The Impact of Central Bank Digital Currencies on the Banking Sector
(An Empirical Study in the Central Bank of Iraq)

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Abstract

This research aims to analyze the correlation and impact relationship between the main independent variable (central bank digital currencies) and the dependent variable (their effect on the banking sector) and to rank these variables according to their priority and significance. It also seeks to identify the significant differences in the responses of the surveyed sample based on personal variables such as (age, educational qualification, job position, and years of service). The analytical descriptive approach was adopted, utilizing a questionnaire as the main tool for collecting data and information from a sample of 365 individuals in managerial positions, including (department manager, first assistant department manager, second assistant department manager, division head, and assistant division head) at the Central Bank of Iraq in Baghdad. Data were also used to interpret the results, alongside conducting personal interviews with the officials. The responses were analyzed using the statistical programs (SPSS V.18) and (AMOS V.24), employing methods such as (weighted mean, standard deviation, percentage weight, coefficient of variation, Spearman's correlation coefficient, t-test, simple linear regression analysis, F-test, coefficient of determination (R^2), and Chi-square test (X^2)). Among the key findings of the research is the existence of a positive and strong correlation, along with a significant impact of central bank digital currencies on the banking sector, with the magnitude of this effect reaching 68%. Furthermore, significant differences were found in the responses of the surveyed sample based on personal variables, such as (age, educational qualification, job position, and years of service).

Keywords: digital currencies, central bank, banking sector.

1. Introduction

First: Research Problem

The rapid advancements in information technology and the widespread use of the internet across the globe, coupled with the need to keep pace with the significant changes in customer needs and desires, have made it imperative for organizations to adapt to these changes in the business environment through various practices and activities, foremost among them being the preparedness for central bank digital currencies (CBDCs). This adaptation is crucial for

organizations to remain competitive, provide suitable products to their customers, and achieve the largest possible market share.

Providing services that align with customer needs and desires, especially in the banking sector, is not an easy task given the competitive environment and the continuous fluctuations and changes in the banking landscape. Although the banks in the research sample offer a limited number of services via the internet to their customers, the concept of readiness for CBDCs remains gradual for many of the services that banks should be offering to keep up with technological advancements and achieve sustainable competitive advantage. Some of the shortcomings currently include:

- Limited availability of ATMs across the country's provinces.

- Weak internet services.

- ATMs being restricted to withdrawals only, without deposit or transfer options.

- Limited ability to offer loans and advances through electronic cards, requiring customers to visit the bank in person.

Despite the aforementioned importance and the emphasis of many studies on the impact of CBDCs on the quality of banking services, Iraqi banks in general, and specifically the banks in the research sample, have not given this matter sufficient attention. Based on this, the research problem can be articulated through the following questions:

1. What is meant by central bank digital currencies, and to what extent are CBDCs available in the banks of the research sample?

2. What banking services are realized through meeting the requirements for CBDCs in the banks of the research sample?

3. Do central bank digital currencies affect the quality of banking services?

Based on the above, the current research sheds light on a real issue in the Iraqi banking sector related to central bank digital currencies (CBDCs) and their impact on the quality of banking services provided to customers. It addresses a critical topic, especially in light of the transformations in banking services, which now rely heavily on information technology, communications, and networks, fundamentally changing how transactions are processed and services are delivered.

Second: Importance of the Research

The subject of central bank digital currencies and their impact on the quality of banking services is one of great importance and vitality. It has garnered significant attention in all its dimensions and applications. The importance of this research is highlighted through the following points:

1. The importance of the banking sector, coupled with advancements in information technology and the dynamic changes in the global economy, has made it necessary for banks to adopt CBDCs to provide services and complete banking transactions.

2. This research serves as a guide for private commercial banks on how to implement CBDCs, providing opportunities to enhance the quality of services offered.

3. The significance of the research lies in its potential to provide valuable information to banks in the research sample, and it also offers a review of the available literature on the subject, particularly regarding CBDCs—a topic for which the Iraqi library currently lacks sufficient resources.

4. The research contributes to identifying the benefits that banks can reap by meeting the requirements for CBDCs, as well as the obstacles that may hinder the banks from achieving these requirements.

Third: Research Objectives

The research objectives are summarized as follows:

1. To explore a contemporary topic and modern concepts in the banking sector by shedding light on central bank digital currencies (CBDCs) and their impact on the banking sector.

2. To gain an understanding of the banking sector and the operational mechanisms adopted by private Iraqi commercial banks.

3. To investigate the extent to which CBDCs are available in the selected sample of private commercial banks operating in the Iraqi banking sector.

4. To clarify and interpret the nature of the correlation and impact relationships between CBDCs and the banking sector within private Iraqi commercial banks.

Fourth: Research Hypothesis Framework

In light of the research problem and its objectives, Table (1) was created, focusing on the following variables. To systematically address the research problem within its theoretical framework and empirical (practical) study, a model has been designed to depict the relationship between the research variables, as illustrated in Figure (1) below:

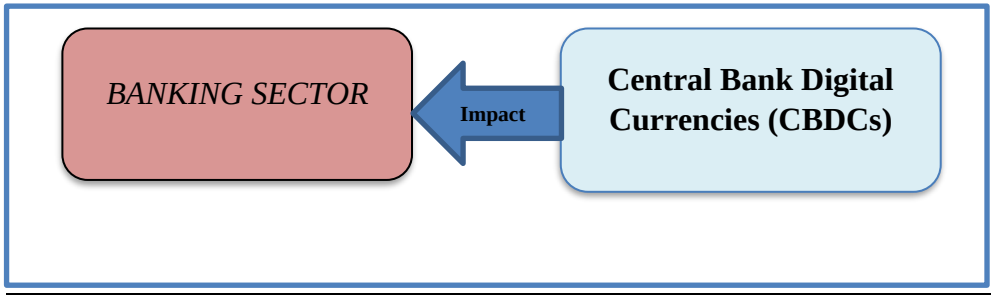

Figure (5): Hypothetical Framework of the Study

Source: Prepared by the Researcher

Fifth: Research Hypotheses

The research aims to answer several research questions through the following hypotheses:

- First Main Hypothesis: There is a significant impact relationship between digital currencies and the banking sector.

- Second Main Hypothesis: There is a statistical relationship between the significant differences and the study variables.

Sixth: Research Methodology

The research adopts the descriptive-analytical approach to address the subject matter, as it is well-suited for studying social phenomena. This approach provides data about the reality of these phenomena, explaining their causes, consequences, and analyzing the responses of the sample regarding the behavior of research variables in the questionnaire designed for this purpose. It aims to identify the factors influencing these phenomena, leading to conclusions and recommendations.

Seventh: Research Boundaries

1. Temporal Boundaries: The research, in both its theoretical and practical aspects, was conducted during (2023-2024). It includes initial visits, observations, distribution, and collection of questionnaires.

2. Spatial Boundaries: These relate to the practical aspect of testing the research hypotheses. A selection of private commercial banks operating in Baghdad was chosen.

3. Human Boundaries: The research targeted managers and IT staff in the banks within the research sample.

Eighth: Data Collection and Information Methods

The methods of data collection and analysis are as follows:

1. Theoretical Aspect: Reference was made to Arabic and foreign books, published research, theses, and dissertations related to the study's topic, available in university libraries and published online.

2. Practical Aspect: A questionnaire was used as a tool for collecting data about the research problem. The questionnaire included two main sections:

- The first section dealt with personal data (gender, age, job title, educational attainment, years of service).

- The second section focused on questions related to the research variables and included 40 items, formulated based on a 5-point Likert scale, ranging from 1 to 5. A score of (5) represents strong agreement, while (1) represents strong disagreement, as shown in Appendix (1). A total of 90 questionnaires were distributed to managers and IT staff in the banks of the research sample, of which 82 were accepted as valid, while 8 were rejected for being invalid.

Ninth: Tools and Methods Used in the Analysis

The research relied on several statistical tools, necessitated by the nature, objectives, and hypotheses of the study. The data were processed using the SPSS statistical program, employing the following tools:

1. Frequencies and Percentages: To describe the sample's views on the study variables.

2. Arithmetic Mean: To determine the importance of the statements in the questionnaire.

3. Standard Deviation: To measure the dispersion of the responses from the arithmetic mean.

4. Significance Level: To identify which items are of greater importance than others.

5. Correlation: To examine the correlation effects between the dimensions of central bank digital currencies (CBDCs) and the dimensions of banking service quality using Pearson's correlation.

6. Multiple Linear Regression Analysis: To determine the relationship between the dimensions of CBDCs and the dimensions of banking service quality.

Central Bank Digital Currencies

Introduction

Digital currency has emerged as one of the most unique and distinctive financial phenomena in our current time. While the skyrocketing market value of digital currencies in early 2020 sparked dreams of quick wealth for many, reports have also recently warned of the risks associated with their use. These risks stem from the extreme fluctuations in their value and exchange rates over a short period, making them difficult to monitor, secure, and control. Moreover, no authority has the power to oversee these markets, leading to challenges in protecting users' devices.

The use of virtual currencies issued by anonymous individuals, traded under false or pseudonymous names, and without any regulatory financial authority overseeing them, opens the door for their misuse in activities such as money laundering, payment for drug trafficking, or transferring funds from fraudulent operations. This could lead to an increase in financial scams and fraud. Furthermore, the economic risks include the potential threat to global monetary stability.

4. Researcher Name and Year	Abdullah Kaboot, 2021
Title of the Study	The Relationship Between Electronic Money, Digital Currencies, Virtual Currencies, and Cryptocurrencies
Study Objective	E-Readiness for ICT Implementation of Higher Education Institutions in Indonesia
Methods Used	The relationship between cryptocurrencies, digital currencies, virtual currencies, and electronic money, with a reference to the Central Bank of Iraq.
Population and Sample	Higher Education Institutions in Indonesia.
Key Findings	Improving the quality of information and communication technology services in these institutions has a highly positive impact on their readiness for the digital age.

6. Researcher Name and Year	Al-Kawaz, 2021
Title of the Study	The Impact of Digital Currency on Monetary Policy Tools – A Case Study of Jordan
Study Objective	The study aims to identify the availability of digital currencies for banking operations through monetary policy tools.

Methods Used	A questionnaire was used for data collection, analysis, and processing.
Population and Sample	Employees of the Jordanian Ministry of Finance.
Key Findings	Digital currencies necessary for banking operations over the internet are available at a good level, reflecting the readiness of organizations as innovative technological tools in Jordanian commercial banks.

9. Researcher Name and Year	Raza etal., (2020)
Title of the Study	Impacts of Service Quality on Customer Satisfaction: A Comparative Study on the Banking Sector of Pakistan Through the Weighted SERVPERF Model
Study Objective	The study aims to determine the effects of service quality on customer satisfaction in the banking sector in Pakistan.
Methods Used	Questionnaire forms and relevant statistical methods for analysis and testing were used.
Population and Sample	The study involved 500 customers from three sub-sectors of commercial banks: 1) private sector, 2) public sector, and 3) Islamic banks.
Key Findings	The study identified differences in customer perceptions across the three banking sub-sectors. Private sector conventional banks were found to have the highest performance, followed by Islamic banks, while public sector conventional banks were identified as low-performing.

7. Researcher Name and Year	Shubeib, 2020
Title of the Study	The Role of the Palestinian Banking Sector in Economic Growth
Study Objective	The study explores whether the banking sector has a role in supporting and financing small projects in African countries to achieve sustainable development goals.
Methods Used	Questionnaire form.
Population and Sample	The study was conducted on four banks in the Sultanate of Oman.
Key Findings	The regression results suggest that banks should focus more on empathy and responsiveness, considering the significant relationship between these variables and customer satisfaction.

Second: The Nature of Digital Currencies:

Several definitions related to digital currencies have been mentioned by researchers and scholars in the field of digital currencies over time, as shown in Table 1 below:

Table 1: Some Definitions of Digital Currencies

S	Researcher and Year	Definition
1	Volodymyret al ,2020:2	It is a digital product derived from the use of electronic payment systems, created by individuals who follow specific protocols for data transfer in conjunction with encryption methods.
2	Perkins,2020:87	It is digital money used through electronic payment systems, where system users validate payments using certain protocols.
3	Al-Najjar, 2019: 32	An accounting unit that has no physical presence or tangible material entity, is not issued by a central bank or specific monetary authority, and is not tied to any local or global currency. It can be converted and stored electronically, issued through advanced computers, and traded on designated platforms without government supervision or control.
4	Keatinge et al,2018:12.	A digital representation of value that is neither issued nor guaranteed by a central bank or public authority, not necessarily linked to legally established currency, and does not have the legal status of money. However, it is accepted by natural or legal persons as a means of exchange, which can be transferred, stored, and traded electronically.
5	Lawrence,2018:8	A digital unit of exchange not backed by legal tender issued by the government, meaning it lacks the status of legal currency and relies on general acceptance for use in financial transactions.
6	Sauer,2016:2	"Money that does not exist physically like coins or banknotes or bank deposits, but exists in digital form."
7	APaiyanukorn,2016:17 .	A new financial innovation and computer algorithm created by individual groups or persons. It has a digital representation of value and acts as a medium of exchange among digital currency users, not issued or endorsed by any state authority, and lacks the legal capacity to settle monetary debt. It is exchanged electronically.

8	Viñals et al,2016:7.	Digital currencies are issued by private developers and restricted to their own accounting units. They can be obtained, stored, accessed, and processed electronically and can be used for various purposes, as long as the parties involved agree to use them.
9	ECB,2014:4	It is a digital representation of value that can be traded digitally and serves as a medium of exchange, unit of account, or store of value, but it does not have the status of legal tender.

Based on the aforementioned definitions of digital currencies, the operational definition for the current study is: "It refers to algorithms representing a digital (virtual) encrypted currency that is illegal, not issued by any official entity, and cannot be controlled by any government or financial authority. Its trade depends on the existence of the internet, functioning on a peer-to-peer basis without an intermediary (third party). It is issued through advanced computers accessible to anyone."

Third: The Importance of Digital Currencies:

It is an exciting time for the financial sector as digital innovations challenge conventional thinking about currency, money, and payments (Brainard, 2018:12). Technology advocates argue that digital currency and the decentralized system using it will be more efficient and secure than the current monetary and payment systems and will be widely adopted (Abuja, 2021:1). Digital currency and blockchain technology eliminate unnecessary intermediary costs in financial transactions (Hellwig, 2020:42). The importance of digital currencies can be summarized as follows:

1. Digital currencies are among the most significant innovations in modern financial and technological thought, which could play an active role in facilitating and advancing direct exchanges and transactions between individuals and groups with minimal costs and effort (Hussein, 2019:142).

2. They align with the demands of an era characterized by speed and reluctance to carry physical money, necessitating the use of an easy and fast financial exchange method through smartphones and modern technologies (Dahshan, 2019:310).

3. The emergence of digital currencies will reshape the rules of the financial system. The way financial services are provided will change irreversibly, eliminating intermediaries and marginalizing (or at least radically altering) the role of financial institutions while reducing the monopoly of national currencies as a means of exchange.

4. Digital currencies open new horizons for financing and act as a catalyst for creating an entirely new financial system based on principles different from those previously known.

5. Digital currencies represent the starting point of a revolution, as they require a focus on radically new concepts rather than simply seeking ways to integrate them into the existing financial system.

Fourth: Advantages of Digital Currencies

Digital currencies represent a new invention and a significant achievement in terms of payments and decentralized networks (Nian & Chuen, 2015: 27-28). They have numerous advantages, including:

1. All digital currencies share the feature of safety and integrity, as they are guaranteed by a community of individuals and computers (Corelli, 2018:1).

2. Digital currencies involve electronic wallets in distributed computer systems, which make transactions easy and direct between the buyer and seller (Ruslan, 2019:177).

3. It facilitates the transfer of value between parties without an intermediary. There is no central bank or government regulation, with low transfer fees compared to current money transfer options (Huang & Zhang, 2019:41).

4. Decentralized finance allows financial services where users can retain the private key that controls access to their wallet (Hays, 2020:42).

5. Lower transaction costs (especially across borders), faster transactions, and anonymity (no need to disclose sensitive data during transactions) (Dabrowski & Janikowski, 2018:14).

Fifth: Characteristics of Digital Currencies

When examining the nature of digital currencies and how they operate and are handled, a set of characteristics emerges, which can be summarized as follows (Amer, 2019: 275-276), (Al-Doush, 2019:247), (Balaq, 2019:220), (Bal, 2014:5), (Leidos et al., 2017:37):

1. Digital currencies are intangible (they have no physical or material existence).

2. High volatility in digital currency prices (increasing or decreasing), which exposes owners to significant risks. A large profit or loss can occur unexpectedly and instantly, making these currencies highly risky.

3. They can be issued by anyone in the world proficient in computer science, software, and mathematical algorithms.

4. Digital currency transactions require constant access to the global internet network.

5. Digital currencies are described as commodity money or commodity currencies, often taking two common forms: system-specific digital currencies and general digital currencies.

Seventh: Comparison Between Digital Currencies and Traditional Currencies

The comparison between digital currencies and traditional currencies can be clarified through Table No. (2).

Table No. (2): Similarities Between Digital Currencies and Traditional Currencies

Traditional Currencies	Digital Currencies
Similarities	
Used for buying or exchanging goods and services.	Used for buying or exchanging goods and services.
Can be divided into smaller amounts.	Can be divided into smaller amounts.

Table No. (3) Differences between Digital Currencies and Traditional Currencies

S	Traditional Currencies	Digital Currencies
Differences		
1.	Cash, gold, or metals.	Digital data.
2.	Stored in bank accounts.	Stored in a digital ledger in virtual space.
3.	Tied to a specific economy.	Not tied to any specific economy.

4.	Centralized, linked to a country or government that controls it.	Decentralized, linked to a network of participants in the digital currency.
5.	Unlimited supply.	Limited supply.
6.	Authenticity verified by experts to prevent counterfeiting.	Authenticity verified automatically to prevent counterfeiting.
7.	Valued against gold and other currencies.	Valued against financial assets and other currencies in the electronic trading market.
8.	Issued and backed by central authorities.	Issued by the network of participants in the digital currency.
9.	Higher costs due to financial intermediation.	Lower costs as they do not require any intermediaries (peer-to-peer).
10.	Slower transaction processing.	Faster transaction processing.

Resources; (Dabrowski. Marek & Janikowski. Lukasz, (2018), "Virtual currencies and their potential impact on financial markets and monetary policy", CASE – Center for Social and Economic Research, No. 495.P14), 135. Viñals. José, Leckow. Ross & Tiwari. Siddharth , (2016), "Virtual Currencies and Beyond: Initial Considerations",INTERNATIONAL MONETARY FUND.p:9)‹

First: The Concept of the Banking Sector:

The banking sector is one of the most important sectors in the economies of countries and is a key means of promoting projects. This varies depending on the nature of the country; in developed countries, there is significant support for projects, whereas developing countries suffer from weak economic sectors due to poor management and political instability. This hinders project growth due to the weak infrastructure needed for their establishment, which in turn negatively affects the private sector and the overall economy of the country. As a result, the country finds itself trapped in a vicious cycle. The banking sector could be one of the ways to break this cycle, revitalize the private sector, and promote entrepreneurial projects, which is what we will discuss in this section.

Second: The Importance of the Banking Sector:

The importance of banks is highlighted by the role of the banking system in creating a balance between savings and investment. It is considered one of the primary financial intermediaries in any country and receives significant attention in the economies of nations, contributing to economic growth and reducing hoarding. The role of the banking sector is particularly evident and crucial in developed countries, as previously mentioned. However, this does not mean that it lacks significance in developing countries; on the contrary, developing nations require an advanced financial system, which they often lack. We observe an increase in money hoarding due to weak banking culture, a low marginal propensity to save relative to interest rates, political and economic instability, and other factors that delay the functioning of banks.

Savings serve as a link between economic growth and the achievement of economic development goals. Raising savings rates allows for the conversion of these savings into financing for investments through financial intermediation channels. This, in turn, leads to an increase in economic capital and positively affects the productive capacity of gross domestic product, thereby propelling the economy into a phase of growth (Mohamed M., 2020).

The banking system is vital for increasing investments that uplift the economies of developing countries, enabling them to keep pace with the growth and development occurring in the age of globalization and technology. Therefore, the banking system plays an effective role in managing the economies of countries, adapting to development and modernization, and occupies a vital position in economic, financial, and monetary systems, thus achieving economic development goals, particularly local development. However, achieving local development requires an efficient banking system and sufficient resources to fund local development programs, which help enhance economic development. Financing is one of the key elements that determine the success or failure of local development; consequently, the banking sector is one of the most important sources of domestic financing for the state, acting as an intermediary between lenders and depositors, and providing deposits in the form of loans that help facilitate economic development (Masoudah, 2018).

Sixth: The Evolution of the Banking Sector with a Comparison Between Developed and Developing Countries

Due to modernity, globalization, and the emergence of economic blocs, communication processes have become easier and faster between countries that extensively use technology. The expansion of multinational corporations, along with rapid technological advancement, has enabled banks to explore unprecedented fields and activities aimed at providing more opportunities, increasing capital, and maximizing profits. Banking and economic activities have become intertwined with globalization, technology, and development, leading to a broad vision for entering new realms through banking activities that have the potential to create and establish economic opportunities that uplift the economies of nations. They are considered essential tools for economic and political changes and for reducing distances between countries around the world (Ibrahim, 2008).

When the global financial crisis occurred in 2008, banks began to employ hedging policies to ensure financial stability, reduce risks, and monitor financial activities. A competent financial sector contributes to the financial stability of a state and enhances the economic well-being of society. The financial system utilizes various policies and tools for financial monitoring and safeguarding, which consists of multiple procedures focusing on a unique financial system and applying macroprudential policies (Khalaf, 2019).

There are indicators of the development of the financial sector in countries, such as the advancement of the banking system and the widespread use of technology, which are often lacking in developing countries. These countries still rely on cash transactions issued by central banks. Due to a weak culture of financial investment, insufficient advisory institutions, and a lack of banking awareness, these nations have struggled to keep pace with modernity and technological advancement in the financial sector (Kazem, 2019).

Hypothesis Testing

First: Measuring the Correlation Between Study Variables

The correlation coefficient (Pearson) serves as a primary indicator in determining the likelihood of accepting or rejecting the hypothesis. It defines the nature of the correlation between variables

at a significance level of (p-value ≤ 0.05). This measure is essential for identifying the direction of the relationship (whether positive or negative).

A positive correlation indicates a direct relationship between the two variables, meaning that an increase in the value of the independent variable corresponds to an increase in the value of the dependent variable. Conversely, a negative correlation signifies that an increase in the value of the independent variable leads to a decrease in the value of the dependent variable.

The study relies on the following to assess the strength of the relationship:

Table (16) Correlation Strength Scale					
Relationship: Positive or Negative	Perfect (±)	Very Strong	Strong	Moderate	Weak
Correlation Value	1	0.80 to 0.99	0.60 to 0.79	0.35 to 0.59	Less than 0.34

"In the case when (correlation = 0), this indicates that there is no correlation between the variables (Saunders et al., 2019, p. 188)."

Main Hypothesis One: "There is a significant correlation at the level of (5% ≥ α) between central bank digital currencies and the banking sector."

This hypothesis involves measuring the correlation between the use of digital currencies in trading within the banking sector as the independent variable and the banking sector as the dependent variable. The Pearson correlation coefficient has been calculated, as shown in the following table:

Table (24): Overall Correlation

Variables	Digital Currencies	
	Correlation Coefficient	p-value
Banking Sector	0.755	0.000
Correlation is significant at 5% // Sample size = 358//		

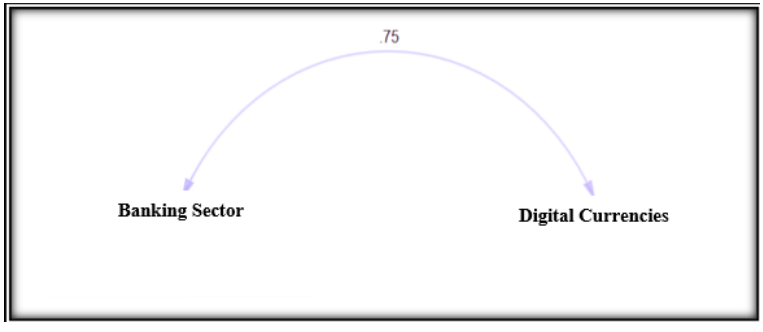

Figure (22) Correlation Diagram according to (Amos)

The statistical outputs show the correlation measurement between the study variables (central bank digital currencies and the banking sector) with a statistically significant correlation at a significance level of (5% ≥ p-value), where the correlation index between the two variables recorded (0.755). This indicates the strength of the relationship and the contribution of digital currencies in reducing the amount of cash in circulation and providing comprehensive

information about cash management in the banking sector, which in turn helps reduce the risks associated with traditional cash transactions and the shift towards modern trading.

Second: Measuring the effect between study variables

Testing the second main hypothesis: "There is a statistically significant effect at a level of (5% ≥ α) between central bank digital currencies and the banking sector."

Table (25) Testing the hypothesis of the impact of central bank digital currencies on the banking sector

Test	F-TEST	Sig.F	Regression Parameter		T-test	Sig.t	R2	MSE	Residuals
Estimated Indicators	471.183	0.000	α	1.03	6.37	0.000	0.57	111.355	0.236
			β	0.843	21.707	0.000			
F(TABE)= 3.89		T(TABLE)=1.984			N=258		P-VULAU<5%		

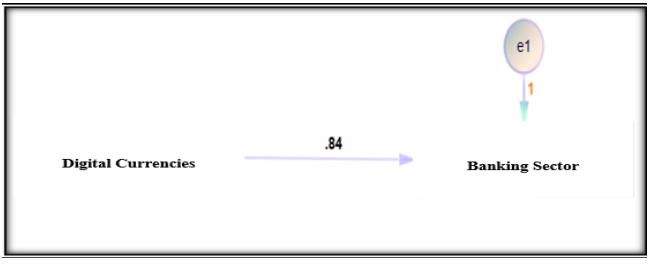

Figure (23) Impact Diagram According to (Amos)

The following table indicates:

The F-TEST recorded a value of (471.183), which indicates the significance of the central bank digital currency study model, as its estimated value according to the regression model was greater than its tabulated value. This suggests the validity of the central bank digital currency study model in estimating the regression parameter or the parameter of direct impact on the banking sector, with a mean square error (MSE) of (111.355), and the residual differences for the predicted value of the banking sector reached (0.236).

The value of the direct impact of the marginal parameter (β) was recorded at (0.843), while the constant term parameter (α) was (1.03) at a significance level of (P-VALUE < 5%). Thus, the linear regression equation for measuring impact is as follows:

Y = 1.03 + 0.843 X1

This mathematical expression indicates that the banking sector is influenced by (84.3%) from the contribution of central bank digital currencies to the banking sector. Referring to the T-TEST, the statistical significance value (Sig.t = 0.000) was (6.37) for the constant term and (21.707) for the direct impact parameter, which confirms the significance of the direct impact parameter in the strategic direction that indicates the significance of the direct impact parameter from the contribution of central bank digital currencies to the banking sector. This impact is attributed to the contribution of modern information technology in the field of modern banking transactions and the modernization occurring in the banking sector.

The coefficient of determination (R^2) was recorded at (0.57), which determines the percentage of changes occurring in the banking sector variable due to the central bank digital currency variable, indicating that 57% of the change in the banking sector is explained by the central bank digital currencies.

The statistical results concerning the regression model parameter and the direct impact parameter of central bank digital currencies in the banking sector confirm the acceptance of the hypothesis that states, "There is a significant impact with statistical significance at the level of ($5\% \geq \alpha$) between central bank digital currencies and the banking sector."

Third: Measuring Significant Differences According to Demographic Variables

The third main hypothesis states: "There are significant differences in the responses of the study sample according to demographic characteristics." To analyze the responses of the study sample and examine the significant differences, the researcher used the One Way ANOVA test, as follows:

1. Significant Differences According to Gender:

To determine whether there are statistically significant differences in the attitudes of the study participants regarding the main study variables according to the gender variable, the results were as follows:

Table (26): Results of One Way ANOVA Test for Differences in Attitudes by Gender

Variables	Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F Value	Significance
Central Bank Digital Currencies	Between Groups	.811	1	.811	1.410	.236
	Within Groups	204.812	356	.575		
	Total	205.623	357			
Banking Sector	Between Groups	.503	1	.503	.972	.325
	Within Groups	184.435	356	.518		
	Total	184.939	357			
Overall Questionnaire	Between Groups	.131	1	.131	.266	.607
	Within Groups	175.389	356	.493		
	Total	175.520	357			

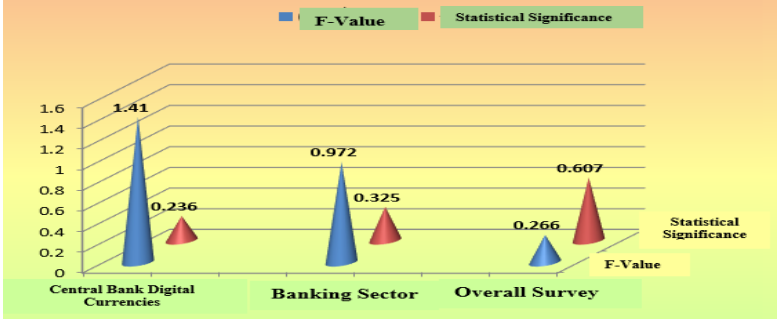

Figure (24) Statistical Differences by Gender

Based on the results presented in the table above, a one-way analysis of variance (ANOVA) was employed to test the differences between the opinions of the study sample regarding the means of responses. The statistical outputs indicated that the p-values for the variables (central bank digital currencies) was (0.236), for the banking sector was (0.325), and for the overall survey was (0.607). This indicates that there are no statistically significant differences at the significance level of ($5\% \leq \alpha$) between the means of the responses related to the level of agreement. The statistical outputs also showed that the F-test values recorded were (1.410) for the variable central bank digital currencies, (0.972) for the banking sector, and (0.266) for the overall survey, all of which were smaller than the tabulated value established at the significance level ($5\% \geq \alpha$), which is (F(TABE) = 3.89). This means that the respondents, regardless of their gender, did not differ in their answers regarding the main variables. Consequently, we reject the hypothesis that states there are statistically significant differences between the means of the responses based on gender and accept the alternative hypothesis which states, "There are no statistically significant differences between the means of the responses based on gender."

Statistical Differences Based on Educational Attainment:

To determine whether there are statistically significant differences between the attitudes of study participants regarding the main variables according to the variable (educational attainment), the results were as follows:

Table (27): Results of the One-Way ANOVA Test for Differences in Attitudes Based on Educational Attainment

Variables	Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F Value	Significance Level
Central Bank Digital Currencies	Between Groups	2.093	3	.698	1.370	.252
	Within Groups	180.289	354	.509		
	Total	182.383	357			
Banking Sector	Between Groups	1.731	3	.577	1.185	.315
	Within Groups	172.372	354	.487		
	Total	174.103	357			
Overall Survey	Between Groups	1.330	3	.443	.901	.441
	Within Groups	174.189	354	.492		
	Total	175.520	357			

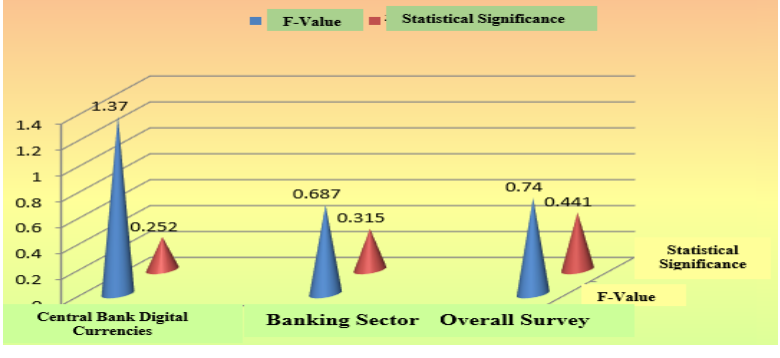

Figure (25) The Statistical Differences According to Educational Attainment

Based on the results presented in the table above, a one-way analysis of variance was conducted to test the differences between the opinions of the study sample regarding the means of their responses. The statistical outputs indicated that the p-values for the variables of central bank digital currencies (0.252), the banking sector (0.315), and the overall questionnaire (0.441) demonstrate no statistically significant differences in the means of the responses related to the degree of agreement. Additionally, the statistical outputs according to the F-test value recorded were 1.370 for the variable of central bank digital currencies, 1.185 for the banking sector, and 0.901 for the overall questionnaire. These values were less than the critical value established at the significance level (5%≥α), which is F(TABLE)= 3.89. This indicates that respondents, regardless of their educational attainment, did not have differing answers concerning the main variables. Therefore, we reject the hypothesis that states "there are statistically significant differences in the means of the responses based on educational attainment" and accept the alternative hypothesis stating "there are no statistically significant differences in the means of the responses based on educational attainment."

Statistical Differences According to Academic Major:

To identify whether there are statistically significant differences in the attitudes of the study participants toward the main study variables based on the variable of academic major, the results were as follows:

Table (28) Results of the One-Way ANOVA Test for Differences Between Attitudes by Academic Major

Variables	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F Value	Statistical Significance
Central Bank Digital Currencies	Between Groups	3.695	3	1.232	2.159	.093
	Within Groups	201.928	354	.570		
	Total	205.623	357			
Banking Sector	Between Groups	1.016	3	.339	.687	.560
	Within Groups	174.503	354	.493		
	Total	175.520	357			
Overall Questionnaire	Between Groups	1.085	3	.362	.740	.529
	Within Groups	173.019	354	.489		
	Total	174.103	357			

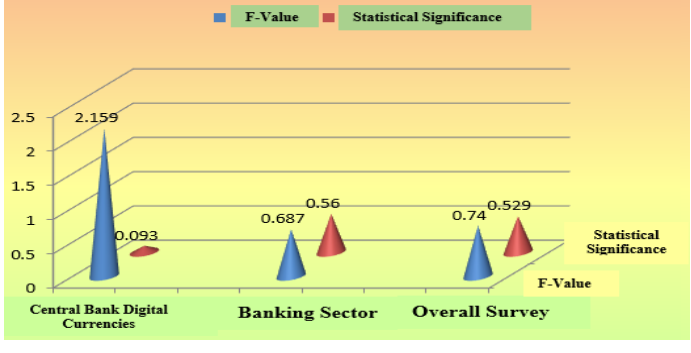

Figure (26) Statistical Differences According to Scientific Specialization

Based on the results shown in the table above, a one-way ANOVA was used to test the differences in the opinions of the study sample regarding the mean responses. The statistical outputs indicated that the p-values for the variables (central bank digital currencies) (0.093), for the banking sector (0.560), and for the overall questionnaire (0.529) show no statistically significant differences at the significance level ($5\% \geq \alpha$) among the mean responses related to the degree of agreement. Additionally, the statistical outputs, according to the value of the F-test, recorded (2.159) for the variable of central bank digital currencies, (0.687) for the banking sector, and (0.740) for the overall questionnaire, which were all smaller than the tabulated value established at the significance level ($5\% \geq \alpha$) of F(TABE) = 3.89. This indicates that the respondents, regardless of their academic specialization, did not differ in their responses regarding the main variables. Therefore, we accept the hypothesis that there are no statistically significant differences at the level of ($5\% \geq \alpha$) among the mean responses based on academic specialization.

Statistical Differences According to Years of Service:

To determine whether there are statistically significant differences in the attitudes of study participants regarding the main variables of the study based on the variable (years of service), the results are as follows:

Table (29) Results of One-Way ANOVA for Differences According to Years of Service

Variables	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Value	Statistical Significance
Central Bank Digital Currencies	Between Groups	2.874	3	.958	1.758	.155
	Within Groups	192.883	354	.545		
	Total	195.757	357			
Banking Sector	Between Groups	3.477	3	1.159	1.886	.132
	Within Groups	217.587	354	.615		
	Total	221.064	357			
Overall Questionnaire	Between Groups	3.247	3	1.082	1.685	.170
	Within Groups	227.359	354	.642		
	Total	230.606	357			

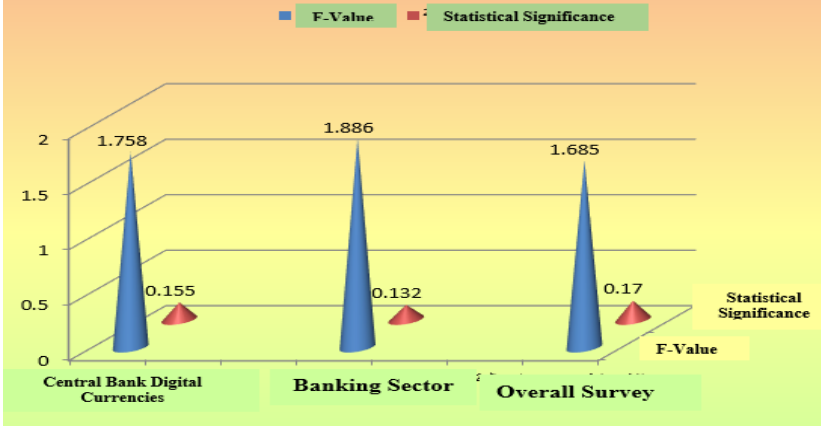

Figure (27) Statistical Differences According to Years of Service

Based on the results shown in the table above, one-way analysis of variance (ANOVA) was used to test the differences between the opinions of the study sample regarding the mean responses. The statistical outputs indicated that the p-values for the variables (central bank digital currencies) (0.155), the banking sector (0.132), and the overall questionnaire (0.170) showed no statistically significant differences at the significance level of (5%≥α) concerning the mean responses related to the degree of agreement. The statistical outputs also indicated that the F-test values were (1.758) for the variable of central bank digital currencies, (1.886) for the banking sector, and (1.685) for the overall questionnaire, which were smaller than the tabulated value set at the significance level of (5%≥α), with a value of F(TABE)= 3.89. This implies that respondents, despite differing in the number of years of service they possess, did not have different responses regarding the main variables. Therefore, we reject the hypothesis that states "there are statistically significant differences between the means of the responses based on years of service," and accept the alternative hypothesis that states "there are no statistically significant differences between the means of the responses based on years of service.

2. Conclusions and Recommendations

Conclusions

1. The descriptive analysis of the data on central bank digital currencies indicates that the sample members possess a high level of knowledge regarding the importance of these currencies in terms of automation, the availability of technological solutions, and communications in modern transactions.

2. The descriptive outputs highlighted the significance of the banking sector in financial and economic stability, which is considered one of the key success factors in implementing monetary policy. The efficiency of financial transactions heavily relies on the banking sector.

3. The results of the descriptive analysis revealed a high consensus on the role of modern technology, including digital currencies, in responding promptly to systems such as Enterprise Resource Planning (ERP), Human Resource Management (HRM), and Information Management.

4. The descriptive statistical outputs indicated agreement on the importance of the channels used for transferring funds, highlighting their role in reducing the time and costs associated with money transfers and financial instruments, as well as their contribution to innovating new methods for conducting banking and financial operations.

5. The results of the statistical analysis demonstrated a significant correlation between central bank digital currencies and the banking sector, with a correlation coefficient of (0.755). This relationship indicates the contribution of digital currencies to reducing the amount of circulating cash and providing comprehensive information on cash management in the banking sector.

6. The statistical results indicated a significant impact of central bank digital currencies on the banking sector, with a direct effect coefficient of (84.3%) in the banking sector. This effect contributed to explaining the changes occurring in the banking sector by (57%).

7. The statistical outputs, according to the one-way ANOVA test for the sample's attitudes regarding central bank digital currencies and the banking sector based on the demographic variables of the sample, showed no statistically significant differences at the level of (less than 5%).

Recommendations

Based on the conclusions reached, the researcher proposes several recommendations that could contribute to enhancing the existing strengths and addressing the weaknesses and shortcomings in the studied company, as follows:

1. Freedom of Entry and Exit in Banking: This is considered the first step toward reforming the banking system and seeking to introduce digital development within it.

2. Enhancing Efficiency in Local Financial Institutions: This can be achieved by increasing competition and improving the quality of banking services regarding the use of digital currencies.

3. Interest Rate Liberalization: Administrative determination of interest rates, often selectively to serve political rather than economic goals, leads to the misallocation of scarce banking resources. Liberalizing bank interest rates can help reduce consumption and encourage saving.

4. Credit Direction Liberalization: The freedom of banks to direct their credit based on creditworthiness is a component of sound financial reform. Government intervention in directing the use of central bank digital currencies can be counterproductive.

5. Complementary Steps for Banking Sector Reform: Reforming the financial system within central banks is linked to opening the field for competition among banks, allowing them to set interest rates freely and directing the use of various types of digital currencies.

WORKS CITED

Al-Asadi, A. I. A. H. (2010). The effects of applying international financial reporting standards on measurement and accounting disclosure in Iraq: An applied study in a sample of private Iraqi banks [Master's thesis, High Institute for Accounting and Financial Studies, University of Baghdad].

Awji, F. Y. A. Q. (2002). The crime of breaching banking supervision duties [Doctoral dissertation, University of Baghdad, College of Law].

Jamal, H. (2013). Banks: An accounting and administrative approach. Al-Waraq Publishing and Distribution, Amman, Jordan.

Al-Siqli, M. S. (2005). The basic principles of effective banking supervision issued by the Basel Committee on Banking Supervision in 1997 [Master's thesis, College of Commerce, Islamic University of Gaza].

Mubarak, A. M. (2005). The mechanism of the Central Bank's supervision over the activities of banks in light of international standards: A case study of the Bank of Algeria [Master's thesis, Faculty of Economic Sciences, University of Algeria].

Marwa, B. T. (2017). The impact of digital marketing on customer satisfaction: A case study of the incoming tourism agency in M'sila [Master's thesis, Faculty of Economic Sciences and Commercial Sciences, Mohamed Boudiaf University, Algeria].

Al-Nasrawi, Z. N. H. (2019). Indicators of banking liquidity and their effectiveness in stimulating economic activity and supporting monetary stability: A sample from Iraqi banks [Master's thesis, College of Administration and Economics, University of Karbala].

Beck, T. R., & Todorov, K. (2012). Supervising cross-border banks: Theory, evidence, and policy. Tilburg University.
Abuja, G. (2011). Liquidity management in Nigeria. Central Bank of Nigeria, Understanding Monetary Policy Series No. 4.
Armstrong, G., & Kotler, P. (2018). Principles of marketing (17th ed.). Pearson Education Limited.
Diamond, S. (2019). Digital marketing all-in-one (1st ed.). John Wiley & Sons, Inc.
Girchenko, T., & Ovsiannikova, Y. (2018). Digital marketing and its role in the banking sector development and economic growth.
Tsaplin, E., & Pozdeeva, Y. (2017). International strategies of business incubators: The USA, Germany, and Russia. International Journal of Innovation, Brazil.
Bernard, R. (1997). Economie financière internationale. ED PUF. Paris.