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Hybridizing cost saving with trust for blockchain technology adoption by financial institutions

Nazir Ullah[a,*], Waleed Mugahed Al-Rahmi[b], Osama Alfarraj[c], Nasser Alalwan[d], Ahmed Ibrahim Alzahrani[e], T. Ramayah[f,g,h,i], Vikas Kumar[j]

[a] *School of Management and Engineering, Nanjing University, China*
[b] *Faculty of Social Sciences and Humanities, School of Education, Universiti Teknologi Malaysia, Malaysia*
[c] *Computer Science Department, Community College, King Saud University, Saudia Arabia*
[d] *Computer Science Department, Community College, King Saud University, Saudi Arabia*
[e] *Computer Science Department, Community College, King Saud University, Saudi Arabia*
[f] *School of Management, Universiti Sains Malaysia, Minden, Penang 11800, Malaysia*
[g] *Internet Innovation Research Center, Newhuadu Business School, Minjiang University, Fuzhou, Fujian, China*
[h] *Department of Management, Sunway University Business School (SUBS), 5, Jalan Universiti, Bandar Sunway, Selangor 47500, Malaysia*
[i] *Faculty of Economics and Business, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak 94300, Malaysia*
[j] *Bristol Business School, University of the West of England (UWE), United Kingdom*

A R T I C L E I N F O

Keywords:
Blockchain
Distributed ledger technology
Developing countries
TAM
Banks

A B S T R A C T

Distributed Ledger Technology (DLT) is transforming the financial industry and leading to a rise in the modern banking system. Like in developed nations, disruptive technology is necessary to advance the traditional banking system in emerging economies. The present study aims to investigate the critical factors that influence a user's intention to accept blockchain technology for financial institutions. The proposed model is based on Technology Acceptance Model (TAM) constructs with trust and cost-saving, tested using structural equation modelling. Findings from an online survey of 188 practitioners working in Malaysia's financial sector confirm that all constructs except trust on perceived usefulness were found to have a significant impact during the blockchain implementation. Moreover, cost-saving matters most during the disruptive technology adoption for financial institutions. Based on the findings, the subsequent theoretical and practical implications are assessed, albeit with notable limitations.

1. Introduction

Many professionals and academics have noticed that DLT's impact extends beyond bitcoin and even the financial industry to drive change in a multitude of sectors. While DLT is currently playing a big part in financial modernizations and is the backbone technology enabling the Fintech revolution, its initial use has been in the area of payments. As a result of novel breakthroughs in technology and trade processes, as well as the fast-growing needs of customers, payments instrument and money transfers have changed [1]. Any payment system's principal aim is to ensure secure and smart transactions. The creation of digital currencies based on DLT is the most recent advancement in the field of money transfer. Distributed P2P networks, cryptographic algorithms, and a public key infrastructure (PKI), in which sets of public and permission keys are being used to protect the transfer, are all employed in cryptocurrency [2].

The autonomous and self-governing architecture, which is required to accommodate a distributed autonomous organization, is yet another use for DLT. The prototype of distributed organizing, decentralized autonomous entities, are projected to be flexible and digital in nature once completely realized, with no premises, executives, regulations, or paychecks, and no centralized strategic orientations [3]. The decentralized trust provides a viable alternative to standard client-server infrastructure. The inputs and operations do not need the central authority's mediation, and that is why the alternative system does not require it. As a result, transactions become immutable, and operation costs are reduced as well. Furthermore, because trust is now placed in the standards and architecture, the need for dependable authorities, commercial initiatives, intermediaries, and counter entities is now removed [4].

In the digitalization of asset ownership, DLT has been regarded as an important technological innovation. The DLT has been defined as a

* Corresponding author.
E-mail addresses: nazirabaz@gmail.com (N. Ullah), waleed.alrahmi1@gmail.com (W.M. Al-Rahmi), oalfarraj@ksu.edu.sa (O. Alfarraj), nalalwan@ksu.edu.sa (N. Alalwan), ahmed@ksu.edu.sa (A.I. Alzahrani), ramayah@usm.my (T. Ramayah), vikas.kumar@uwe.ac.uk (V. Kumar).

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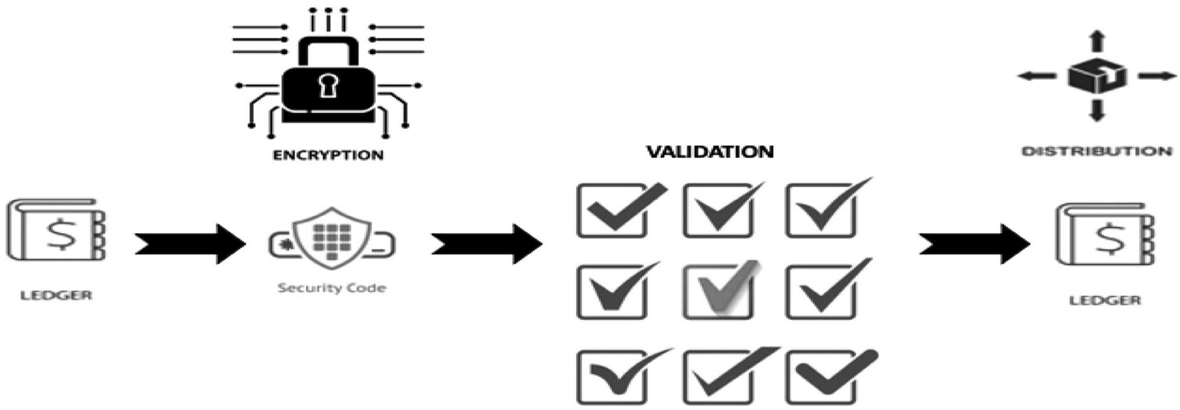

Fig. 1. Blockchain-based Transaction System

versatile programming framework for handling assets and agreements, in addition to providing a secured audit trail that cannot be tampered with. DLT enables verified, tamper-resistant transactions over a large set of network nodes. Blockchain is a group of systems that provide consumers trust that stored information (for example, a certificate) has not been tampered with, either accidentally or intentionally [5]. According to research, DLT has the potential to eliminate transactional insecurity, and uncertainty by enabling full transactional transparency and a shared truth for all members of the network. DLT can create financial tools like remittances, smart contracts, and business records, as well as eliminate unfavourable transactions and their consequences. Moreover, this technology considers legal and social documents, such as voting or affidavits, as prospective use cases. Because it overcomes the difficulty of reliable recording of large scale Peer to Peer (P2P) activity, blockchain can be used as a transactional method for sharing economic' services. By cutting operating costs and eliminating the need for intermediaries, blockchains are predicted to radically revolutionize businesses and civilizations. With the emergence of the "Programmable World," where a rising number of objective items (the IoT) become programmable and connected to the Internet, the relevance of such a transactional mechanism grows. By cutting transaction costs and eliminating the need for intermediaries, DLT is predicted to radically revolutionize businesses and civilizations [6]. The graphical view of the basic distributed ledger base transaction framework is shown in Figure 1.

By implementing a holistic approach, financial institutions will significantly boost the cost to income ratios. Banks will concentrate on several levers in the three crucial spending areas to create substantial impacts. The branch networks and office buildings area can be revamped to allow salesforce to function more efficiently, reducing friction and customer experiences with no value-added. Entirely fundamental redesigns will drive clients towards self-service technologies like blockchain [7]. Employment levels must be regulated to account for better efficiency levels and special service provisions, such as adding new customers to access online banking. The financial institutions have to look at their indirect activities such as back-office and business support functions, assess layers, and transform the operations model. Several banks have set up centralized design studios to create a start-up ecosystem that leverages mutual risk analysis, including KYC and AML processes. This is likely to entail developing new positions for many financial institutions and automation for repetitive activities. Blockchain technology integration with IoT for security and privacy and artificial intelligence solutions such as machine learning for data integrity could be useful for such organizations where complex information is involved [8]. The next area for financial institutions in IT and digital development; the cloud can play a pivotal role in allowing infrastructure facilities that are flexible on-demand. Due to migration issues, regulatory affairs, or high data costs, some financial organizations have struggled with implementation. While the systematic change from traditional IT orthodoxy builds to consume is likely to be lasting; therefore the issue is not about whether to switch the cloud, except when, how, and to what extent [9]. Subsequently, aside from these three major cost areas, the financial institutions could substantially savings in non-branch physical networks, advertising, and other administrations. The total cost to income optimization is shown in Figure 2 [9].

The existing research on disruptive technology adoption for financial institutions is mostly on developed economies like the US, UK, EU [10–12]. This study focused on blockchain acceptance of financial organization management in developing countries. Also, the past research about blockchain technology is mostly focused on the TOE context [13] and in the literature review form [14]. In this empirical study, we proposed a model based on the technology acceptance model [15] with trust [16] and cost-saving [17]. Subsequently, reviewing numerous research articles, we considered that this is the first empirical research for assessing DLT by financial organizations in developing economies. The results confirm that the study shows a dynamic role for both experts and developers to accept the DLT. The key purpose of this research is to address whether the cost-saving and trust with TAM factors could influence the acceptance of disruptive technology among financial institutions. The present study aims to shed light on the subsequent research queries through this inquiry.

Q1. What are the drivers for developing economies to implement distributed ledger technology in financial institutions?

Q2. Among the drivers who have a superior relationship with the purpose of acceptance?

The present study is structured as follows. Section 2 elaborates the literature review, Section 3 develops the conceptual model, Section 4 explains the research methodology, Section 5 explains the results, Section 6 clarifies the major findings, and finally, Section 7 concludes a work.

2. Literature review

2.1. Blockchain technology

Satoshi Nakamoto proposed an idea of disruptive technology [18]. The blockchain was used to deliver a novel method of generating and exchanging money through the internet, and the technology can now be used to operate and regulate decentralized systems via smart contracts [19]. As defined by Nick Szabo, the goal of using smart contracts is to insert them into an entire variety of valued and digitally regulated assets. New illustrations that suggest using distributed ledger technology for a variety of novel purposes have begun since Nakamoto's inspirational work [20]. F. Glaser [21] Offers substantial ontological progress of ideas for distributed ledger systems and describes a standard collection of mechanisms for blockchain. In an academic context, this research acts as a structure and basis for analyzing disruptive solutions' impacts.

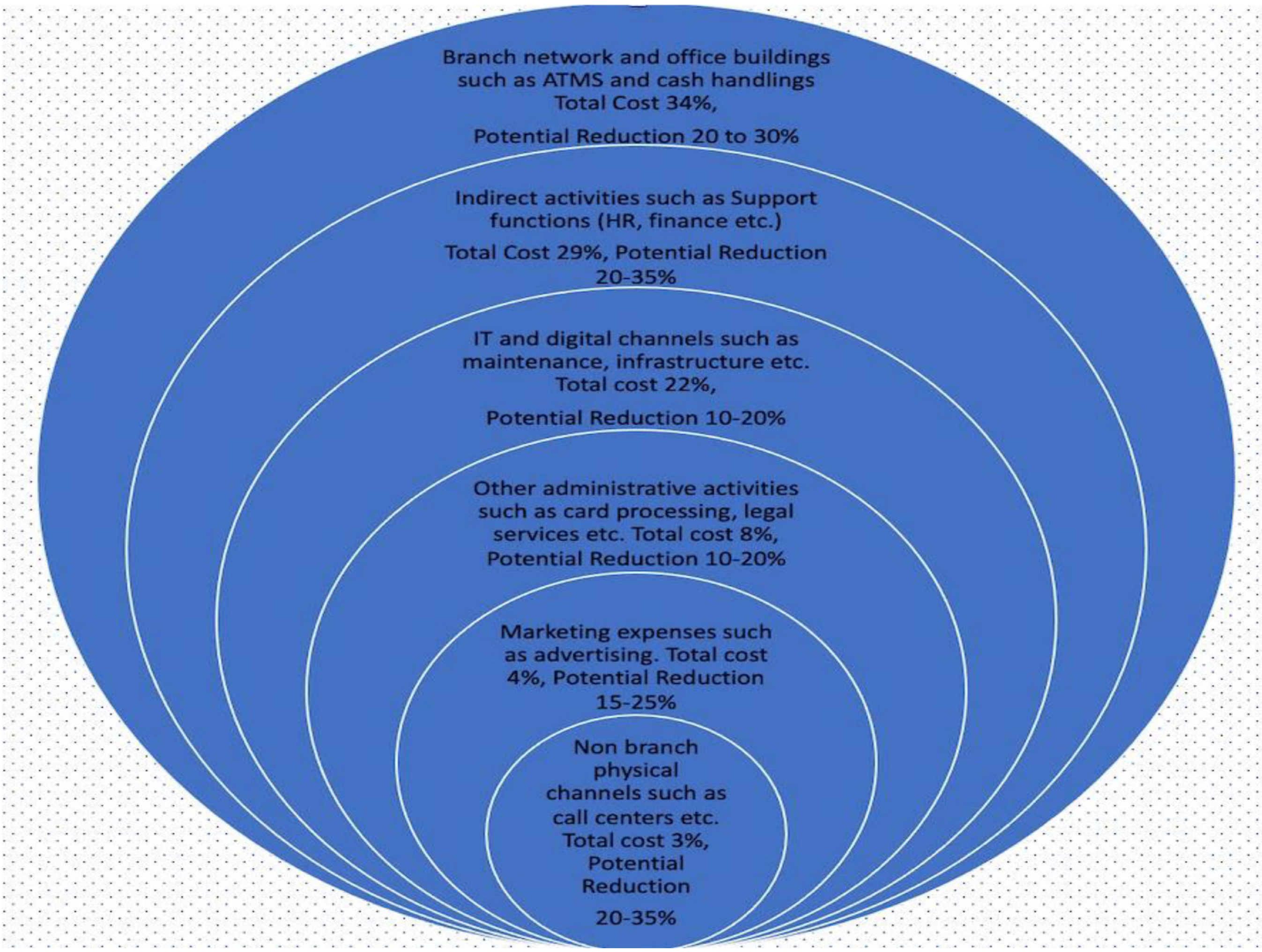

Fig. 2. Total Cost-to-income Optimization for Financial institutions (20-30%)

F. Glaser [21] explicitly identifies two important layers of code: fabric and application layer. The fabric layer determines the governance kind of framework, which may be public, private/permissioned, or hybrid [22]. The application layer contains the logic of the services executed in a smart contract format [23]. It covers three dimensions-namely the closeness of the ecosystem, the value connecting, and the form of marketplace [24]. The blockchain provides Peer to Peer data transmission, transparency with pseudonymity, irreversibility of records, and computational logic [25]. These advantages are using cryptography (hashes nature and digital signatures) and distributed consensus algorithms [26].

Blockchain technology mainly consists of three stages. Blockchain 1.0 describes issuing and transacting cryptocurrencies without the need for a central authority such as bitcoin [27]. Blockchain 2.0 is familiar for the marketplace and monetary applications, and blockchain 3.0 is for applications beyond digital currencies, finance, and marketplaces [28]. Furthermore, public blockchain networks such as Ethereum/bitcoin are permissionless networks where anyone can join the network. All participants can freely access and make transactions with data [29]. The entity for proof of transaction is decided by consensus algorithms like proof of work (PoW) and proof of stake (PoS) and cannot be known in advance. So, because multiple unverified members are involved, higher encryption and authentication are essential, making it difficult and very slow to expand the network. In addition, a complete distributed structure is created by permissionless blockchain, and network members are pseudo-anonymous and are therefore not ideal for financial services that need to be managed by a centralized information management system [30]. Financial institutions are paying more attention to private/permissioned and consortium blockchain networks, consequently aiding in cost-saving without losing the financial service's essential system management authority and edge.

In private blockchain such as Hyper ledger Fabric network, utilization cases are linq, a stock trade market for NASDAQ unlisted firms. Only members can access and make transactions, so it gets attention from the financial institutions. Real-time transactions can occur safely, fast, and lower cost in permissioned blockchain networks [26]. The intermediate form of both public and private blockchain is the consortium blockchain network [14]. The best example of a utilization case in a consortium is R3CEV. It consists of pre-defined rules for all the members and could be changed relatively easily according to the agreement among the network members. The network expansion in a consortium is easy, and transaction speed is fast [31]. In conclusion, the adoption of DLT can lower transaction costs, advances traceability in the supply chain domain, and additive manufacturing for improving the anti-counterfeiting measures in financial institutions.

2.2. Trends in DLT applications

DLT based applications have become gradually common in the financial industries in recent years. Banking is investing in DLT to improve the security of certain data classes, expand the system's capabilities, and collaborate with other systems. Financial assets management and commercial transactions have both benefited from the use of DLT.

Because of the systematic ledger distribution, transactions are decentralized and immutable [32]. By providing consumers with the benefits of the current financial system, DLT is expected to contribute to global sustainable development. Another reason why financial industries are looking to blockchain in the adoption of the smart contract is that DLT can tackle the challenges of trust, safety, and control over data in financial services. It promises a capital market revolution and makes operations safer, particularly through digital payment [33]. In addition, DLT improves the efficiency of services such as loan administration, control, audits and general services. Organizations in the financial services industry are making efforts in this direction. JP Morgan Chase's Quorum unit, for example, is developing a blockchain solution with an emphasis on contracts and the distributed ledger. Bank of America has recently submitted a patent and trademark application for DLT. Goldman Sachs is also spearheading a potential attempt to solve the issue of volatility [3]. The use of DLT will aid businesses in reducing costs, improving customer service, and expanding their innovation capabilities. Stakeholders will gain more trust and adopt blockchain as a long term aspect of their financial activity in the near future.

2.3. Blockchain in finance

There are large numbers of banking transactions around the world today. For example, 28.45 million financial transactions per day have been reported by the society of worldwide interbank financial telecommunication (SWIFT) [34]. Therefore, it is important to have adequate techniques to verify the parties involved in a payment transaction and their rights to conduct and obtain a payment transaction to prevent transaction fraud. The study of Y. Guo and C. Liang [3] explores the DLT for the payment clearing and credit information systems in China banks. The study of Bootsma KYC's burden [37] proposed blockchain as the newest application to lessen KYC's burden for financial organizations. The author describes how regulatory technology can be used to reduce cost, increase transparency, and improve customer experience throughout onboarding a customer.

The study of Shbair et al. [34] proposed a public blockchain-based KYC system based on the Ethereum network. The author develops a tool that enhances nodes reservation, deployment, and blockchain configuration over the Grid 5000 platform. The study of Moyano et al. [12] proposed a new system based on DLT that reduces the costs of reducing the basic KYC verification procedure for financial organizations. The study of Cocco et al. [35] explores the obstacles and possibilities of the banking-wide implementation of DLT, offering food for thought about this innovative technology's potential. The disruptive technology can enhance the worldwide economic infrastructure into more effective structures than at attaining sustainable growth. Indeed, several financial institutions are now focusing on DLT to boost economic growth and speed up green technology development. The study of Paech [36] proposed a model for the governance of blockchain networks in financial markets. The study of O'Leary, [37] suggests that DLT transaction processing can offer accurate information in those settings where there is a single truth feed of information flow for interest phenomena, no ability to conduct off DLT transactions (or high penalty costs), and limitation of a single identity for each blockchain company. The study Hassani et al., [38] presents the most detailed analysis of the effects of DLT in banking to date by summarizing the possibilities and challenges from the perspective of bankers. The study of Harris and Wonglimpiyarat [39] explored the strategic rivalry of distributed ledgers banking. The author proposed a systemic innovation model that can be applied to win market share in financial industries.

The study of Lai [40] focused on Project Ubin, launched by the Monetary Authority of Singapore for the development of interbank settlement and payments. Wang et al. [41] proposed a blockchain-based data privacy management system for financial organizations. The proposed method is verified by laboratory and field experiments. Lu et al. [42] proposed a blockchain-based Bank tax interaction framework in a smart city. Also, the experiments were carried out to confirm that the proposed system can solve banks' data sharing problems. In conclusion, the adoption of blockchain technology can reduce transaction, energy, and storage costs in financial institutions. It can increase transparency, enhance privacy and security, faster transactions, immutability, and develop the trust for next-generation services in banking and finance.

2.4. TAM

Technology advancement plays a critical role in the advancement of financial institutions. Technological development is of no use before and unless it is used [43]. Understanding the acceptance of technology is, therefore, of paramount significance. We have adopted an approach in this analysis that is based on the adoption of blockchain technology. That means we provide the history of adoption and all that comes up after adoption, including benefits for the financial institutes [44]. The technology acceptance model was developed by Davis [45]. It is a theory of Information system that models the decision-making mechanism by which users may or may not embrace new technology. The researchers developed TAM from the experiments, the tenets of which indicate that the acceptance of a given technology is grounded on two key factors: perceived ease of use and perceived usefulness by the intended consumer. To understand the recent literature on traditional adoption theories for technology adoption is presented in Table 1.

3. Development of proposed model

3.1. Proposed model

In developed economies, the existing research for the adoption of blockchain technology in financial institutions is mostly based on traditional adoption theories, namely technology acceptance model, unified theory of acceptance model, diffusion of innovation theory, the theory of planned behaviour, transaction cost theory. To complement these studies, the present assimilate the technology acceptance model with cost-saving and trust for the following objectives. Firstly, the user intention to adopt disruptive technology could be explained by Fred Davis [44]. Secondly, the technology acceptance model has been mainly based on system-specific insights, and cost-saving is essentially money saved in the long term by using self-service technologies [52]. Thirdly, the distributed ledger technology basic principle is to remove trust-related issues in financial organizations [1]. So, the existing study develops the technology acceptance model factors by the cost-saving offered by Globerson and Maggard [17] and the trust suggested by Mayer et al. [53] to understand the adoption of DLT for financial organizations management. The proposed model is shown in Figure 3.

3.2. Hypotheses development

3.2.1. Cost-saving

Costs of technology have always been a key consideration in its adoption. Cost-saving includes emotional efforts, time, and money saved by using self-service technologies [52]. It is "the extent to which the customer feels that using a certain framework would save money spent on running the service [54]. The study of Meuter et al. [55] listed the saved money items as one of the subcategories that drive customer self-service selection. Distributed ledger technology disrupts the financial industry and contributes to the increased big data in financial institutions [38]. Blockchain technology can efficiently handle financial processes more efficiently than under the traditional system [35]. Previous research studies also confirm that e-commerce and self-service technologies can lessen transaction costs [56]. The transaction costs, such as protection (e.g., data encryption) and distribution costs (e.g., e-logistic service), can be lessened by the acceptance of innovative, disruptive technology [57]. Previous studies' results confirm that cost savings positively impact perceived ease of use [58,59]. In addition, cost savings have a beneficial

Table 1
TAM literature review

Autor	Model used	Major Findings
[46]	TAM	The author presented the results from both developer's and -users' perspectives to identify relationships and dissimilarities in how numerous stakeholders use cryptocurrencies.
[47]	Extended TAM	The findings significantly influence financial costs, facilitating conditions, trust, and readiness during disruptive technology adoption.
[48]	UTAUT	The findings confirm that assurance matters most during the user's intention to accept internet banking. In addition, effort expectancy and performance expectancy significantly impact all other technology and service quality constructs.
[49]	TAM	The findings confirm that all the constructs significantly influenced disruptive technology and suggested further research on applying the proposed model at financial institutions to study its fitness.
[50]	TAM	The perceived ease of use and perceived usefulness showed a significant effect during disruptive technology implementation. Conversely, safety disclosed an insignificant impact neither influences perceived effectiveness and ease of use during blockchain-based smart lockers.
[51]	UTAUT	The findings confirm that facilitating conditions, social impact, and performance expectancy significantly impact distributed ledger technology adoption. However, effort expectancy shows an insignificant impact during blockchain adoption in banks.
[27]	Theory of Planned Behavior, Diffusion of Innovation Theory, Benefit-Risk Concept and Transaction Cost Theory	The findings confirm that service compatibility and perceived benefits play a significant role during blockchain adoption. However, trialability and observability show insignificance during the adoption of bitcoin transactions.

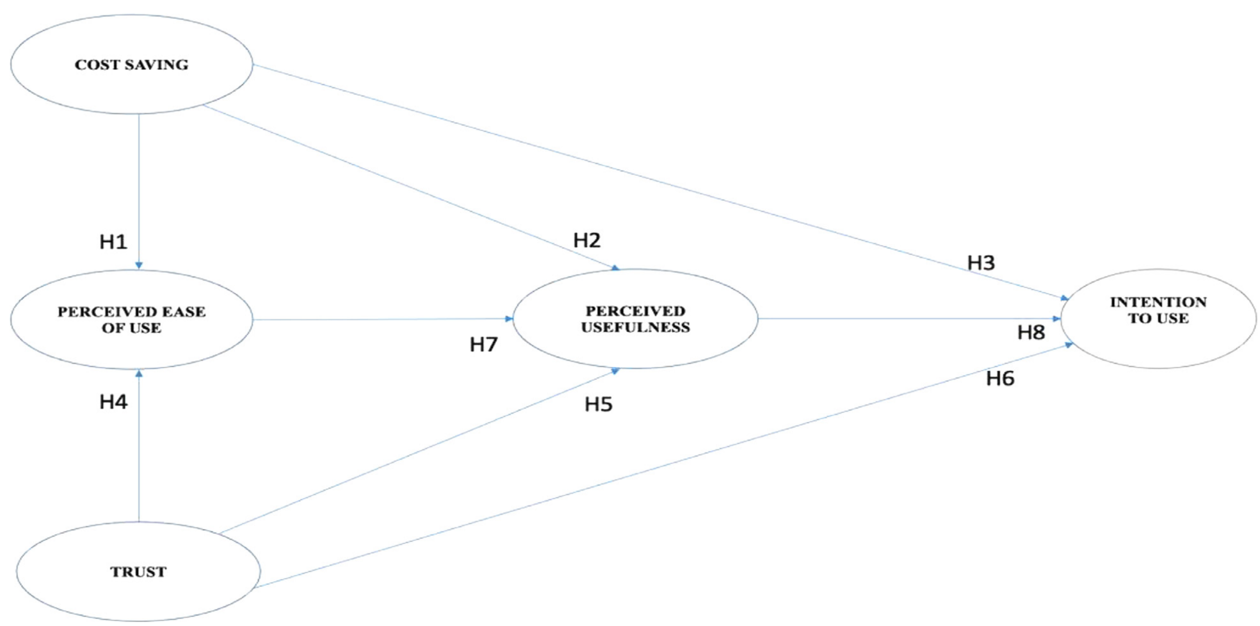

Fig. 3. The Conceptual Model

influence on perceived usefulness [57,60]. Consequently, cost savings positively influence intention to use [61,62]. Therefore,

H1. Cost Saving has a positive influence on the Perceived ease of use of Blockchain Technology

H2. Cost Saving has a positive influence on the Perceived usefulness of Blockchain Technology

H3. Cost Saving has a positive influence on the intention to use Blockchain for financial institutions

3.2.2. Trust

R. M. Morgan and S. D. Hunt [63] conceptualize that trust occurs only when one party trusts an exchange partner's reliability and honesty. Customer trust plays a significant role in individuals' decision individuals' decisions to develop long-term relationships with particular brands, service providers, or goods [64]. Trust in disruptive technologies service providers has been widely recognized as one of the key determining factors for users to remain loyal or disloyal to a service company [65] and avoid losing customers [66]. Trust-free systems based on distributed ledger technology at the tip of the hype cycle potential to revolutionize connections between peers that involve strong levels of trust [67], typically enabled by third party suppliers. P2P resources sharing networks represent a frequently discussed area of application for trust free DLT [24]. Numerous studies have thoroughly examined trust in e-services as a significant determinant [68]. Previous research has investigated the connection between perceived usefulness, ease of use, and trust [69]. Perceived usefulness is positively affected by trust [70,71], while trust is positively affected by perceived ease of use [69,72]. Consequently, trust has a significant impact on intention to use [73,74]. So, we postulate the subsequent hypothesis.

H4. Trust has a positive influence on the perceived ease of use of blockchain technology

H5. Trust has a positive influence on the perceived usefulness of blockchain technology

H6. Trust has a positive influence on the intention to use blockchain technology for financial institutions

3.2.3. TAM constructs

The TAM believes in two key factors, namely perceived ease of use and perceived usefulness. Perceived ease of use is defined by [44] as the degree to which a user trusts that it will be free of effort to use the framework. Fred Davis discusses that Bandura's [75] study on the theory of self-efficacy supports the value of perceived ease of use, which is defined

Table 2
Construct Measurements

Construct	Code	Question	Adapted from
Cost Saving	CS1	Blockchain technology is cost-effective	[35,38,82,84]
	CS2	The disruptive technology will reduce transaction, storage, and Energy costs at your firm	
	CS3	The distributed ledger technology is compatible with most aspects of Financial management concerns	
Trust	TR1	The blockchain will remove trust-related issues in financial firms	[16,23,85-90]
	TR2	The distributed ledgers can make it possible to build a financial system that could run without the need of the individual, which could be considered “trust-free.”	
	TR3	Regulators will like that blockchain-based transactions can get greater traceability and transparency-an “immutable audit trail.”	
Perceived ease of use	PEU1	Do you think blockchain technology is easy to use	[91–93]
	PEU2	You feel blockchain technology is easy to understand	
	PEU3	Do you think blockchain technology is compatible	
	PEU4	You feel blockchain technology is easy for multi tasks	
Perceived usefulness	PU1	Using disruptive technology will improve the performance of your firm by direct communication of P2P transmission	[76,94,95]
	PU2	Using distributed ledger technology will increase traceability in the supply chain domain at your firm	
	PU3	Using blockchain technology will help in anticounter measures in the manufacturing domain	
Intention to use	INT1	You expect your firm will use innovative technology in the future	[81,96,97]
	INT2	You assume that your firm will use blockchain to provide better services.	
	INT3	You think that your firm will take benefits from potential applications of blockchain technology.	

as “judgments of how well one can execute courses of action to deal with prospective circumstances”. Davis [44] explains perceived usefulness as the extent to which a user trusts that using a specific framework can boost his job efficiency. The prior studies’ findings confirm that perceived ease of use significantly impacts perceived usefulness [76–79]. Moreover, perceived usefulness has a noteworthy influence on intention to use [44,80,81]. Financial innovations have generated a new paradigm shift for driving innovation in the financial sector have generated a new paradigm shift for driving innovation in the financial sector have generated a novel paradigm shift for driving innovation in financial sector, and DLT is an integral part of this transformation [82]. Therefore,

H7. Perceived ease of use has a positive influence on the perceived usefulness of blockchain technology

H8. Perceived usefulness has a positive influence on the intention to use blockchain technology for financial institutions

4. Methodology

4.1. Instrument development

The present study’s proposed model consists of five multi-item factors. All the survey instruments were adopted from the prior literature. Cost Saving [17] and Trust [63] were used to measure financial institutions’ blockchain adoption processes. The measurement scale for perceived usefulness, ease of use, and intention to use was adapted from the TAM model proposed by [44]. The 5-point Likert scale was used to assess all scales, ranging from 1 (strongly disagree) to 5 (strongly agree) [83]. To evaluate their validity and clarification within the developing economies context, all survey instruments were checked by four experts. Based on their response, the survey tools were changed slightly. We didn’t convert the questionnaire into the local language because English is the official language in financial organizations. We contacted eight (08) experts before conducting the online survey as a pretest to validate the instrument. We made small adjustments to enhance the working of the times in the questionnaire based on the feedback. The details of the construct measurement are presented in Table 2.

5. Data collection

An online survey was used to collect data from experts working in Malaysia’s financial sector through using the Google Form service. The questionnaires were available online for a 16-week duration (Mid of June2020-Mid September 2020). We used convenience sampling, which is reliable with the sampling method adopted in disruptive technologies acceptance [58,76]. We received only 274 responses in total. We discovered that the average completion time was approximately 5 minutes, similar to the approximate completion time based on the pilot test. We have deleted 58 responses that were filled in less than 1.5 minutes. Moreover, we tested all responses and found that no responses to all items had the same score. A further 28 were removed due to many missing data. Finally, a total of 188 correct responses were considered for partial least square structural equation modelling. The sample size fulfilled the standard of 05 observations per parameter [98]. The details of demographic variables are presented in Table 3. Approximately 74.5% were males, and 25.5% were females. The majority of respondents had experience (29.3%) between 5 and 7 years. Over 32.4% of employees work at Group Office at Banking Service Group (BSG/Operations) and Corporate and Retail Banking Group (CRBG).

Table 3
Respondents Profile

Demographic Variables	Categories	Frequency	Percentage
Gender	Male	140	74.5
	Female	48	25.5
Age (years)	18-22	52	27.7
	23-26	40	21.3
	27-32	62	33.0
	33-40	25	13.3
	Above 40	9	4.8
Experience (years)	6 months- 1 year	25	13.3
	2-4 years	32	17.0
	5-7 years	55	29.3
	8-10 years	46	24.5
	More than 10 years	30	16.0
Work Location	Branch Banking	16	8.5
	Regional Office	18	9.6
	Group Office	61	32.4
	Head Office	55	29.3
	Others	38	20.2

Table 4
Full Collinearity

Construct	Cost Saving	Intention	PEU	PU	Trust
VIF	1.069	1.632	1.429	1.436	1.666

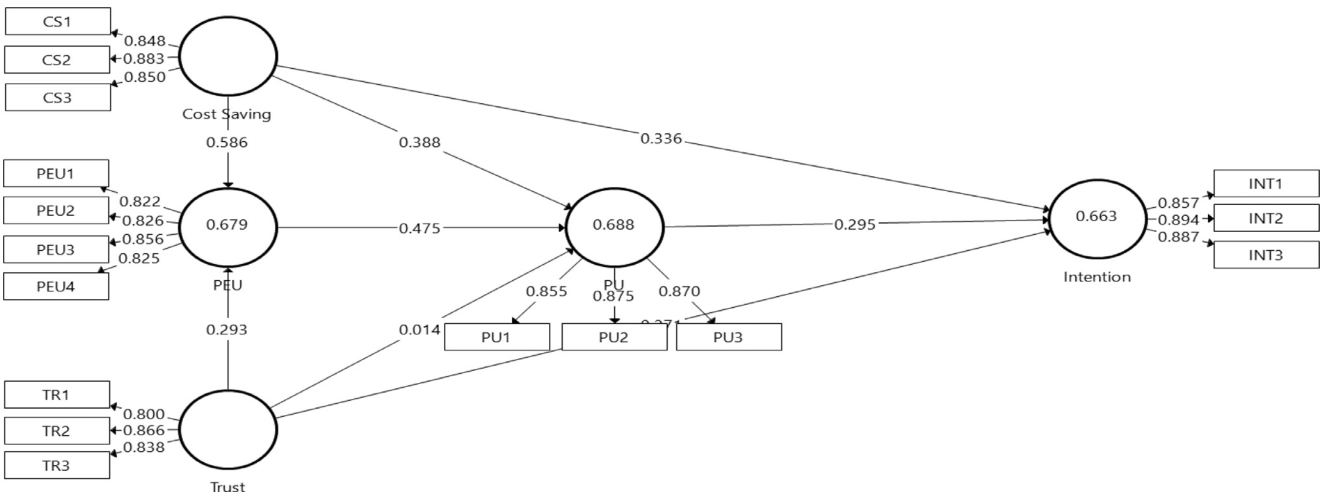

Fig. 4. Measurement Model

Table 5
Construct Reliability and Validity

Construct	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted
Cost Saving	0.825	0.824	0.895	0.740
Intention To Use	0.854	0.855	0.911	0.774
Perceived Ease Of Use	0.852	0.852	0.900	0.693
Perceived Usefulness	0.835	0.837	0.901	0.752
Trust	0.783	0.784	0.874	0.698

5.1. Method bias issues

We performed a full collinearity test to analyze the possible common method bias in online survey data collection [99,100]. The results shown in Table 4 confirm that there is no problem with a single source bias as the Variance Inflation Factor (VIF) test. The results of the vertical collinearity also confirm that the construct's highest VIF was below the standard value of 5 [101]. The findings confirm that this study doesn't pose a multicollinearity issue and is sufficient for the proposed model. Endogeneity could be created by the structural model recursively. Consequently, we applied a Ramsey regression equation error test and found no endogeneity issue [102,103].

6. Results

For data analysis, Partial least square structural equation modelling (PLS-SEM) was used [104]. Due to their limited causal and complicated modelling capacity, the first generation methods were not used [105]. PLS-SEM is generally applied among the second-generation research techniques [106]. In analyses of studying technology acceptance models, the SmartPLS is more precisely used. The proposed model was evaluated using a two-step process in the current analysis. First of all, we have tested the constructs' reliability and validity. In the second step, bootstrapping was applied to assess the significance of the structural model.

6.1. Reliability and validity tests

A convergent validity test is used to verify the inconsistency between the conceptual model constructs when the hypothetical variables developed for the study are closely related to the items used to calculate it. Five constructs were tested in the current study by following the guidelines for testing the measurement constructs' validity.

- First, we tested the factor loading for the significance level; the threshold for each item loading is 0.70 or above [101]. The findings confirm that all the values match the threshold, as shown in Figure 4.
- After the factor loading test, the composite reliability and average variance extracted (AVE) test were applied to all constructs. The findings confirm that all the values match the threshold of a minimum of 0.70 for composite reliability and 0.50 for AVE [101], as presented in Table 5.
- Discriminant validity was also investigated to assess the degree to which measurement constructs are different from each other in a proposed model. The findings confirm that validity is found significant and can be used to evaluate structural model measurement. The discriminant validity is presented in Table 6.

Table 6
Discriminant Validity

	1	2	3	4	5
1. Cost Saving	**0.861**				
2. Intention to Use	0.763	**0.880**			
3. Perceived Ease of Use	0.799	0.759	**0.832**		
4. Perceived Usefulness	0.778	0.730	0.795	**0.867**	
5. Trust	0.727	0.704	0.719	0.638	**0.835**

Note: The diagonals (bolded) are the square root of the AVE, while the off-diagonals are correlations.

6.2. Structural model

In the second stage of evaluating the SEM, bootstrapping was used for significance tests of the path coefficient. Subsamples (5000) were checked with replacement to prevent faults in the bootstrapping process, which led to the approximate t-values for the proposed model's significance testing. For structural models, the bootstrapping method approximates data normality, as shown in Figure 5. The findings confirm that independent constructs justified 66.3 percent of the variation in intention to use. As a result, Table 7 presents the final judgment on the creation of hypotheses.

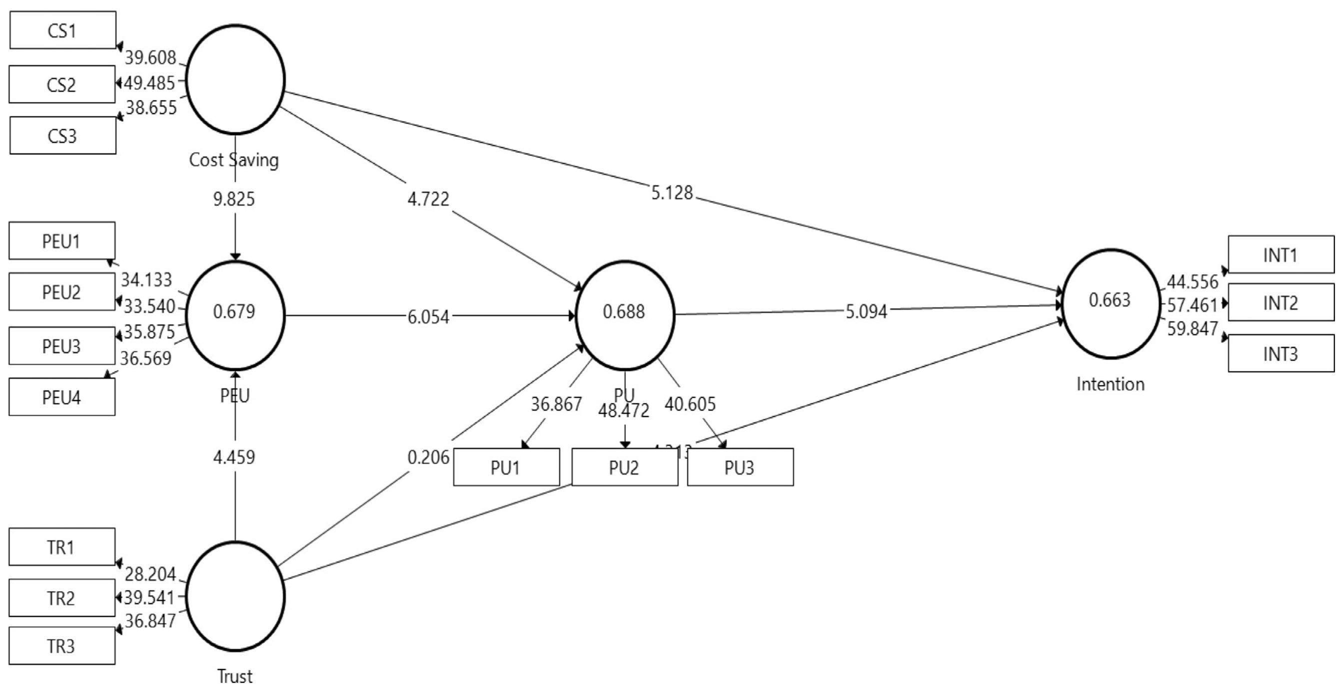

Fig. 5. Structural Model

Table 7
Hypotheses Testing

Hypothesis	Relationship	Std. Beta	Std. Error	t-value	p-value	f^2	Decision
H1	Cost Saving → PEU	0.586	0.060	9.825	p< .001	0.506	Supported
H2	Cost Saving → PU	0.388	0.082	4.722	p< .001	0.151	Supported
H3	Cost Saving → Intention To Use	0.336	0.066	5.128	p< .001	0.102	Supported
H4	Trust → PEU	0.293	0.066	4.459	p< .001	0.126	Supported
H5	Trust → PU	0.014	0.066	0.206	0.418	0.000	Not Supported
H6	Trust → Intention To Use	0.271	0.063	4.313	p< .001	0.100	Supported
H7	PEU → PU	0.475	0.079	6.054	p< .001	0.232	Supported
H8	PU → Intention To Use	0.295	0.058	5.094	p< .001	0.099	Supported

6.3. Structural model assessment

Based on the findings as presented above in Table 7, the result between cost-saving and perceived ease of use got ($\beta = 0.586$, T = 9.825, P = < .001). Therefore, H1 is supported. As the study shows, a result between cost-saving and perceived usefulness got ($\beta = 0.388$, T = 4.722, P = < .001), so H2 is supported by the study. Consequently, the result of cost-saving on intention to use got ($\beta = 0.336$, T = 5.128, P = p< .001), therefore H3 is supported. The next result between trust and perceived ease of use was ($\beta = 0.293$, T = 4.459, P = p< .001), therefore H4 is supported by the study. The result between trust and perceived usefulness got ($\beta = 0.014$, T = 0.206, P = 0.418), therefore H5 is not supported by the study. Subsequently, the result between trust and intention to use got ($\beta = 0.271$, T = 4.313, P = p< .001), so H6 is supported by the study. The next result between perceived ease of use and perceived usefulness got ($\beta = 0.475$, T = 6.054, P = p< .001), therefore H7 is supported. Finally, the between perceived usefulness on intention to use DLT for financial organizations got the following result ($\beta = 0.295$, T = 5.094, P = p< .001), so H8 is supported by the study.

Further to that, Shmueli et al. [107] proposed PLS predict, a holdout sample-based procedure that generates case-level predictions on an item or a construct level using the PLS-Predict with a 10-fold procedure to check for predictive power.

Based on Table 8, a majority of the errors of the PLS model were lower than the LM model thus we can conclude that our model has moderate predictive power.

Table 8
PLS-Predict

	PLS		LM		PLS – LM		
	RMSE	MAE	RMSE	MAE	RMSE	MAE	Q^2_predict
INT2	0.910	0.738	0.892	0.720	0.018	0.018	0.497
INT1	0.903	0.717	0.906	0.721	-0.003	-0.004	0.454
INT3	0.872	0.677	0.890	0.679	-0.018	-0.002	0.490

7. Discussion

7.1. Major findings

The findings confirmed that cost-saving had a significant influence on perceived ease of use and similar to previous studies of [58,108,109]. The cost-saving had a significant influence on perceived usefulness and previous studies [58–60]. Consequently, cost-saving showed a considerable effect on the intention to use and was supported by the studies of [62,38,35,82]. The study's findings strengthen that adoption of disruptive technology will reduce the transaction, storage, and energy cost for financial firms. The next trust showed a significant impact on perceived ease of use and similar with previous studies of [24,86,88]. In addition, trust showed an insignificant impact on perceived usefulness and deviated from the previous studies of [16,88]. Subsequently, the findings also confirmed that trust had a significant impact on intention to use disruptive technology, similar to previous studies of [89,90]. The study outcomes suggest that marketing agencies put effort into awareness about blockchain technology and focus on buying potential applications for actual use in developing economies [110]. The next perceived ease of use significantly influenced perceived usefulness and was supported by the other studies of [76,78,79]. Finally, perceived usefulness showed a substantial influence on the intention to use blockchain technology and similar to previous studies of [76,79,81]. From the major findings, it can be concluded that disruptive technology is attracting attention as an innovative technology to transform the future and has developed as a new financial market pattern.

7.2. Theoretical implications

This study is a response to a call made by Ying et al. [111], who stated that empirical study is urgently needed to supplement the existing state of DLT research, which is mostly exploratory in nature. Indeed, most of the DLT literature to date has been in the form of a literature review such as Hughes et al. [112], Min et al. [113], Queiroz et al. [114]), and is conceptual in nature such as Francisco et al. [115]. Even if some scholars have worked harder to gather empirical evidence, many investigations are fairly limited, focusing on a single object Such as Ying et al. [111], qualitative in nature such as Wang et al. [116], or UTAUT frameworks such as Queiroz et al. [117], or TAM with DOI frameworks such as Ullah et al. [118]. This study is intended to contribute to the ever-growing literature on understanding the DLT adoption in financial institutions and bring diversity to the literature on adoption models for technical advances using an empirical approach by using the theoretical lens of the TAM framework with cost-saving and trust, and empirical evidence from Malaysian financial sector. In the current study, we proposed a model to make it possible to understand adoption behavior for the DLT adoption in the financial organization management and information system. Our proposed model was derived from the traditional technology acceptance model [44] to address a research gap on limited empirical research and literature on blockchain adoption for developing countries [119]. Based on findings from the proposed model, it is indicated that developers and experts can take benefits in terms of reducing cost and increasing trust when it comes to embracing innovative blockchain technology. Research scholars can expand this study by adapting or extending our proposed model to a new cross-culture country collection.

7.3. Practical implications

Based on the analysis, this research specifies that the conceptual model has a strong descriptive effect (R^2=0.663 and R^2 adjusted=0.658), representing a 66.3 percent variation of the intention to use. Furthermore, the perceived ease of use showed a variance of (R^2=0.679 and R^2 adjusted=0.676). Consequently, perceived usefulness showed a variance of (R^2=0.688 and R^2=0.683). Distributed ledger technology has begun to be explored in financial organizations by the emerging economies [30].

The reduction of overhead expenses is one of the evident commercial benefits of integrating DLT in a financial system. Using DLT, banks can cut their overhead expenses by a large amount, which can be based on the cost-saving construct. Lower administrative costs, reduced transaction costs, elimination of intermediaries, and reduced operating costs are all part of this architecture. In the banking sector, the implementation of DLT will result in the elimination of intermediaries, resulting in lower administrative and operational transaction fees. In addition to core banking, DLT offers many benefits in the financial services and insurance sectors, including smart contracts, renewals, and process optimization. DLT deployment promotes trust, lowers costs for both the company and its consumers, and improves security [120]. Through DLT-enabled platforms, both the supplier and the users may quickly build trust in digital banking. DLT allows a company to build trust and assure transparency in its commercial dealings. Traditional methods are prone to errors since the banking and similar businesses deal with enormous amounts of data. Top banking executives can be confident in data accuracy and thereby reduce the risks connected with data processing. Banking experts can use DLT to automate and renew transactions that are repeated among a company's stakeholders. DLT may be used by experienced managers to improve the security and efficiency of their service ecosystem. Controlling data is crucial in the banking business, and this control must be backed up by system resilience. DLT can enable the resilience and immutability of the audit trail in particular conditions, such as humanitarian financial crises, which is useful to both corporations and auditors. Because the banking industry interacts directly with the finances of both individuals and businesses, it is vulnerable to fraud and record-keeping errors. To process payments safely, present electronic payment systems rely on trustworthy, central parties. The strain to reduce these transaction costs has led banks to start accepting each other's statements. As merchants could now deposit notes from other banks directly to their own bank, this breakthrough made trading more convenient, removing the burden of converting paper money into gold to transfer funds. Consequently, disruptive technology can change the financial industry by eliminating the intermediary role of banks and overhead costs. FinTech on distributed ledgers builds a modest landscape that would drive the FinTech revolution [121].

Conclusion and future work

The present study provides an overview of hypothetical factors of consideration from a holistic sight through the TAM context. In response to a research question (Q01), Cost saving significantly impacts perceived usefulness, ease of use, and intention to use. Trust shows a significant impact on perceived ease of use and intention on use. However, Trust shows an insignificant impact on perceived usefulness. In developing economies, still, blockchain is an emerging technology. The next Perceived ease of use shows a significant impact on perceived usefulness. Consequently, Perceived usefulness shows a significant impact on intention to use. Regarding the research question (Q02), cost-saving matters the most during blockchain technology for financial organization management. This study will, therefore, provide a guide to both scholars and experts.

There is remarkable scope for further study on blockchain technology adoption. Firstly, based on the study findings, the present study model showed moderate predictive power. In future, additional validation can also be performed. Secondly, the present study is only conducted in developing economies for financial organization management. Researchers may consider empirical study research of the key drivers in developed countries like the US, UK, Australia, and developing countries like India, Malaysia, and Pakistan. The result of such comparative studies will be interesting [117]. Thirdly, this study considers factors from the TAM framework with cost-saving and trust. Further studies may consider other adoption theories like technology readiness index, diffusion of innovation theory, information system success theory, performance expectancy theory. The result of such important theories in this area for financial management will be more substantial. Fourthly, disruptive technology is not a standalone technology. [76]. Further studies may consider the integration of blockchain technology with IoT, AI, big data, and the role of local regulations. Such studies will help decision-makers better understand the influence of confidentiality, reliability of data and privacy, and DLT responsibility in protecting sensitive data for financial organizations [111]. Fifthly, each organization differs in the segments of culture, infrastructure, and industry, which together can lead to a different blockchain section. Current studies have reported either on blockchain-based designs of business processes or technology models but not on their relationship. Therefore, further studies are needed to understand the effect of exchanging information and resources to make better adoption decisions. Finally, apart from prototype and feasibility research, few research studies have thoroughly noted the costs of blockchain implementation [58]. Furthermore, this scarcity prevents the analysis from comparing similar works on the same technology. As such, businesses thinking of incorporating blockchain into their current business models will need further consideration of the need for such technology [114]. However, the amount of publicity created by blockchain serves as a reminder that organizations can no longer retain conventional ways of doing things but that change needs to be accepted. Technology will change activities dramatically, and companies need to be prepared.

Declaration of Competing Interest

None

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Nazir Ullah is PhD from School of Management and Engineering, Nanjing University. His research interest includes Blockchain technology, Hyperledger Fabric network, Technology adoption theories, Structural equation modelling. He has several publications in top tier Web of Science (WoS) Listed journals and IEEE international conferences. He is a Potential reviewer in several WoS Listed Journals such as Journal of Consumer and

Retailing Services, Technovation Journal, Environment Development and Sustainability Journal, Connection Science Journal, IEEE Access Journal, Information Discovery and Delivery Journal. He is invited as a Speaker and Participant for Several international conferences. He is working in collaboration with blockchain and IT senior experts including World top 2% Scientists and Top 1% highly cited researchers.

Waleed Mugahed Al-Rahmi is an assistant professor in faculty of social sciences and humanities, school of education, Universiti Teknologi Malaysia. He has completed his PhD degree from the Faculty of Computing - Information Systems, Universiti Teknologi Malaysia. He got Best Student Award, Doctor of Philosophy (Faculty of Computing - Information System), Excellent academic achievement in conjunction with the 56nd Convocation Ceremony, Universiti Teknologi Malaysia (UTM), 2016. Dr. Waleed experiences had 8 years teaching experience at Department of Computer Science, Hodeidah University, as well as teaching assistant 2.5 years in Faculty of Computing at Universiti Teknologi Malaysia. Moreover, Post- Doctoral in Faculty of information and Communication Technology at International Islamic University Malaysia, Moreover, Post- Doctoral in Faculty of Science at Universiti Teknologi Malaysia. Furthermore, Currently Post- Doctoral in Faculty of Education at Universiti Teknologi Malaysia. His research interests are information system management, information technology management, human-computer interaction, implementation process, Technology Acceptance Model (TAM), communication and constructivism theories, impact of social media networks, collaborative learning, E-learning, knowledge management, Massive Open Online Course (MOOCs), statistical data analysis (IBM SPSS, AMOS, NVIVO and SmartPLS).

Osama Alfarraj received the master's and Ph.D. degrees from Griffith University, in 2008 and 2013, respectively, all in information and communication technology. He is currently an Associate Professor of computer science with King Saudi University, Riyadh, Saudi Arabia. His current research interests include eSystems (eGov, eHealth, and ecommerce), cloud computing, and big data. He served as a consultant for two years and a member of the Saudi National Team for Measuring E-Government, Saudi Arabia.

Nasser Alalwan is an associate professor of computer science at computer science department, and head of the Literature and Education Dept., Community College, King Saud University. His main research interests include database, semantic web, ontology, electronic and mobile services and information technology management.

Ahmed Ibrahim Alzahrani is currently an associate professor at computer science department, community college, King Saud University. He acts as the head of the informatics research group, King Saud University. His main research interests span over in the area of Information Systems (IS) including adoption and diffusion of emerging information technologies, theories and models of IS research, usage patterns in technology and cyberspace, online electronic services in various contents, Impact of social media and human computer interaction.

Vikas Kumar is a Professor of Operations and Supply Chain Management and Director of Research at Bristol Business School, University of the West of England (UWE), UK. He is also a visiting Professor at the Faculty of Accounting, Ton Duc Thang University, Vietnam. He holds a PhD degree in Management Studies from Exeter Business School, UK. He has published more than 200 articles in leading international journals and International conferences including the International Journal of Production Research, Technological Forecasting and Social Change, Supply Chain Management: an International Journal, Expert System with Applications, Journal of Business Research, Computers & Industrial Engineering, and Production Planning & Control. He serves on the editorial board of several journals. He has successfully secured funding in the excess of £1 million from various research agencies such as EPSRC, Innovate UK, British Academy, Newton Fund and British Council. His current research interests include Sustainability, Industry 4.0, Circular Economy, Food Supply Chains, and Operational Excellence.