

تحليل تأثير تطبيقات الذكاء الاصطناعي وتقنية البلوك تشين على أداء الأنظمة المصرفية التقليدية: دراسة تحليلية

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Analyzing the impact of artificial intelligence applications and block chain technology on the performance of traditional banking systems: an analytical study

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المستخلص

أصبح تبني التغيير القائم على التكنولوجيا محركاً ومُعزّزاً مهماً للخدمات المصرفية التقليدية مع التأثير على المنظمات التقليدية وطرق تعاملها مع العملاء. الغرض من هذه الدراسة هو تحليل كيفية تبني الصناعة المصرفية التقليدية للتقنيات الجديدة في خدماتها بما في ذلك الذكاء الاصطناعي وسلسلة الكتل والخدمات المصرفية عبر الهاتف المحمول. يتم استخدام مزيج من البيانات النوعية التي تم جمعها من المشاركين في الصناعة المصرفية والجامعة جنباً إلى جنب مع التحليل الكمي لقياسات أداء الشركات في الدراسة. تسلط النتائج الرئيسية الضوء على العديد من المزايا: تحسين إمكانية الوصول وسهولة المعاملات وأوقات المعالجة الأسرع وتعزيز تدابير الأمن وتحسين الوصول المالي. وفي نفس السياق، يعمل الذكاء الاصطناعي على تحسين كفاءة الأنشطة التجارية وتسهيل اتخاذ القرار وضبط علاقات العملاء. تقلل تقنية البلوك تشين من الوسطاء، وتعزز معدل الانفتاح، وتعزز مستوى الأمان. كما تعمل على توسيع أبعاد الخدمات المصرفية، وتعزز علاقات العملاء، وتوفر فرصة للخدمات المصرفية لشريحة كبيرة من السكان الذين ليس لديهم فرصة لاستخدام المنتجات المصرفية التقليدية. ومع ذلك، لا تزال هناك بعض القيود، وهي تكاليف التنفيذ المرتفعة، والمخاطر السيبرانية، وتردد موظفي المنظمة في تبني التغيير. مستوى الارتباط معتدل وإيجابي، كما يمكن رؤيته من خلال تباين التحول الرقمي (DT) الذي يفسر جزءاً كبيراً من التغيير في أنظمة الخدمات المصرفية التقليدية (TBS) ؛ (R المعدل مربع 0.336). هناك دليل إحصائي مهم للنموذج الإجمالي ($p < 0.05$) يشير إلى أن التحول الرقمي له تأثير جيد على المتغير التابع.

الكلمات المفتاحية: التحول الرقمي، أنظمة الخدمات المصرفية التقليدية، تقنية البلوك تشين، الذكاء الاصطناعي

Abstract

The embrace of technology-based change is becoming a significant driver and enhancer of conventional banking services while impacting conventional organizations and their ways of engaging with customers. The purpose of this study is to analyze how the

traditional banking industry embraces new technologies in its services, including AI, block chain and mobile banking. A combination of qualitative data collected from participants in banking industry and university together with the quantitative analysis of corporate performance measurements is employed in the study. Key findings highlight several advantages: enhanced accessibility and ease of transactions, Faster processing times and Strengthened security measures and improved financial access. In the same regard, AI improves efficiency of business activities, facilitates decision making and fine tunes customer relations. Blockchain reduces intermediaries, enhances the openness rate, and strengthens the security level. It extends the dimensions of banking services, enhances customer relations, and offers an opportunity for banking services to the vast population that dose not have a chance to use conventional banking products. There still are some constraints, and they are high costs of implementation, cyber risks, and organizational employees' reluctance to embrace the change. The level of correlation is moderate and positive, as can be seen by the variance in Digital Transformation (DT) which explains a considerable portion of the change in Traditional Banking Systems(TBS); (Adjusted R squared of .336). There is statistically significant evidence of the overall model ($p < 0.05$) suggesting that DT has a good influence on the dependent variable.

Keywords: *Digital Transformation, Traditional Banking Systems, Blockchain Technology, AI*

Introduction

As the market embraces innovative financial technologies, conventional banking systems are at risk. An analysis of impacts of this disruption can help because it will reveal how banks can continue to thrive when faced with disruptive change.

Potential Research Questions:

The study problem can be the banking sectors have implemented the integration of AI and blockchain in various aspects of the banking processes, specifically focusing on the core banking operations as core banking is a critical aspect of banking services. This study will discuss the different barriers to the digital transition thoughts questioned by traditional banks.

A: Has the trust and the customers security perceptions changed over time in regard to digital banking?

Based on the foregoing, this research **hypotheses** that artificial intelligence (AI), blockchain, and mobile banking application, impact operational efficiency, customer satisfaction and competitive advantage in the financial sector. Therefore, this study can

inform policymakers and leaders in banking organizations on how to approach digitization properly and know how to manage customer concerns.

Literature Review

Artificial Intelligence in Financial Services

It has been widespread in the recent past in all sectors of the economy due to increased digital data and increased computational power among the influential factors. A lot of gains can be got when these tools are applied to the delivery of financial services to the general society and not only in the institutions of financial seriousness. Some of the benefits described in this article include and also briefly outlines some of the main uses of these tools among the financial institutions as well as the central banks. It also reveals the major flaws that can be seen in the application of the technology and its probable effects on the right operations of the financial sector. (Fernández, A., 2019:19)

Organizations in operations benefit from artificial intelligence in that it automates activities like approvals of loans, detection of fraud and risk, as well as increases the speed in decision making. Fernández, A. AI in Customer Experience helps to enable banking services through chat bots, virtual assistants and sentiment analysis, 2019 (Yella & Suganyadevi, 2024:4). AI in Decision-Making Powers algorithmic trading, portfolio optimization, and predictive analytics for market trends. There is clear evidence of cost-saving and achieving operational efficiency by large financial organizations in the use of AI (Nazareth & Reddy, 2023:640). Currently, there is little information about how AI influences SMBs, and the problem of ethicality and AI's biases has not been extensively researched.

Blockchain Technology

Blockchain in Operational Efficiency enables faster and more secure transactions through decentralized ledgers. Also, There is a reduction in the cost of intermediaries and time spent on processing them. Therefore, Blockchain in Transparency and Security leads to provide an unchangeable record of transactions and make it more auditable and trustworthy, Reduce cyber security risks by avoiding implementation of single points of failure. Customer experience is enhanced by blockchain in the following ways cross-border payments and real-time settlements can be made through blockchain also, secure data sharing helps to improve the trust of the customers (Kunduru, 2023:60). Increasing use in payments, smart contracts as well as in supply chain finance waiver of blockchain is evident. Blockchain outcomes are also evident in the reformulation of fraud and improvement in efficiency. A significant lack of research is available on how these blockchain systems scale and their energy consumption pattern. Empirical research regarding the blockchain's long-term effects in less-developed markets is insufficient.

It is clear that the blockchain need to engage with the significant technical, economic, and regulatory challenges blockchain faces today.

Mobile Banking Platforms

Mobile banking is adopted as a viable service delivery option for Banking in Accessibility to reach out to the remote and less served areas. Moreover, it helps to improve the government's efforts in providing financial inclusion by reducing account ownership hurdles. Mobile Banking in User Engagement: Enhances the communication by sending timely updates and alerts to the customers, Provides personal service to the users and Retains the users by developing easy to use interface and gift giving. (Shankar, A. 2021:15). Mobile Banking in Competitive Advantage – Every bank has focused on increasing its market share by providing customers exclusive novelties to engage in mobile banking. Also it employ use of data analytics for financial solutions. (Siddik,&eatls, 2014:116). found that more of adoption to mobile banking leads to more of financial inclusion. Recurring enhancements in the satisfaction of the customers concerning the mobile app usability. That is, there is scarce knowledge on the issue of impediments to the use of mobile banking in emerging markets.as well as that cloud computing is advantageous in banking services.

Mobile banking with the help of AI and blockchain technology is making a commendable change in the conventional system of banking services. Therefore, AI and blockchain are related in that one strengthens the other by providing security and operational improvement for the other. For instance, it is possible to use data from the blockchain to identify fraud in real-time (Yli-Huumo et al., 2016:477). Likewise, the organisation and control of many AI-based procedures is made secure with the aid of data record immutability of blockchain.

Thus, mobile banking is the frontline in the interface between the customer and the provision of services employing artificial intelligence and block chain. Advanced MonGoo mobile applications rely on artificial intelligence that recommendations users, and the utilization of blockchain that secures payments. (AlSheikh and Alzoubi 2023:395) established that this integration leads to customer trust and engagement as well as minimizes operational issues affecting the performance of the banks.

Results of the one study insure in the development of the legislative regulation of the FinTech industry in Russia. (Galazova, & Magomaeva, 2019:48). Also, this study is to determine that domestic banking sector need to transform to digitalization, in order not only to improve the competitiveness and efficiency of functioning, but also to stay in the banking business.

Challenges of Digital Transformation implementation

That being said, the implementation of AI together with the utilization of blockchain and mobile banking more benefits than drawbacks still have some limitations. Legal issues regarding data privacy and security and other permits and approvals thus remain important considerations as does the technology's feasibility of scaling up to the number of users that may sign up for the service. Some of them includes implementation costs, risks of cybercrimes, and strong resistance from workers.

Study variables

Study variables consist of independent variable (digital transition) and dependent variable (traditional banking services)

Methodology

In this part, the data are presented and the hypotheses are tested. The researcher used the questionnaire method (likert scale) as a basic tool for collecting data. The researcher first verified the validity of this tool and its internal consistency.

The validity of the questionnaire:

The researcher verified the accuracy of the questionnaire by evaluating its validity and reliability. The validity of the questionnaire content was evaluated by sharing it with a group of experts and specialists. The paragraphs that received approval from the experts at a rate of (77%) were identified, which indicates their accuracy and appropriateness. In this questionnaire, the Pearson correlation coefficient was calculated to determine the degree of correlation between the scores of each paragraph and the scores of each paragraph. Table (1) shows the following results:

Table (1) Reliability statistics

Reliability Statistics		
Cronbach's Alpha		Total
Digital Transformation	0.700	0. 71
Traditional Banking Systems	0.720	

The study participants comprised of both academics, professionals and bankers (25 persons).The researcher chose these sample randomly because they are too much experience in both field accounting and IT.

Table (3) shows Occupation of respondents

Demographic	Analysis:	%
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Occupation	
IT	27%
accountants	25%
academics	24%
Auditors	24%

IT professionals made up 27% of respondents while Accountants made up 25% followed by academics at 24% and students also at 24%. This diversity shows representatives covered a wide range of banking needs and patterns of usage.

Table (2) shows Age of respondents

Demographic Analysis: Age	%
Above 55	2%
36-45	22%
Under 25	21%
26-35	19%
46-55	2%

The age distribution of the bank users according to the survey shows the largest percentage belongs to the age bracket “Above 55” at 25%, “36-45” at 22% and the “Under 25” age group at 21%.

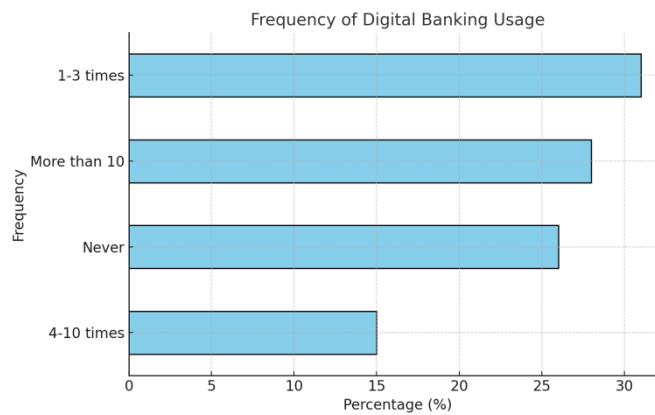
2. Banking and Digital Banking Trends

Table (4) shows Banking and Digital Banking Trends of respondents

Banking Frequency		%
	Monthly	30%
	Rarely/Never	25%
	daily:	24%
	weekly	21%
Digital Banking Frequency		
	1-3 times:	31%

	More than 10 times:	28 %
	Never:	26 %
	4-10 times:	15 %
Digital Usage Duration		
	4-6 years:	32 %
	1-3 years:	26 %
	More than 6 years:	22 %
	Less than 1 year:	20 %

Researched data shows Digital Banking service usage distributions through a bar chart presentation.



Monthly usage of banking services is most common among respondents at 30% but 25% of respondents rarely use such services (which indicates a shift toward digital banking options). Respondents show high adoption rates as 31% of them use digital banking 1-3 times per month and another 28% utilize it more than 10 times per month. However, 26% of respondents never use digital banking due to a digital divide. Most respondents have used digital banking services for 4-6 years (32%) demonstrating strong long-term commitment.

3. Feature Ratings (1-5 Scale)

Table (5) Ratings of DT Features

Ease of Use:	3.17
Transaction Speed:	2.72
Security:	3.15
Accessibility:	3.09

The rating for digital banking services falls at a moderate level yet transaction speed needs enhancement for better customer satisfaction. Electronically available features receive mixed reviews and so does the degree of banking satisfaction associated with conventional methods.

4 Traditional Banking and Transition Impact

Table (6) Traditional Banking and Transition Impact of respondents

Branch Visits		%
	Monthly	33%
	Rarely/Never	24%
	Weekly:	23%
	Few times a year	20%
Satisfaction with Traditional Banking	3.21/5	
Change in Traditional Usage		
	Increased:	35%
	Decreased:	35%
	No change:	30%

The practice of monthly visits remains popular (33%) although 24% of consumers minimize traditional banking by using alternative digital systems. The measured customer satisfaction rate stands at a somewhat neutral level (3.21 out of 5) because customers find it difficult to match the convenience of digital solutions. The digital adoption transformation has resulted in a 35% change among people toward traditional banking usage with an equal split between those who increased and those who decreased their use.

5. Future Outlook

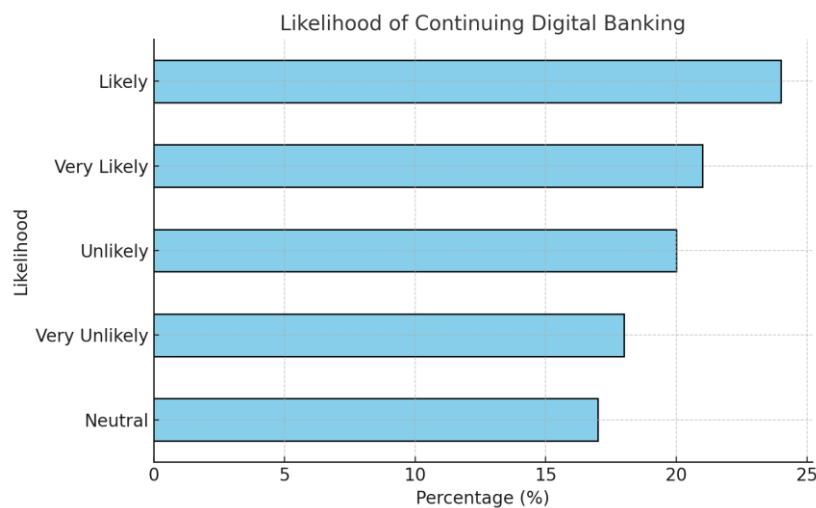
Table (7) Future Outlook of respondents

		%
Likelihood of Continuing Digital Banking:		
	Likely:	24%

	Very Likely:	21%
	Unlikely:	20%
	Very Unlikely:	18%
	Neutral:	17%
Belief in Complete Replacement of Traditional Banking:		
	No	35%
	Unsure	34%
	Yes	31%

The survey results show that digital banking receives a positive response among respondents as 24% express likelihood and 21% indicate extreme likelihood to continue using it. 40% of respondents display skepticism about digital banking replacing traditional banks.

A bar chart shows the likelihood distribution of participants who intend to maintain digital banking usage.



6. Fulfillment Percentage of respondents

Table (8) Fulfillment Percentage of respondents

	%
Average Digital Fulfillment:	79.71%
Average Traditional Fulfillment:	19.74%

Remote banking technology already satisfies many user requirements thus demonstrating its fundamental importance. Therefore the researcher chose to investigate regression

coefficients for digital banking and traditional banking systems. To know the impact of digital transformation on traditional banking systems, the researcher decided to conduct a regression.

Regression

Table (9) Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig. Change	F	Durbin-Watson
1	.586 ^a	.346	.336	.89409	.000		1.600

R: 0.586 – This is the correlation coefficient, indicating a moderate positive relationship between the dependent variable (traditional banking services) and the predictor (digital transtion). R Square (R^2): 0.346 – This implies that approximately 34.6% of the variance in the dependent variable (TBS) is explained by the independent variable (DT). Adjusted R Square: 0.336 – This adjusts the R^2 value for the number of predictors in the model, slightly reducing the explained variance to account for possible overfitting. Standard Error of the Estimate amounts to 0.69409 and evaluates the distance between observed values and the regression line while Durbin-Watson reaches a value of 1.600 to check for autocorrelation in residuals. When the value approaches 2 it demonstrates no autocorrelation exists in the data. The value of 1.600 indicates a possible connection between positive correlations.

Table (10) ANOVA Table

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.405	1	41.405	51.139	.000 ^b
	Residual	79.345	98	.810		
	Total	120.750	99			
a. Dependent Variable: TBS						
b. Predictors: (Constant), DT						

The Regression Sum of Squares amounts to 41.405 while Residual Sum of Squares determines unexplained variability at 79.345 and Total Sum of Squares reaches 120.750 . The F-statistic result stands at 51.139 indicating model significance. The p-value

significance level achieves 0.000 therefore validating the model as statistically significant with $p < 0.05$.

Table (11) Coefficients^a

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.560	.279		5.584	.000
	DT	.666	.093	.586	7.151	.000
a. Dependent Variable: TBS						

1. Constant:

The y-intercept value for the regression line amounts to 1.560 according to the Unstandardized Coefficient (B). The coefficient of 1.560 has a statistically valid difference from zero level at $p=0.000$.

2. DT

The value of VAR00002 drives a .666 unit change in TBS when it increases by one unit. The standardized relationship between DT and TBS reaches a value of .586 according to the standardized coefficient (Beta). The statistical analysis demonstrates that DT has a significant impact on TBS as proved by the p-value (0.000).

The results indicate a significant positive correlation between the variables and VAR00002 accounts for 34.6% of the variability in TBS. Additionally the statistical analysis shows this relationship to be significant at $p < 0.05$. Residual autocorrelation stands as a potential concern due to results from the Durbin-Watson statistic thus demanding further examination.

This results are align with (Yella & Suganyadevi, 2024) ,(Kunduru, 2023) & (Shankar,2021) that ensure on automates activities can help in increasing the speed of decision making, more secure transactions through decentralized ledgers and Recurring enhancements in the satisfaction of the customers concerning the mobile app usability.

Conclusion

1.Traditional banks experience a transformation through digital methods that generates operational enhancement and customer satisfaction while creating competitive edges for

success. 2.The beneficial aspects that AI, blockchain and mobile banking deliver to operations require organizations to handle cybersecurity challenges and control implementation expenses together with employee acceptance issues.

3.The model analysis reveals an average level of positive correlation as DT generates a 32.6% predictive power on TBS. Moreover, the results reach statistical significance at $p < 0.05$ and indicate that DT applies meaningful significant influence on the outcome variable.

Recommendations

1.Local banks should gradually adopt digital transformation, taking into consideration different technologies, such as artificial intelligence and blockchain.

2.Iraqi banks should take into consideration the challenges and benefits of each technology and try to balance between them. Digital transformation indicators in Iraq are weak, so, the Central Bank of Iraq should work towards broader digital transformation through a policy of tightening the banking and non-banking sectors.

Future Studies

1.Researchers need to study the challenges which prevent people in underprivileged regions from using digital banking options.

2.Research should concentrate on creating standardized technological integration frameworks which fulfill banking regulations and protect against possible risks while keeping pace with global financial requirements.

References

1. Fernández, A. (2019). Artificial intelligence in financial services. *Banco de España Article*, 3, 19.
2. Nazareth, N., & Reddy, Y. V. R. (2023). Financial applications of machine learning: A literature review. *Expert Systems with Applications*, 219, 119640. <https://doi.org/10.1016/j.eswa.2023.119640>
3. Pal, A., Tiwari, C. K., & Behl, A. (2021). Blockchain technology in financial services: A comprehensive review of the literature. *Journal of Global Operations and Strategic Sourcing*, 14(1), 61–80. <https://doi.org/10.1108/JGOSS-08-2020-0057>
4. Kunduru, A. R. (2023). Blockchain technology for ERP systems: A review. *American Journal of Engineering, Mechanics and Architecture*, 1(7), 56–63.
5. Kesharwani, S., Yadav, R., & Sethi, D. (2022). Customer-centric blockchain phenomenon in global perspective. *Global Journal of Enterprise Information System*, 14(1), 27–33.
6. Asongu, S. A., & Odhiambo, N. M. (2019). Mobile banking usage, quality of growth, inequality and poverty in developing countries. *Information Development*, 35(2), 303–318. <https://doi.org/10.1177/0266666918755922>
7. Shankar, A. (2021). Impact of mobile banking application interactivity on consumer engagement: An experiment-based investigation. *Journal of Global Information Management*, 30(5), 1–18. <https://doi.org/10.4018/JGIM.20210901.oa1>
8. Kendory, E. (2022). Adoption of cloud computing by external auditors in Iraq: An exploratory study. *Journal of Administration & Economics* (134).
9. Yli-Huumo, J., Ko, D., Choi, S., Park, S., & Smolander, K. (2016). Where is current research on blockchain technology? A systematic review. *PLOS ONE*, 11(10), e0163477. <https://doi.org/10.1371/journal.pone.0163477>
10. AlSheikh, M., & Alzoubi, A. (2023). The synergistic impact of AI and blockchain on mobile banking adoption. [Journal name missing, please provide].
11. Kendory, E. (2024). Can the using of SASB standards lead to a reduction in pollution? *The Iraqi Journal for Economic Sciences*, 22(80. S), 625–634.
12. Galazova, S. S., & Magomaeva, L. R. (2019). The transformation of traditional banking activity in digital. [Journal name missing, please provide].
13. Yella, A., & Suganyadevi, K. (2024, June). Improving customer satisfaction in retail banking through AI-driven algorithm optimization. In *2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT)* (pp. 1–6). IEEE. <https://doi.org/10.1109/ICCCNT61992.2024.10365221>
14. Siddik, M. N. A., Sun, G., Cui, Y., & Kabiraj, S. (2014). Financial inclusion through mobile banking: A case of Bangladesh. *Journal of Applied Finance and Banking*, 4(6), 109–136.