How Block Chain Technology Works in Financial Services

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Abstract

The Research goal is to explore the factors that can forecast the behavioral intention of financial sectors to use blockchain technology. The UTAUT model was enriched with the integration of safety and consciousness to grow the theoretical model for this research. The paper studies the influence of performance expectancy, effort expectancy, facilitating conditions, social influence, and additional factors on the behavioral intention to utilize blockchain technology. This research is mostly based on primary data that has been collected through a well-structured questionnaire. The questionnaire was spread to 234 distinct responders in various places. To examine the hypothesis made for the analysis, multiple regression analysis was conducted, and cross-sectional data were used. All of the variables have statistically noteworthy impacts on the financial sector's desire to embrace blockchain technology and are statistically significant. However, some extraneous factors might be added to the model to gain a better idea. The study concluded that blockchain has huge potential in Bangladesh. Blockchain technology will be crucial in the future for handling a variety of Financial Services.

Keywords: Blockchain Technology, Financial sector**,** Behavioral Intention, UTAUT

Introduction

A financial technology known as blockchain was initially created as the distributed ledgers for bitcoin. Blockchain technology was briefly eclipsed by the bitcoin boom, but over the past few years it has started to become well-known on its own and is emerging as a key FinTech technology (S. L. P., 2019). Many professionals and academic researchers have noticed that the effects of blockchain go beyond bitcoin and even the financial sector to spur transformation in a variety of industries (S. Ølnes, 2017). One of the most sophisticated technologies in the whole FinTech space is blockchain(S. L. P., 2019). Blockchain has possibilities outside of bitcoin, despite its initial purpose of serving as a distributed ledger for recording bitcoin transactions. It may indeed alter a variety of company processes in the fields of finance and other commerce(S. Underwood, 2016). The term "blockchain" refers toa system of interconnected data blocks, each used to store transactional information. A timestamp, transaction information, and a cryptographic hash of the preceding block are

included in each block (S. L. P., 2019). This innovation can help with keeping up with the congruity between innovation, client information, and protection as the advanced transformation creates. The need of mystery might be stressed further, and information the executives could acquire. While bookkeeping records between counterparties are solid and modern, the review cycle is more straightforward and productive. Reviewer consideration might be redirected from dissecting countless routine exchanges to settling really testing and argumentative issues. Subsequently, process computerization didn't prompt the end of inspectors or bookkeepers (W. S. U. M. E. M. Lahkani M.J., 2020)(A.I.N.O., 2019). Artificial intelligence and blockchain are two very different technologies with an incredible range of uses. Conversely, artificial intelligence relies on protected data that is immutable and cannot be inspected, making it a highly centralized service. There are several advantages to their cooperation, especially in

terms of funding. Blockchain technology makes it possible for the procure-to-pay, record-to-report, and order-to-cash processes to be completed without keeping records since it allows for smooth communication between the parties involved in the transaction (M., 2020)(A.V., 2018)(Hofmann E., 2018). The advancement of digital technology has created new opportunities for increased cooperation. Financial accounting procedures have evolved as a result of cloud-based applications with analytics designed for certain use cases, like contract administration, reporting, account payables and receivables, and more. The most secure payment options include wire transfers, cash, and cashier's checks. However, you cannot combine cash and time-consuming wire transfers. These issues are resolved and client confidence is raised by payments made utilizing blockchain technology. Real-time cash transfers between financial institutions are now feasible, reducing friction and accelerating settlement. This technology is great for transaction tracking and has the ability to automate processes. Smart contracts may be used by financial service providers to track buyer payments and seller deliveries (R., 2021)(B, 2016)(L., 2021)(G., 2021). In this article, we'll talk about blockchain technology, including how it works in the financial services industry.

The Review of Literature

Upcoming changes in the financial sector will be greatly impacted by blockchain. In financial services, blockchain offers a safe and secure solution that lowers costs, time, and effort. An increasingly cashless world is being facilitated by these blockchain-related technologies. Finance management's and staff's approval of utilizing these technologies is critical to the success of blockchain adoption in financial systems. The processes by which employees think, trust, believe, behave, and feel about themselves are just a few of the numerous variables that affect acceptance(Jevsikova, 2021).A number of information system (IS) adoption theories have been developed since the early 1980s in an effort to predict and comprehend the uptake of new technologies. The research on blockchain adoption in the financial industry will be covered in this part. Despite this, not much research has been done to forecast how blockchain technology would be used in the financial sector.Researchers acknowledge that there are aspects of Blockchain technology that work well in the financial sector, but they are still unable to identify a suitable application for Blockchain's widespread adoption in contemporary society. Examining the key ideas, we see that decentralization, digital innovation, and new innovation are some of the most prevalent ideas in the literature.

Studies indicate that technical attributes are increasingly serving as catalysts for technological innovation and disruption. One of the primary problems with blockchain technology is its scalability, which is further supported by academics who contend that a high number of complete nodes is necessary to guarantee the Blockchain's theoretically attainable security.Blockchain technology makes cryptocurrencies suitable for use in business transactions since it eliminates the need for a central authority, lowering both transaction costs and risk(Cahyadi, 2021). Blockchain offers a number of untapped applications in the banking sector, and technological advancements may occur. Furthermore, because technology is unregulated, it is still in its infancy and there is still much to be done in the subject(Trivedi, 2021). The most recent development in sectors like finance, where trust is crucial. Financial benefits, challenges, and utility of blockchain technology. This analysis separates out recommendations for further research and application inside the blockchain framework.(Ali, 2020).Blockchain technology can lower risks associated with transactions by tying up fewer assets, increasing efficiency, increasing transparency, and cutting costs in the financial industry(Jutila, 2017).With the goal of lowering transaction costs and boosting operational efficiencies, several financial institutions have begun integrating blockchain technology into financial operations(Wu, 2019).The use of blockchain technology into the fund management industry might get better data immutability, accountability, transparency, accuracy, and confidence between investors and fund managers(Fiergbor, 2018).The financial services and banking sector has recognized the numerous benefits of blockchain technology. This special issue investigates its peculiar beginnings, significant influence, difficulties in execution, and immense promise.(Treleaven, 2017).a careful examination of blockchain innovation, giving specific consideration to its development, applications and advantages, the particulars

of cryptography with regards to public key cryptography, and the difficulties of blockchain in dispersed exchange records, as well as the broad rundown of blockchain applications in the monetary exchange framework(Habib, 2022).blockchain technology is being implemented in the financial services sector, transforming the banking and finance sectors. The chapter also outlines the challenges facing the banking and financial sectors as they apply blockchain technology.(Karim, 2022).Different approaches and consensus mechanisms with a more useful secondary function, especially focusing on NP complete problems as mediators in solving complex and resource heavy problems(Juričić, 2019).Davidson and colleagues furthermore contend that Blockchain technology opens up new avenues for institutional innovation(Johansen, 2017).(Zhao, 2016)Gave ansummary on blockchain technology research and advancement.The study indicates that new avenues for company innovation and research will become available as a result of the broad use of Blockchain in the financial and commercial sectors.The research suggests an expanded UTAUT model that incorporates several contextual factors in forecasting the financial industry's desire to adopt blockchain technology. Due to the paucity of empirical information about usage intention drivers in previous research conducted in financial institutions, this study will provide valuable insight to the assessment of blockchain adoption from the practitioner angle. The study would facilitate the application of blockchain technology in finance by financial sector decision-makers.

Methodology

A standardized questionnaire was utilized to collect cross-sectional data for this study, which was able to get 234 respondents. The data were analyzed using regressions and correlations. For the analysis for this study, SPSS 26 and Microsoft Excel 2013 were both used.

The following hypothesis has been explored in order to ascertain the relationship between adoption variables and the financial sector's intention to work with blockchain technology.

H_0: There is no relationship between the adoption factors and the intention to adopt blockchain technology in the financial sector.
H_1: There is an association between the adoption factors and the goal is to embrace blockchain innovation in the monetary area.
To test the hypothesis following model appliedin this study.

$$Y = b_0 + B_1X_1 + B_2X_1 + B_3X_3 + \cdots\cdots\cdots\cdots + B_nX_n + et$$

Here,

- Y denotes the explained variable
- b_0 is the intercept
- $B_1, B_2, B_3 \ldots\ldots\ldots\ldots B_n$represents regression coefficients or parameters
- X_1 , X_1 , $X_3 \ldots\ldots\ldots\ldots X_n$ are explanatoryfactors
- et is the estimation error

For the convenience of the study the model can be recreated as follows:

$$BI = b0 + B1\ PE + B2\ EE + B3\ SI + B4\ FC + B5\ AF + et$$

In the above equation, BI (Behavioral Intention)was dependent variable and PE (Performance Expectancy), EE (Effort Expectancy), SI (Social Influence), FC (Facilitating Condition), AF (Additional Factors)were independent variables.

Results & Discussion

The following table shows that out of the respondents, there are 24.4% females (57) and 75.6% males (177). The group with the highest proportion, 81.6% (191), was made up of respondents who were 18 to

25. This was followed by respondents who were 26 to 35 and those who were 36 years of age or older, with 11.9% (28) and 2.6% (6), respectively.

Table 1: Frequency Distribution

Gender	Frequency	Percent	Valid Percent
Male	177	75.6	75.6
Female	57	24.4	24.4
Total	234	100	100

Age	Frequency	Percent	Valid Percent
18-25	191	81.6	82
26-35	28	11.9	12
36-45	6	2.6	2.6
Over 45	6	2.6	2.6
Under 18	3	1.3	1.3
Total	234	100	100

With the Sphericity Test of Bartlett's showing a significant level of 0.000, which is below 0.05, and the KMO test showing a value of 0.759, which is greater than the cut-off 0.50 indicating sampling adequacy, the table below indicates that the data is suitable for conducting additional tests.

Table 2: Analysis of Factor

Sampling Adequacy Measure (Kaiser-Meyer-Olkin)	**Bartlett's Test of Sphericity**		
	Approx. Chi-Square	**df**	**Sig.**
0.759	3691.409	300	0.000

With the highest Cronbach's Alpha value compared to the Table and outstanding consistency about the desire to use blockchain, the data is considered reliable for the study. The social influence, effort expectation, performance expectancy, and facilitating condition all have Cronbach's Alpha values of 0.678, 0.721, 0.687, and 0.638, respectively. Since the values of all the variables mentioned above are more than 0.6, the reliability analysis rule of thumb indicates that they all show worthy dependability. All the variables are therefore thought to be trustworthy for the research.

Table 3: Reliability Analysis

Variables	**No. of Items**	**Cronbach's Alpha**
Behavioral Intention (BI)	4	0.778
Performance Expectancy (PE)	4	0.721
Effort Expectancy (EE)	5	0.678
Social Influence (SI)	4	0.687
Facilitating Condition (FC)	4	0.838
Additional Factors (AF)	4	0.721

Descriptive statistics for the independent and dependent variables utilized in this investigation are displayed in the table below. From this, it can be concluded that, among the

independent variables, Performance Expectancy (PE) has the highest mean (3.996), indicating that, according to the majority, Performance Expectancy will have the most influence on the behavioral intent to embrace blockchain technology in the financial industry. Effort Expectancy (EE) has a lower mean value of 3.5846, suggesting a less significant influence. The Facilitating Condition (FC) yields a greater standard deviation (.6839). Based on Table, it can be concluded that all independent and dependent variables have normal distributions since skewness and kurtosis scores fall within the range of -3 and +3, respectively.Thus, the overall data set is normally distributed because there is no concern of skewness and kurtosis.

Table 4: Variable's Descriptive Statistics

Variables	Mean	Standard Deviation	Skewness	Kurtosis
Behavioral Intention (BI)	3.846	.61004	(.476)	.204
Performance Expectancy (PE)	3.996	.5834	(.745)	1.462
Effort Expectancy (EE)	3.5846	.5898	(.708)	2.050
Social Influence (SI)	3.6058	.5779	(.860)	2.761
Facilitating Condition (FC)	3.6122	.6839	(.627)	1.574
Additional Factors (AF)	3.8333	.5683	(1.168)	2.531

The correlation matrix for the variables used in this study is displayed in the following table of 5. The data shows a positive correlation of 0.626 between the intention to use blockchain technology and Social Influence (SI).The remaining factors Performance Expectancy (PE), effort expectancy, and facilitating condition- have a moderate association with behavioral intention to adopt blockchain.

Table 5: Correlation Matrix

	BI	PE	EE	SI	FC	AF
BI	1					
PE	.363**	1				
EE	.462**	.325**	1			
SI	.626**	.538**	.632**	1		
FC	.501**	.243**	.311**	.493**	1	
AF	.664**	.455**	.259**	.529**	.502**	1

**. Correlation is significant at the 0.01 level (2-tailed).

There are no multiple correlations among the independent variables that were studied in the study, as can be seen from the table below. Thus, multicollinearity is not a problem in this situation. Variable tolerance values exceed 0.1 and variable the factor of variance inflation values are less than 10. Consequently, the multicollinearity problem is not present in this study.

Table 6: Test for Multicollinearity

Variables	**Tolerance**	**VIF**
Performance Expectancy (PE)	0.661	1.513
Effort Expectancy (EE	0.592	1.689
Social Influence (SI)	0.384	2.605
Facilitating Condition (FC)	0.666	1.502
Additional Factors (AF)	0.591	1.693

The primary purpose of this research is to determine the characteristics that influence behavioral intention to use blockchain; thus, five factors have been selected to measure the impact of those aspects on blockchain adoption. Here, regressions are performed using varying variable mixes to get the best-fitting model.

In the first model, only Performance Expectancy (PE) is included; subsequent models include other factors. The model's R Square, or coefficient of determination, has increased along with the number of variables. Consequently, the magnitude of the impact has grown more noticeable. Model 01 could account for just 66.4% of the variation in the willingness to use blockchain. Nonetheless, the predictor variables in model 04 explain around 75.6% of the variance. Furthermore, the model has improved as indicated by the adjusted R square, which expanded from 0.441 to 0.572. This number only increases when important variables are added to a model.Therefore, it is evident from the models that model 04, which has the greatest R square value and a large F value of 0.000, is the most appropriate model to gauge how independent factors affect the intention to use blockchain. The 95% confidence level of the model further supports its statistical validity.

Table 7: Results of Step-wise Regression

Model	R	R Square	Significance F
1	.664	0.441	0.000
2	.739	0.546	0.000
3	.750	0.563	0.000
4	.756	0.572	0.000

It is evident that model 04 offers the most insight into the factors driving the banking sector's acceptance of blockchain technology. Table 8 shows the detailed regression output of model 4. The dependent and independent variables in this model have a strong positive correlation, as shown by the coefficient of correlation, or R, of +0.758, as seen in the accompanying table. The coefficient of determination (R Square) value takes into account the degree of freedom adjustment and is 57.5% of the variability of BI for the variance of PE, EE, SI, FC, and AF. Some factors not included in this study account for 42.5% of the remaining cases of BI.The overall quality of the model fit appears to be pretty excellent, based on the F value. Further, importance F illustrates the statistical importance of the relationship.

Table 8: Regression Result

R			.758				
R Square Adjusted R Square			.575 .565				
F Significance F			61.569 0.000				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.281	.236		1.192	0.234		
PE	-.070	.056	-.067	-1.26	0.209	0.661	1.513

EE	.172	.058	.167	2.971	0.003	0.592	1.689
SI	.276	.074	.261	3.75	0.000	0.384	2.605
FC	.094	.047	.105	1.991	0.048	0.666	1.502
AF	.494	.060	.460	8.181	0.000	0.591	1.693

According to the table 8,the correlation coefficient (R) is 0.758, representing a strong positive relationship between the anticipateors(PE, EE, SI, FC, AF) and the response variable.Based on the provided regression analysis, factors such as higher EE, SI, and AF are significant predictors of the response variable. PE and FC levels also play a role, although the relationships are weaker and, in the case of PE, not statistically significant.EE (P=.003), SI (p<.001), FC (P=.048), and AF (p< .001) are highly significant and strong relationship with a higher response variabsle.F-Statistic (61.569): Indicates that the overall regression model is statistically significant.

While the null hypothesis of this research stated that there's no connection between adopting factors and the intention to accept blockchain technology in Bangladesh's financial sector, the alternative hypothesis examined the possibility of a relationship between adopting factors and the intention to adopt blockchain. An R-value of.758 and a R square of.575 are displayed for the relevant and viable model in the table. In addition, this model is statistically successful at the 95% confidence level because the significance F is 0.000 and less than 0.05. Conversely, each of the five predictors shows significant coefficients at a 95% confidence level.Based on the regression results, it is possible to accept the alternative hypothesis, which postulates a significant relationship between the adoption factors of social influence (SI), facilitating condition (FC), performance expectancy (PE), effort expectancy (EE), additional factors (AF), and the intention to accept blockchain technology in the financial sector.

Table 9: Result of Hypothesis Testing

H_0: There is no relationship betweenadoptionfactors and the intention to adopt blockchain in the financial sector.	Rejected
H_1:There is an relationship between adoption factors and the intention to adoptblockchain in the financial sector.	Accepted

Several Significant Blockchain Technology Limitations and Difficulties

Globally, blockchain technology is the most widely used technology. The public ledger is used by this decentralized, open-source platform to keep track of transactions.

Every technology has advantages of its own as well as some drawbacks that should be taken into account while utilizing it. These are

- Lack of Technical Information
- Ability to scale
- Less privacy
- Fear for security
- Difficulty
- More transactions cost at the opening
- Manual mistakes

Challenges

- Blockchain Technology setup cost is very costly.
- A vastvolume of computing power to explainin order to validate and process the transaction, a proof-of-work algorithm requires a high energy calculation.

- Bangladesh is now experiencing a network challenge, as is common knowledge in rural and isolated places.
- Lack of Technical knowledge, privacy, and security issues will arise.
- Once we commit an error, the information cannot be removed or altered due to ignorance. Due to human nature, it is not feasible.
- Lack of public knowledge; information about this technology is not easily accessible, and its use presents challenges.
- A deficient legal framework both domestically and globally.

Conclusion

The research found that a number of factors, including performance expectation, effort expectancy, social influence, conducive conditions, and other factors, affect the financial sector's behavioral intention to embrace blockchain technology. Furthermore, note that

blockchain technology has great promise for Bangladesh's financial system. A trustworthy global commerce network may be established through these potentials, which include the establishment of a completely decentralized, paperless, transparent, real-time, and affordable financial system. But most crucially, these potentials will realize Bangladesh's goal of becoming a digital nation. To individuals in the banking industry who are interested in implementing and using blockchain technology, these results would offer a precise representation of management activities. Blockchain will take some time to completely integrate into financial systems, thus it might be dangerous to expect too much too fast. Years may pass before the financial industry truly benefits. Furthermore, the nation's financial industry would find it extremely difficult to effectively employ blockchain technology without support from the government. In order to implement blockchain technology, financial institutions will also need to allocate more money in their budgets. Nonetheless, credit should be given to the financial institutions in Bangladesh that adopted this technology, even if they did it sparingly but with great advantages. However, it is a truism that a technology cannot truly be appreciated until it is widely adopted. Thus, the time has come for the financial sector to engage in extensive research and development of this technology.

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