ISSN 2409-2665
Journal of Logistics, Informatics and Service Science
Vol. 10 (2023) No.2, pp.91-107
DOI:10.33168/JLISS.2023.0207

The Impact of Blockchain Technology on Financial Services: Mediating Role of Big Data Analytics

Abdulrahman Hashem

Department of Banking and Financial Management,Isra University, Amman – Jordan

ahashem@iu.edu.jo

Abstract. The purpose of current study is to examine and explore the mediating influence of big data analysis on the relationship between Block-chain technology (Decentralization, Improved security, Transparency, Smart Contracts, and Tokenization) and financial services within financial brokerage corporations in Amman stock exchange. Quantitative approach was employed, and a questionnaire was distributed on convenient sample (84) managers within financial brokerage corporations. SPSS was adopted to analyze primary data; results of study indicated the acceptance of the main hypothesis and agreeing on the fact that the integration of big data analytics with block-chain technology can create significant value for financial services. Recommendations of study included he need for more collaboration with stakeholders (regulators, financial institutions, tech firms) in order to aid the integration of technology into the financial system in an effective way. Further recommendations were presented in the study.

Keywords: Financial Technologies, Block-chain, Decentralization, Improved security, Transparency, Smart Contracts, Tokenization

1. Introduction

Through the last decade, there has been an inventible amount of focus on Block-chain technology (Block-chain tech) and its ability to improve financial services industry (Harris et al, 2022). However, as with any new technology, there are challenges to be addressed, and one of the key challenges facing the integration of Block-chain technology into financial services is the need for effective data management, this is where big data analytics can play a critical role in mediating between Block-chain technology and financial services (Deepa et al, 2022).

Ali et al (2020) noted that Block-chain tech has the ability to reengineer financial services through presenting a safe, secure, decentralized approach to store, and transfer data. It has been touted as a solution to a wide range of problems, from reducing transaction costs to preventing fraud and increasing transparency (Arslanian and Fischer, 2019). However, for Block-chain technology to deliver on its promises, it needs to be combined with effective data management techniques. This is where big data analytics can come in (Polyviou et al, 2019).

The term (big data analytics) appeared as a process of analyzing large data in order to extract useful insights (Wang et al, 2020). In the environment of Block-chain tech and financial services, big data analytics appeared as a tool that can aid financial sector to reach better management of the huge and complex data they retrieve through their working process including transaction histories, account balances and transaction fees (Varma, 2019).

It was argued that big data analytics in the field of financial industry has the ability to detect and prevent any possible fraud, in addition, Block-chain tech is often utilized as a fraud-proof tool, however, there are still many possible ways for fraudsters to exploit the system and achieve their aims in fraud and corruption (Zachariadis et al, 2019). Moncada et al (2021) argued that through processing and analyzing the huge and complex amount of data available for financial firms through Block-chain; big data analytics could serve to identify possible patterns that may lead to fraudulent activity.

Another way that big data analytics can mediate between Block-chain technology and financial services is by providing insights into customer behavior. By analyzing data on customer transactions and interactions with Block-chain systems, financial institutions can gain a better understanding of their customers' needs and preferences. This can help them tailor their products and services to better meet the needs of their customers and improve customer satisfaction (Chen and Bellavitis, 2020).

Finally, big data analytics can help financial institutions better manage the risks associated with Block-chain technology. As with any new technology, there are risks associated with Block-chain, including regulatory risks, operational risks, and reputational risks. By analyzing data on these risks, financial institutions can better understand the potential impact of Block-chain on their business and develop strategies to mitigate those risks (Chen and Bellavitis, 2019).

Based on above argument, the purpose of current study was to examine the mediating influence on big data analytics on the relationship between Block-chain technology (Decentralization, Improved security, Transparency, Smart Contracts, and Tokenization) and financial services within financial brokerage corporations in Amman stock exchange.

Current study was motivated by the idea that there is an urgent need to understand the potential impact of (big data analytics and Block-chain tech) on the financial industry putting into perspective that Block-chain tech and big data analytics were highlighted as major developers in the financial services environment through their ability to reengineer financial transactions and data analysis.

Based on exploring the mediating influence of big data analytics on the relationship between Block-chain technology and financial services, authors can have insights on the possible ways such technologies interact and the ways they are used together in order to create an efficient and secure financial portals.

Furthermore, understanding the mediating influence of big data analytics on the relationship

between Block-chain technology and financial services can also inform policymakers and regulators about the potential impact of these technologies on the financial industry. It can help them develop policies and regulations that promote innovation and competition while ensuring consumer protection and financial stability.

The motivation behind examining the impact of block-chain technology on financial services and the mediating role of big data analytics is to better understand how these emerging technologies are changing the financial industry. Block-chain technology has the potential to revolutionize the financial sector by streamlining processes, reducing costs, and increasing transparency and security. Big data analytics can play a mediating role by providing insights into the vast amounts of data generated by Block-chain transactions, enabling financial institutions to make more informed decisions. By studying the impact of Block-chain technology and big data analytics on financial services, researchers and practitioners can gain a better understanding of how these technologies are reshaping the industry and identify best practices for their implementation. This knowledge can aid in the development of more efficient, secure, and innovative financial systems that benefit users, institutions, and the global economy as a whole.

2. Literature Review

2.1. Financial Technologies (Fin-Tech)

According to Palmié et al (2020), financial technology, also known as fintech, is a rapidly growing sector that is revolutionizing the way people and businesses manage their finances. Fintech encompasses a wide range of digital services, including online banking, payment processing, cryptocurrency, investment management, and insurance. The adoption of fintech has skyrocketed in recent years, with the global fintech market projected to reach $305 billion by 2025 (Phan et al, 2020).

Hidajat (2020) started that Fintech is the integration of technology into traditional financial services to make them more efficient, secure, and accessible. It involves the use of digital tools and platforms to offer financial services and products, such as mobile banking apps, online payment systems, robo-advisors, and peer-to-peer lending platforms. Fintech has transformed the financial industry by simplifying processes, reducing costs, and expanding financial access 90.

Herawati et al (2020) noted that Fintech offers several benefits to individuals, businesses, and the financial industry as a whole, such benefits included enhanced efficiency, increased accessibility, reduced costs, improved security and personalization. Purwantini et al (2020) argued that Fintech encompasses a wide range of digital services, each with its own unique features and benefits. Such services of fintech included online banking, payment processing, cryptocurrency, investment management and insurance.

According to Barberis et al (2019), fintech industry is rapidly evolving, and new technologies and trends are emerging every year such as:

- Artificial Intelligence: Artificial intelligence (AI) is transforming the way financial institutions operate by automating processes and providing personalized recommendations to users.
- Block-chain: Block-chain tech has the ability to reengineer financial transactions by presenting safe and transparent record-keeping and reducing the desire for intermediaries.
- Open Banking: Open banking is a system that allows third-party financial

2.2. Block-chain as a Fin-Tech

Block-chain technology is a revolutionary invention that has disrupted the traditional ways of conducting transactions and managing data. It is a decentralized and distributed ledger system that provides a secure, transparent, and immutable way of recording transactions and data (Zhang et al, 2020).

According to Liu and Jiang (2021), Block-chain is a continuously growing chain of blocks that contain information, each block in the chain is linked to the previous block using cryptography, forming a secure and tamper-proof chain. This technology has many potential applications in various industries, including finance, healthcare, supply chain, and more.

Boakye et al (2022) argued that among the major benefits of Block-chain tech is formed in (decentralization), on the contrary of traditional systems in which centralized authority has the control on data and transactions, Block-chain tech operates among a network of nodes, making it less vulnerable to fraud or corruption by a single entity. This feature ensures that data stored on the Block-chain is secure and tamper-proof, giving users more control over their data.

Another significant benefit of Block-chain tech is its transparency, as all participants on Block-chain gain access to the same information on which all transactions gets recorded and stored. This means that anyone can track and verify transactions, making it easier to identify fraud and ensure accountability (Gan et al, 2021).

Caldarelli and Ellul (2021) added that, in addition to security and transparency, Block-chain technology can improve efficiency and reduce costs in various industries. For example, in the finance industry, Block-chain technology can facilitate faster and cheaper cross-border transactions by eliminating intermediaries and reducing transaction fees. In healthcare, Block-chain technology can improve data sharing between healthcare providers and patients, making it easier to access and share medical records securely.

However, despite its many benefits, Block-chain technology still faces some challenges. One of the most significant challenges is scalability as according to (Rijanto, 2021). As the number of users and transactions on the Block-chain increases, the system can become slow and inefficient. This challenge has led to the development of new technologies such as sharding and sidechains, which aim to address scalability issues.

Another challenge facing Block-chain technology is the lack of standardization and regulation. With many different Block-chain platforms and protocols, it can be challenging to establish a standardized framework for interoperability and data sharing. Additionally, the lack of regulation and legal clarity surrounding Block-chain technology can make it challenging for businesses to adopt and integrate the technology (Dong et al, 2022).

Osmani et al (2021) argued that Block-chain technology as able to transform financial industry through presenting safe, transparent and efficient tools to manage data and transactions. There might be fields in which there are challenges, but the development of new techs and the increasing utilization of Block-chain gave an indication that there will be a continuous development of its role in re-shaping the future of economy and finances.

2.3. Characteristics of Block-chain Technology

According to Chang et al (2019), Block-chain technology has several key characteristics that make it unique and valuable in various applications; some of the apparent characteristics of Block-chain techs are decentralization which means the total independence on central authority or intermediary in order to manage and verify transactions. Instead, transactions are verified and recorded by a network of participants making it more secure and transparent.

Trivedi et al (2021) argued that Block-chain is also a distributed ledger, which means that it is a shared database that is stored and updated across a network of nodes. Each node has a copy of the database, which helps to ensure that the system is secure and tamper-proof, in addition to that, it is immutable as the transaction cannot be altered or deleted, and this makes the Block-chain tamper-proof and helps to ensure the integrity of the data.

Smith (2019) argued that Block-chain technology uses cryptography to secure transactions and data. Transactions are verified using complex mathematical algorithms, and data is encrypted to protect it

from unauthorized access. On the other hand, Hashemi et al (2020) noted that Block-chain tech provided smart contracts based on self-executing storage on the Block-chain as they automatically executed when certain situations take place.

From another perspective, Du et al (2020) noted that all transactions on the Block-chain are transparent and can be viewed by anyone as it makes it easier to track and verify transactions; this helps to promote trust and accountability. Wang and Qu (2019) stated that among the characteristics of Block-chain is the fact that it is highly secure, thanks to its decentralized and distributed nature, as well as its use of cryptography. This makes it more difficult for hackers and other bad actors to compromise the system.

2.4. Influence of Block-chain Tech on Financial Services

Pal et al (2021) and Ali et al (2020) noted that Block-chain tech has the ability to influence financial services in different ways, including:

- Decentralization: Block-chain tech is naturally decentralized; the transactions are processed and verified without central authority. This can reduce transaction costs, increase efficiency, and make financial services more accessible to people who do not have access to traditional banking services.
- Improved security: Block-chain technology is inherently secure, with each block in the chain containing a unique cryptographic hash that makes it virtually impossible to alter previous blocks. This can help prevent fraud and improve the security of financial transactions.
- Transparency: Because Block-chain transactions normally recorded on a public ledger, they are transparent and easily auditable. This can help increase trust and accountability in financial services.
- Smart contracts: Smart contracts are self-executing contracts that can be programmed to execute automatically when certain conditions are met. Block-chain tech enables the adoption and creation of smart contracts, which help automate financial transactions, reduce their costs, and increase their efficiency.
- Tokenization: Block-chain tech is used as an approach to tokenize assets (stocks, bonds, and real estate) which make them more liquefied and more tradable, this helps in increasing access to investment opportunities and make financial markets more efficient.

Block-chain tech is able to reengineer financial services by making transactions more secure in addition to improving the level of transparency and accuracy, lower costs, and improve customer experience (Khalil et al, 2021). Chang et al (2020) argued that Block-chain provides a tamper-proof database that presents an immutable record of all transactions that allows variety of parties to access and update data, this eliminate the requirement of a central authority. Additionally, Block-chain can help reduce or eliminate fraudulent activities by using encryption technology, smart contracts, and automated processes that require authorization before completing a transaction.

2.5. Financial Services

According to Ali et al (2020), financial services refer to the range of products and services that financial institutions provide to their customers, a financial institution could be a bank, insurance company, investment firm, or any other organization that deals with money matters. Financial services are vital for individuals, businesses, and even governments, as they provide a range of tools to manage money, mitigate financial risk, and plan for the future (Chang et al, 2020).

Chanias et al (2019) argued that one of the critical financial services that individuals and businesses rely on is banking, banks are financial institutions that offer a range of services, including deposit accounts, loans, and credit cards. Another vital financial service is insurance. Insurance companies offer protection against financial losses resulting from unforeseen events such as accidents, illnesses, and natural disasters. Insurance policies cover various risks, such as health insurance, life insurance, auto insurance, and property insurance. Insurance is essential to mitigate financial risk, as it enables individuals and businesses to prepare for contingencies that could threaten their well-being (Karjaluoto

et al, 2019).

Financial services are also crucial for governments, as they rely on financial institutions to manage their budgets, collect taxes, and provide financial assistance to citizens (Bananuka, 2020). Chen and Bellavitis (2020) noted that financial services are essential for individuals, businesses, and governments to manage their money, mitigate financial risk, and plan for the future. Banking, insurance, investment, and other financial services provide customers with tools to achieve their financial goals and protect their financial well-being; as the global economy evolves and technology advances, financial services will continue to play a critical role in shaping the financial landscape (Schär, 2021).

2.6. Big Data Analytics

From the perspective of Hariri et al (2019), big data analytics is defined as the process screening large and complex data sets to reveal certain patterns, correlations, and insights that help financial organizations make informed decisions. Wang et al (2022) argued that with the growth of digital technologies and the internet, organizations – regardless of their field of interest - are generating vast amounts of data every day. This data can come from a variety of sources, such as social media, websites, sensors, and mobile devices. Big data analytics allows us to extract value from this data, enabling businesses and governments to optimize their operations, improve their services, and gain a competitive advantage (Mohamed et al, 2020).

Shi (2022) stated that there are several key components of big data analytics, including data collection, storage, processing, and analysis. The first step is to gather data from various sources and store it in a way that is easily accessible and secure. This can be a challenge, as the volume and velocity of data can be overwhelming, to address this, many organizations use cloud-based storage solutions/distributed file systems that can scale to accommodate large data sets. Once the data is collected and stored, the next step is to process it. This involves cleaning and transforming the data so that it can be analyzed effectively. Data cleansing is critical, as it helps to remove errors, duplicates, and inconsistencies in the data (Mikalef et al, 2019).

With the data cleaned and transformed, the next step is to analyze it. There are several approaches to big data analytics, including descriptive analytics, predictive analytics, and prescriptive analytics. Descriptive analytics involves summarizing the data to gain insights into past events and trends. Predictive analytics involves using statistical models and machine learning algorithms to forecast future events or trends. Prescriptive analytics involves using optimization techniques to recommend the best course of action based on the data (Syed et al, 2020) according to Ranjan and Foropon (2021) government agency may use big data analytics to monitor social media for signs of public sentiment, enabling them to respond quickly to emerging issues or crises.

However, there are also challenges associated with big data analytics. One of the main challenges is data privacy and security. As more data is collected and analyzed, there is a risk of sensitive information being exposed or misused. Another challenge is the complexity of the analytics process itself. Big data analytics requires specialized skills and expertise in data science, machine learning, and statistics. There is a shortage of professionals with these skills, making it difficult for organizations to implement big data analytics effectively (Li et al, 2022).

2.7. Related Studies

Pal et al (2021) in their study provided a comprehensive overview of the current state of knowledge on the use of blockchain technology in financial services. The purpose was to identify the key trends, challenges, and opportunities associated with the use of blockchain in the financial services sector. The authors conducted a systematic review of the relevant literature on blockchain technology in financial services. They searched several databases, including Scopus, Web of Science, and Google Scholar, for articles published between 2008 and 2018 that focused on blockchain technology in financial services. The results of the study indicated that blockchain technology has significant potential to transform

financial services by improving efficiency, reducing costs, and increasing security. The review identified several key applications of blockchain technology in financial services, including clearing and settlement, identity verification, digital currencies, and smart contracts.

Ali et al (2020) provided a comprehensive overview of the current state of knowledge on the use of block-chain technology in the financial services sector. The purpose was to identify the key themes, challenges, opportunities, and future directions of blockchain technology in financial services. The authors conducted a systematic literature review by searching several databases, including Scopus, Web of Science, and Google Scholar, for articles published between 2008 and 2019 that focused on blockchain technology in the financial services sector. The authors then analyzed and synthesized the findings of these studies to identify key themes and trends. The study found that blockchain technology has the potential to bring significant benefits to the financial services sector. The most significant benefit is the potential to reduce costs by simplifying and automating complex financial transactions. Blockchain also has the potential to increase efficiency, security, and transparency in the financial services sector. The study identified several key challenges to the widespread adoption of blockchain technology in financial services, including regulatory barriers and legal uncertainties, interoperability issues, scalability, and the need for standardization. The authors also highlighted several future research directions for blockchain technology in financial services, including the need for interdisciplinary research that combines technical, economic, and legal perspectives.

Zachariadis et al (2019) examined the challenges facing blockchain technology in financial services, particularly in terms of governance and control. The authors aimed to understand the critical issues that need to be addressed to realize the potential benefits of blockchain technology in financial services. The authors conducted a qualitative study by analyzing interviews with 40 participants, including blockchain experts, regulators, academics, and practitioners. The interviews were conducted between January and June 2018 in the United Kingdom, United States, and Asia. The study found that governance and control are significant challenges for blockchain technology in financial services. Blockchain is designed to be decentralized, and this creates challenges for traditional governance structures. The researchers identified several key issues related to governance and control, including the need for trust, the role of intermediaries, and the need for standardization. The study also found that there is a tension between the desire to create decentralized systems and the need for control and regulation. While blockchain technology has the potential to increase transparency and reduce the need for intermediaries, there are concerns about security, privacy, and legal compliance.

3. Methods

3.1. Methodological Approach

Current study adopted quantitative approach in order to reach the main aim presented earlier, it was fond out that quantitative approach is the best methodology due to its ability to be generalized and give better explanation for the phenomenon.

3.2. Tool of Study

A questionnaire was built in order to be the main tool of study. The questionnaire was built with the help of previous studies, and it contained two main sections, the first took into account the demographics of study sample, while the other section presented statements related to variables of study including (Decentralization, Improved security, Transparency, Smart Contracts, Tokenization). The questionnaire was arbitrated by a group of specialized academics in the field, and in its final version it contained (36) modified statements which were based in liker 5 point scale (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree.

3.3. Population and Sampling

Population of study consisted of all financial managers within Jordanian financial services companies,

specifically financial brokerage corporations in Amman stock exchange in total of (52) firms. Two questionnaires were distributed on the chosen corporations in total of (104) questionnaires, after application process researcher was able to gather (84) properly filled questionnaires which indicated a response rate of (80.7%) as statistically accepted.

3.4. Statistical Processing

Statistical Package for Social Sciences (SPSS) was adopted in order to analyze gathered primary data, Cronbach's alpha was used to figure out how reliable the questionnaire was, and the results are shown in the table below. All of the Alpha values for the variables are above 0.70, which is a good sign:

Table 1: Reliability Test

	Alpha value
Decentralization	0.70
Improved security	0.722
Transparency	0.716
Smart Contracts	0.725
Tokenization	0.719
Financial Services	0.861
Big Data Analytics	0.876

Other statistical processes included frequency and percentages, mean and standard deviation, and multicolleniarity test.

4. Results and Analysis

4.1. Demographics Results

Frequency and percentages were calculated for demographics of study. It was seen as in the table below that majority of the sample were males forming (82.1%) of the sample, in addition to that, the majority were more than 37 years forming (40.5%) of the sample, they held BA degree forming (34.5%) and they had an experience that ranged between 10-13 years forming (41.5%) of the sample.

Table 2: Demographic Statistics

	Frequency	Percent
Gender		
Male	69	82.1
Female	15	17.9
Age		
25-30	24	28.6
31-36	26	31.0
+37	34	40.5
Education		
Diploma	18	21.4
BA	29	34.5
MA	24	28.6
PhD	13	15.5
Experience		
2-5	11	13.1
6-9	30	35.7
10-13	35	41.7
+14	8	9.5
Total	84	100.0

4.2. Questionnaire Analysis

Mean and standard deviation were calculated for responses to questionnaire statements, as it was seen through table below, all statements were positively received as they scored higher than mean of scale 3.00 which was seen as statistically accepted.

In terms of sub-variables of study, table 2 below noted that the highest mean of variable was (big data analytics) and scored 4.16/5.00 compared to the lowest mean which was scored by (decentralization and smart contracts) as both scored 3.97/5.00.

Regarding statements of questionnaire, the highest statement was "The use of big data analytics enable businesses to identify opportunities for improvement in their Block-chain-based applications" and scored 4.23/5.00 compared to the lowest – but still positive – which was "Smart contracts can be stored on the Block-chain and executed in a decentralized manner" with mean of 3.87/500.

Table 3: Descriptive Statistics

Statement	Mean	Std. Deviation
Decentralization enables transactions to be processed and verified without the need for a central authority	3.95	.64
Decentralization works with network of nodes that work together to validate transactions and maintain the integrity of the Block-chain	4.05	.74
Decentralization can guarantee increased security, and resilience	3.94	.83
Decentralization reduces the risk of fraud and censorship, as there is no single point of failure in the network	3.99	.86
Decentralized finance (DeFi) guarantees an ecosystem of financial applications built on Block-chain technology.	3.92	.89
Decentralization	**3.97**	**.54**
Block-chain leverages advanced cryptographic techniques to provide a tamper-evident and tamper-resistant record of transactions.	3.93	.86
Block-chain uses digital signatures and cryptographic hashes, which make it extremely difficult to alter or falsify data without detection	4.08	.82
The distributed nature of the Block-chain makes it more resilient to attacks	4.02	.79
Block-chain requires a significant amount of computing power to successfully attack the network.	4.04	.84
Block-chain technology enables the use of multi-signature wallets, which require multiple signatures to authorize a transaction, further enhancing security.	4.04	.81
Improved security	**4.02**	**.57**
The transparency of the Block-chain enables easy auditing and monitoring of transactions	4.19	.80
Transparency of Block-chain makes it easier to detect fraudulent activity.	4.14	.79
Block-chain technology present many security features, such as zero-knowledge proofs, homomorphic encryption, and secure multi-party computation	4.14	.82
Transparency enables all transactions to be recorded on a public ledger that is accessible to all participants in the network	3.95	.88
Transparency of the Block-chain enables easy auditing and monitoring of transactions,	3.88	1.00
Transparency	**4.06**	**.59**
Smart contracts are self-executing programs that can automatically execute the terms of a contract when certain conditions are met.	4.02	.78
Smart contracts can be stored on the Block-chain and executed in a decentralized manner.	3.87	.77
The use of smart contracts in Block-chain-based supply chains can enable the automation of processes such as tracking inventory, verifying the authenticity of goods, and settling payments.	3.98	.74
Smart contracts can also be used to create decentralized autonomous organizations (DAOs)	4.04	.91

The use of smart contracts in Block-chain-based financial applications enable the creation of complex financial instruments that can be executed automatically.	3.95	.85
Smart Contracts	**3.97**	**.56**
Tokenization can convert real-world assets or rights into digital tokens	4.01	.86
Tokenization enables the fractionalization of assets, enabling individuals to own a portion of an asset that was previously out of reach	4.00	.86
The use of tokens in Block-chain-based financial applications enables the creation of new investment opportunities and business models.	4.11	.76
The use of tokenization in Block-chain-based supply chains enable the tracking of products and materials	4.11	.82
The use of tokenization in Block-chain-based gaming and social media applications enable the creation of digital economies	3.92	.79
Tokenization	**4.03**	**.56**
Block-chain-based financial services offer new and innovative solutions to traditional financial services.	4.13	.85
Block-chain-based financial services enable secure and transparent transactions that are recorded on a decentralized	4.13	.82
Block-chain-based financial services offer greater financial inclusion by enabling access to financial services	4.15	.90
The use of Block-chain technology in financial services enable the creation of decentralized autonomous organizations (DAOs)	4.02	.88
Block-chain-based financial services enable the creation of complex financial instruments	3.99	.87
Financial Services	**4.09**	**.69**
The use of big data analytics in Block-chain-based financial services enable businesses to identify patterns of fraud and other financial crimes	4.19	.91
Using big data analytics enable businesses to gain greater visibility into their supply chains	4.18	.82
Big data analytics in Block-chain improve efficiency and reduce costs.	4.13	.82
Big data analytics is used to analyze data from smart contracts, enabling businesses to gain insights into the performance of their contracts and identify potential issues.	4.01	.91
The use of big data analytics enable businesses to identify opportunities for improvement in their Block-chain-based applications	4.23	.83
Big data analytics can identify potential security threats and other issues that may impact the performance of the network.	4.20	.89
Big Data Analytics	**4.16**	**.68**

4.3. Multicolleniarity test

VIF and Tolerance were calculated for each of the independent variables to see if there was multicollinearity between the variables. Here are the things that were found to be true:

Table 4: Multicolleniarity

variable	Tolerance	VIF
Decentralization	.684	1.462
Improved security	.662	1.511
Transparency	.956	1.047
Smart Contracts	.904	1.106
Tokenization	.897	1.115

There is no indication of multicollinearity, as shown by the fact that the VIF values are less than 10 and the Tolerance values are more than 0.10 (Gujarati & Porter, 2009).

4.4. Hypotheses Testing

Table 5: Fit model

Indicator	AGFI	$\frac{X^2}{df}$	GFI	RMSEA	CFI	NFI
Value Recommended	**> 0.8**	**< 5**	**> 0.90**	**≤0.10**	**> 0.9**	**> 0.9**
References	(Miles and Shevlin, 1998).	(Tabachnick and Fidell, 2007)	(Miles and Shevlin, 1998).	(MacCallum et al, 1996)	(Hu and Bentler, 1999).	(Hu and Bentler, 1999).
Value of Model	0.891	1.271	0.949	0.057	0.966	0.967

All of the aforementioned indicators have attained or exceeded the values recommended by the aforementioned sources and research, as shown in Table 5. In this way, the researcher may make use of the study model's outputs and disseminate them effectively during the study's duration.

Table 6: Impacts

			Direct impact	Indirect impact	C.R.	P	result
Big data analytics	<---	Block-chain	0.602		2.720	.007	Accept
financial services	<---	Big data analytics	0.321	0.193	2.592	.010	Accept
financial services	<---	Block-chain	0.414		2.154	.031	Accept

H1: Block-chain has a significant influence on financial service

This hypothesis is accepted (C.R. = 2.154; P < 0.05; = 0.031). This means that Block-chain has a significant influence on financial service

H2: Block-chain has a significant influence on Big data analytics

This hypothesis is accepted (C.R. = 2.72; P < 0.05; = 0.007). This means that Block-chain has a significant influence on big data analytics

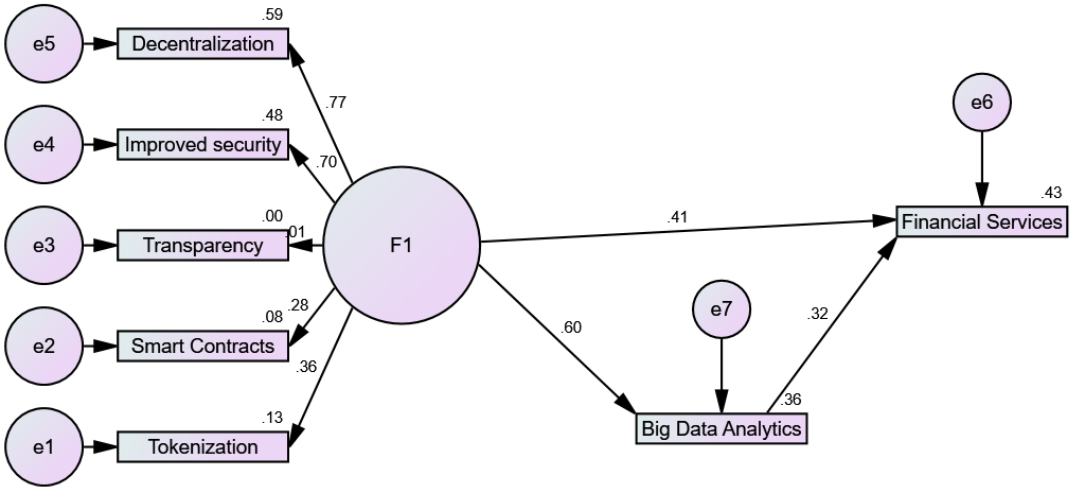
H3: Big data analytics has a statistically significant influence on financial services

This hypothesis is accepted (C.R. = 2.592; P < 0.05; = 0.01). This means that Big data analytics has a statistically significant influence on financial services

H4: Big data analytics mediates the relationship between Block-chain and financial services

This hypothesis is accepted (C.R. = 2.592; P < 0.05; = 0.01) and the indirect effect is 0.193 which is significant at 0.05 level. This means that Big data analytics mediates the relationship between Block-chain and financial services

Following chart summarizes the results:



4.5. Discussion

Purpose of current study was to examine the mediating influence of big data analytics on the relationship between Block-chain technology and financial services within financial brokerage corporations in Amman stock exchange. Quantitative approach was employed and a questionnaire was distributed on a convenient sample of (84) managers within financial brokerage firms in Amman Stock Exchange. SPSS was utilized to process primary data, and analysis of data proved that big data analytics is able to mediate the relationship between Block-chain tech and financial services.

Block-chain technology has the ability to enhance financial services

Based on study results, it was seen that there are a number of ways in which Block-chain could be beneficial for the financial services. As a start, it can help to improve the accuracy and transparency of transactions, Block-chain can also help to reduce the cost of financial services by providing a more efficient way of exchanging information. This result agreed with Pal et al (2021) and Ali et al (2020) who argued that Block-chain could help to increase the trustworthiness of financial services providers.

Also result indicated that Block-chain technology offers a variety of potential advantages for financial services, such as increased transparency and improved accuracy in record keeping; in addition to that, it can provide improved security, greater efficiency in financial transactions, and reduced costs. Khalil et al (2021) agreed on these results adding that Block-chain influence on financial services include streamlining the process of creating and tracking financial contracts, digital payments, and more complex financial instruments.

Results of study indicated that Block-chain tech in financial services can improve security through decreasing costs and reduce risks within the area in which financial transactions are completed, and improved security could ensure that sensitive data is not stolen; which agreed with Chang et al (2020).

There is a mediating influence of big data analytics on the relationship between Block-chain technology and financial services

The previous hypothesis was refuted by results indicating that the integration of (big data analytics and Block-chain) are able to create significant value for financial services firms, but that this value was dependent on the effective exploitation of big data analytics to interpret and analyze the data generated by Block-chain networks. Block-chain technology offers numerous benefits for financial services firms, including improved security, increased transparency, and enhanced efficiency. However, the vast amount of data generated by Block-chain networks can be overwhelming, making it difficult for firms to fully realize the potential benefits of this technology which was previously agreed on by Ranjan and Foropon (2021).

This is where big data analytics comes in. By analyzing and interpreting the data generated by Block-chain networks, financial services firms can gain valuable insights into the behavior of network participants, identify potential risks and threats, and improve the overall performance of their Block-chain-based solutions. In this way, big data analytics acts as a mediator between Block-chain technology and financial services, enabling firms to fully leverage the benefits of Block-chain by effectively managing the vast amounts of data generated by these networks. Current empirical research has supported this hypothesis, showing that the integration of big data analytics with Block-chain technology can create significant value for financial services firms.

As a result, big data analytics has the potential to transform the way business is done and decisions are made. By leveraging the power of data, organizations can gain insights that were previously hidden, leading to better decisions, improved services, and increased efficiency. However, big data analytics also presents challenges that need to be addressed, such as data privacy and security, and the need for specialized skills and expertise. As we continue to generate more data, big data analytics will become increasingly important in enabling organizations to stay competitive and meet the needs of their customers and stakeholders. Such results matched what came along earlier by Li et al (2022).

5. Conclusion

5.1. Conclusion

In conclusion, Block-chain technology has a significant relationship with financial services, offering potential benefits such as improved security, efficiency, and new business models. As such, it is expected to continue to disrupt and transform the financial industry in the coming years. Big data analytics can play a critical role in mediating between Block-chain technology and financial services. By providing insights into customer behavior, detecting and preventing fraud, and helping to manage the risks associated with Block-chain technology, big data analytics can help financial institutions realize the full potential of Block-chain technology while minimizing its risks. As the financial services industry continues to evolve, the importance of effective data management techniques, including big data analytics, will only continue to grow.

However, study was able to prove that Blockchain technology and big data analytics can be used to improve financial services in several ways, including:

1. Streamlining processes: Blockchain technology can be used to automate and simplify many of the administrative and operational processes involved in financial services. This can reduce the time and costs associated with these processes, improving efficiency and customer experience.

2. Increasing transparency: Blockchain technology provides a transparent, tamper-proof record of all transactions, which can improve accountability and trust in financial services.

3. Enhancing security: Blockchain technology uses advanced cryptography and distributed ledger technology to secure transactions and protect against cyber-attacks and fraud.

4. Risk management: Big data analytics can be used to identify patterns and insights in vast amounts of data generated by blockchain transactions. These insights can help financial institutions assess risk better, make more informed decisions, and develop more effective risk management strategies.

5. KYC (Know Your Customer) and AML (Anti-Money Laundering) compliance: Blockchain technology can facilitate secure and efficient KYC/AML processes by enabling quick and secure data sharing between institutions.

6. Payment systems: Blockchain technology can facilitate the creation of secure and efficient digital payment systems, which can improve access to financial services for unbanked populations.

5.2. Theoretical and Practical Implications

Theoretical implications

Implications of current research from a theoretical perspective lies in the fact that implementation of Block-chain tech presents insights through big data analytics as a mediating the relationship between Block-chain tech and financial services. Also, the study can help researchers better understand the interplay between Block-chain technology and big data analytics, providing a deeper understanding of how these two technologies can be integrated to create value for financial services firms.

Practical implications

The study can provide valuable insights for financial services firms looking to adopt Block-chain technology, helping them understand the potential benefits and challenges of integrating big data analytics into their Block-chain-based solutions. Also, the study can help financial services firms develop more effective strategies for leveraging big data analytics to improve their Block-chain-based solutions, enabling them to offer more efficient and effective financial services to their customers.

5.3. Recommendations

- It is important to define a clear business case for implementing Block-chain technology in financial services. The business case should align with the strategic goals of the organization, and a clear return on investment (ROI) should be identified.
- Collaboration in order to ensure that the Block-chain tech is integrated into the financial system effectively.
- Security and privacy are critical aspects of Block-chain technology, as it is designed to be a trustworthy ledger. Therefore, it is important to ensure that the system provides a high level of security and privacy protection for all participants.

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