Using an e-wallet to purchase goods and services and conduct e-transactions. | 1.058 | 3.85 | High |
| 5 | All financial movements of cryptocurrencies can be regulated through the use of an e-wallet. | .824 | 4.13 | High |
| 6 | E-wallets help their users to keep their personal and financial data and information they need confidential and secure. | .764 | 4.35 | Very high |
| 7 | There is enough awareness among citizens about the e-wallet and how to use it to conduct financial transactions securely. | 1.015 | 3.83 | High |
| 8 | There are competent authorities that have sufficient infrastructure and effective mechanisms and have confidence in managing e-wallets effectively, efficiently, and securely. | .918 | 4.04 | High |
| 9 | All information and data that is inside the e-wallet is in an encrypted format that protects the data. | 1.031 | 3.94 | High |
| | Average | .894 | **4.0588** | High |

Table ( 10 ) indicates Pearson correlation coefficient between the axis of importance of cryptocurrencies represented by the symbol (AB) with the two axes of the banking sector, and its value reached (0.998) with the axis of reducing the costs of banking services and raising the operational efficiency of banks represented by the symbol (A), which indicates that there is a strong direct relationship, meaning that the banking costs are falling and the operational efficiency of banks is positive increases positively with the increase in dealing with cryptocurrencies, while its value reached (0.994) with the axis of developing and raising the efficiency of banking services performance represented by the symbol (B). It also indicates a strong direct correlation, which means that there is a development and an increase in the efficiency of the performance of banking services with an increase in dealing with cryptocurrencies, and the value of the correlation coefficient reached (0.993) between the two axes of the banking sector itself, which is a strong positive correlation.

Table (10) Pearson correlation coefficient for the axis of importance of cryptocurrencies with the axis of the banking sector

| Variable | AB | A | B |
|---|---|---|---|
| AB | 1 | | |
| A | 0.988** | 1 | |
| B | 0.994** | 0.993** | 1 |

Table ( 11 ) indicates pearson correlation coefficient between the axis of importance of cryptocurrencies represented by the symbol (CD) with the two axes of the financial sector, and its value reached (0.995) with the axis of developing e-commerce represented by the symbol (C), which indicates that there is a strong direct relationship, meaning that the development of e-commerce increases positively with the increase in dealing with cryptocurrencies, while its value reached (0.994) with the axis of using the e- wallet represented by the symbol (D). It also indicates a strong direct correlation, which means that there is a use and development of the e- wallet with an increase in dealing with cryptocurrencies, and the value of the correlation coefficient reached (0.998) between the two axes of the financial sector itself, which is a strong positive correlation.

Table (11) Pearson correlation coefficient for the axis of importance of cryptocurrencies with the two axes of the financial sector

| Variable | CD | C | D |
|---|---|---|---|
| CD | *1* | | |
| C | *0.995\*\** | *1* | |
| D | *0.994\*\** | *0.998\*\** | *1* |

Table (12) presents the simple regression analysis of the relationship between the axis of cryptocurrencies and the axis of monetary policy, the banking sector, the paragraph of reducing the costs of banking services and raising operational efficiency. It was found out that the value of the correlation coefficient is (0.324), while the absolute calculated *T* value was (4.315), which is higher than its tabular value (1.185) at a degree of freedom (161), and the significant *p-vale* of 0.259. The value of the determination coefficient was (0.30), and it indicates that about 30% of the changes that occur in the decrease in the costs of banking services and the increase in the operational efficiency of banks can be explained by dealing in cryptocurrencies, and this value can be highly relied upon in the process of interpretation and prediction of the relationship with the paragraph of the promotion and development of banking services, so the value of the *correlation* coefficient was (0.333), and the absolute value of the calculated *T*  was (1.512), which is higher than its tabular value (1.224) at a degree of freedom (161), and the significant *p-vale*  of 0.244. The value of the determination coefficient was (0.37), indicating that about 37% of the changes that occur in the promotion, development and upgrading of banking services can be explained by dealing in cryptocurrencies. This value can be highly relied upon in the process of interpretation and prediction. Through the outputs of the simple regression analysis, the costs of banking services and the operational efficiency of banks are affected by dealing with cryptocurrency. Therefore, the null hypothesis  $H0_{1.1}$ was rejected, and the alternative hypothesis was accepted; i.e. there is a statistically significant relationship for adopting cryptocurrencies, reducing the costs of banking services raising the operational efficiency of El Salvadoran banks, rejecting the null hypothesis $H0_{1.2}$ , and accepting the alternative hypothesis, meaning that there is a statistically significant relationship for adopting cryptocurrencies and promoting and developing banking services and upgrading them El Salvadoran banks. By rejecting the two null hypotheses and accepting the alternative hypotheses for the two paragraphs of the monetary policy - the banking sector, the main null hypothesis $H0_1$ was rejected and the alternative hypothesis was accepted, meaning that there is a statistically significant effect relationship for the adoption of cryptocurrencies and monetary policy for the banking sector in El Salvador.

Table (12) simple regression analysis of the relationship between the cryptocurrency axis and the monetary policy axis banking sector

| AB | Calculated value for (F) | R | $R^2$ | *Adjusted R2* | Calculated value for T | T | p-vale | *Sig* | *Result* | |
|---|---|---|---|---|---|---|---|---|---|---|
| A | 1.405 | 0.324 | 0.105 | 0.30 | 4.315 | 1.185 | 0.259 | 0.001 | *Reject $H0_{1.1}$* | *Reject H01* |
| B | 1.499 | 0.33 | 0.11 | 0.37 | 1.51 | 1.12 | 0.244 | 0.157 | *Reject $H0_{1.2}$* | |

Table (13) presents the simple regression analysis of the relationship between the axis of cryptocurrencies and the axis of monetary policy, the financial sector, the paragraph of E-Commerce. It was found out that the value of the correlation coefficient is (0.325), while the absolute calculated *T* value was (2.728), which is higher than its tabular value (0.972) at a degree of freedom (135), and the significant *p-vale* of 0.360. The value of the determination coefficient was (0.06), and it indicates that about 6% of the changes that occur in E-Commerce can be explained by dealing in cryptocurrencies, and

this value can be highly relied upon in the process of interpretation and prediction of the relationship. with the paragraph of the e-wallet so the value of the *correlation coefficient* was (0.358), and the absolute value of the calculated $T$ was (2.832), which is higher than its tabular value (1.014) at a degree of freedom (135), and the significant *p-vale* of 0.344. The value of the determination coefficient was (0.03), It indicates that about 3% of the changes that occur in the e-wallet can be explained by dealing in cryptocurrencies. This value can be highly relied upon in the process of interpretation and prediction. Through the outputs of the simple regression analysis, the banking costs and operational efficiency of banks are affected by cryptocurrency. Therefore, the null hypothesis $H0_{2.1}$ was rejected, and the alternative hypothesis was accepted; i.e. there is a statistically significant relationship for adopting cryptocurrencies and increase in e-commerce of El Salvadoran . Rejecting the null hypothesis $H0_{2.2}$, and accepting the alternative hypothesis, meaning that there is a statistically significant relationship for adopting cryptocurrencies and promoting and E-wallet developing them El Salvadoran. By rejecting the two null hypotheses and accepting the alternative hypotheses for the two paragraphs of the monetary policy financial sector, the main null hypothesis $H0_2$ was rejected and the alternative hypothesis was accepted, meaning that there is a statistically significant effect relationship for the adoption of cryptocurrencies and monetary policy for financial sector in El Salvador.

Table (13) simple regression analysis of the relationship between the cryptocurrency axis and the monetary policy axis financial sector

| CD | Calculated value for (F) | R | $R^2$ | *Adjusted R2* | Calculated value for T | T | p-vale | *Sig* | *Result* | |
|---|---|---|---|---|---|---|---|---|---|---|
| C | 0.945 | 0.325 | 0.106 | 0.06 | 2.728 | 0.972 | 0.360 | 0.026 | *Reject H0_{2.1}* | *Reject H0_2* |
| D | 1.028 | 0.358 | 0.128 | 0.03 | 2.832 | 1.014 | 0.344 | 0.025 | *Reject H0_{2.2}* | |

## 5. Results and Recommendations

From the conclusions reached, the following recommendations may be drawn:

1. Central banks must deal with financial technology, use its tools, and work to control and regulate it in a way that preserves the financial stability of the state. In order not to become a spectator, central banks must work to issue their own digital currencies, be under their supervision and control, develop the technology of the distributed ledger records DLT, and deal with BlockChain technology to store and preserve data. These steps will have a great impact in enhancing the role of central banks and their ability to carry out their functions and control over the tools of monetary policy.
2. Developing legislation and systems for operations based on financial technology FinTech, so as to ensure that central banks play their role in supervising and controlling transactions developed and based on financial technology.
3. Empowering the necessary legal and regulatory frameworks that govern and regulate existing transactions by cryptocurrency and e-commerce.
4. Encouraging the concerned authorities, especially in countries that do not have a national currency, to move towards the application of cryptocurrency trading.
5. Paying attention to the development of the use of e-commerce in El Salvador by increasing the spread of cryptocurrencies, while avoiding their risks.
6. Educating all users of cryptocurrency in El Salvador about the importance of using digital wallets to store cryptocurrency, as it is important to keep funds safe.
7. Creating governmental organizations and entities in the country of El Salvador that monitor the circulation of cryptocurrencies and issue awareness bulletins on an ongoing basis to their users to help them use them correctly and safely away from risks.
8. Conducting research and other studies examining the possibility of issuing El Salvador cryptocurrencies by the Central Bank.

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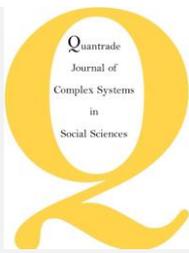
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