Adopting Block chain Technology to Improve Financial Reporting by Using the Technology Acceptance Model (TAM)

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ABSTRACT

Considering the capabilities of Blockchain technology, the present study examines the important issue of acceptance of this technology by the producers and users of financial reporting. First, the study has reviewed the available theoretical and experimental foundations and according to technology acceptance model (TAM, henceforth) has presented a theoretical model and extracted the factors affecting the acceptance of this technology in financial reporting. Then, by adopting a qualitative method and analyzing the content of 11 semi-structured interviews, the initial theoretical model is modified and the factors affecting this technique have identified in financial reporting. Finally, by collecting and analyzing 35 questionnaires by applying fuzzy Delphi method, the final model has been given and the view of the preparation and users of financial reporting regarding the acceptance of this technology have been evaluated. Financial reporting embraces blockchain technology, and the main reason for the adoption of this new technology is the perceived usefulness as a result of the positive impact on the qualitative characteristics of information. This scientific research helps to better understand the factors involved in the adoption of new techniques by financial reporting developers and their impact on the current intention and application of the system in the field of financial reporting.

Keywords:

Blockchain Technology, Technology Acceptance Model, Information Quality, Perceived Usefulness.

1. Introduction

Today's world is accompanied by increasing changes that the rate and acceleration of these changes are incredible and, consequently, they affect individuals, organizations and societies in different ways. One of the most critical changes is the emergence of new technologies, which often have many potential benefits. However, the development and deployment of these technologies are not enough to enjoy its benefits, but the technology must be taken into account by users (Shafiee et al. 2014). On the other hand, nowadays accounting and traditional financial reporting face with inadequate analysis and misrepresentation of information among users. Thus, commercial markets and users of business information need arrangements and conditions to increase the transparency of the reporting process. Therefore, achieving a series of appropriate business reporting system to solve these problems is vital (Bozorgi Asl & Valipour Rokni, 2006) Accordingly, information technology is one of the crucial tools used and the development of information and communication technology is part of the path to improvement. It paves the way for advances in technology and communication in such a way that they prepare the appropriate conditions for establishing information systems within organizations which have caused many changes. In addition, they have led to important consequences in the forms of economic relations, business practices and exchanges between companies (Arab Mazar Yazdi, 2006). The most important feature of information and communication technology is the high speed of transmission and information processing, ease of access to information, the possibility of electronic exchange, low costs and high quality data transfer (Abdollahzadeh & Maleki 2016). Accountants, meanwhile, are most concerned with the consequences of changes in the world of information and communication technology, because the way of presenting these changes are directly related to how they perform day-to-day tasks and process improvement, including current or traditional reporting limitations and upgrading periodic financial reporting to continuous business reporting (Arab Mazar Yazdi, 2006). Therefore, accountants have to use technology properly. In other words, the role of information in societies has become critical with the advent of information technology and information providers, especially accountants and auditors should be pioneers in using existing software and they have to provide better services to the economic community, otherwise as soon as possible, the position of accounting and auditing profession is weak. (Abdollahzadeh & Maliki 2016). Actually, due to the fact that providing reliable, timely and comparable information to support investors are essential to help the decision-making process as well as to have an efficient capital market, this goal is possible with the emergence of technologies such as the Internet and related services like online reporting which is possible through the web (Bagherian & Kasgari 2007). In other words, the Internet has the potential to evolve financial reporting, and companies can report other discretionary financial and non-financial information in various forms at the same time as their traditional annual reports (Euler Wall-Bossidi 2009). The theoretical basis of using the Internet for financial reporting can be the concept of no Information symmetry between management and company ownership. For this reason, today companies think of mechanisms such as financial reporting via the Internet and the Web in order to reduce the negative effects of information asymmetry and consequently they reduce agency costs, reduce capital costs and increase the value of the company (Debrecen et al. 2002).

Technology in the world is changing at an unprecedented rate. This is a trend that will only continue to grow in the coming next years as big minds continue to develop things to make everyday life easier and more accessible to everyone. As this trend continues, changes will be common not only in everyday life, but in the business world as a whole. This technology has already exploded and has been able to allow businesses to accelerate to different levels of profitability and competition.

The Internet, a complex global network, has changed our world and revolutionized the way of exchanging information. However, it has been proven to be less useful in the exchange of values (Warburg,

2016). First, by using cloud operations on the Internet, accountants tried to address the shortcomings of financial accounting and reporting. Cloud Operations is a user-friendly interface for cloud service customers so that they can independently monitor and better understand the management of their sensitive information by third party cloud services. However, Tepskat (2016) identified several problems when creating the accounting process from data collection to bookkeeping. He believes that despite the increasing use of technology and internal tools, there is still the possibility of human errors in accounting. These errors may be general problems, but it is possible that the corrections that auditors make to the audit of the audit process will lead to erroneous audit conclusions.

Advances in accounting have been made using more specialized accounting software and cloud-based systems. Corporate customers have also become more technically diverse. However, these developments have faced challenges because the company's cybersecurity program must now be developed to prevent billions of Rials and the loss of private / confidential information due to cybersecurity breaches. In general, most different layers of accounting are affected by the use of a new technology within a company or industry. It is one of the more effective technologies currently accepted in the field of accounting and potentially in the field of cybersecurity.

Non-stop digital evolution has led to the development of blockchain, a peer-to-peer (P2P) - based distributed network that enables value exchange by recording and transmitting it in an intact manner. In fact, blockchain seems to be the next step in the digital age, and it is expected to have an impact on business and society. Therefore, it has attracted the attention of both academics and thinkers. Blockchain can be considered as the second wave of change in the structure of computing. Adoption of blockchain technologies and protocols is facilitated through integration with modern Internet resources and public cloud service

Providing useful information for decision making is one of the fundamental goals of financial accounting and reporting. Among the qualitative features in providing information are reliability and relevance of information. Following the recent financial scandals such as Enron, WorldCom, Parmalat and Ahalid, investors' confidence in financial reporting systems has weakened and the quality of financial reporting has been suggested as an important factor in determining the credibility and reliability of reported figures. As a result, determining the quality of accounting information resulting from financial reporting systems and its results have been of interest to investors, managers, legislators and standards developers (Sajadi & Mohammadi, 2010). As a result, determining the quality of accounting information resulting from financial accounting systems and its results has been of interest to investors, managers, legislators and standards developers. Any research on how accounting information affects a wide range of stakeholder decision-makers in companies will help to better understanding of how this information plays the role and the need for more and better disclosure. As a result, it is necessary to pay attention to the quality of the information provided. On the other hand, as mentioned earlier, blockchain technology in accordance with the theoretical foundations and research background can help to increase the quality of accounting information and financial reporting.

In other words, in the current sensitive situation and due to the weakness in internal and external financial reporting in Iran, you should think of a way to improve it. Therefore, the present study is based on two well-known theories, TAM and information systems success model, and according to the main issue of the research, which is the pattern of using blockchain technology to improve accounting and financial reporting, the effect of blockchain technology on improving accounting and reporting quality of financial review. In summary, the aim of the present study is to obtain the components and keywords that are obtained through semi-structured interviews and conducting questionnaires from experts about the applications, opportunities, threats and strengths and weaknesses of the blockchain in financial accounting and reporting. The need for this framework is tied to the possible frameworks for the use of blockchain technology in future financial accounting and reporting that will be created to financial accounting and reporting. The present study answers the question that according to the information obtained from the interview and the questionnaire about the factors affecting the acceptance of blockchain technology. Regarding this issue, the main research questions are as follows:

1) What are the strengths and benefits of using blockchain technology in financial accounting and reporting?
2) What are the weaknesses of blockchain technology in financial accounting and reporting?
3) What are the challenges of implementing blockchain technology in financial accounting and reporting?
4) What is the role of accountants in implementing blockchain technology?

2. Literature Review

2.1. Theoretical Foundations

2.1.1. Blockchain

If we want to provide a simple definition of blockchain, we can say that blockchain is a system for recording information and since it uses encryption to record information, it is impossible to delete and manipulate information, so the reliability of the data stored in this system is very high. Blockchain software has the distributed functionality and synchronizes data recorded on PC and server network "nodes".

Blockchain technology establishes a system for building distributed understanding in the digital online world. This means that due to the undeniable registration of information in the general office, all components of the network are aware of the realization of a digital event and recognize it. Blockchain technology is essentially a distributed database of documents or a general ledger of all digital transactions or events that is run jointly by its components. And every transaction in the General Office is done with the consent of the majority of system components. The difference with other systems is that the information stored on this type of system is shared among all members of the network, and using encryption, it is almost impossible to delete and manipulate the recorded information. The blockchain itself is a subset of distributed head office technologies. Blockchain is a type of data architecture used in head office technology in which transaction records are stored in interconnected chains.

Blockchains, like other types of databases, can be public or private. The bitcoin network is public (also called "no license required") because everyone can read or write data from the general ledger if they have the right bitcoin software, but private blockchains are networks in which participants already have recognized and authorized to update the general office. Participants may belong to an organization or different organizations in an industry, and informal agreements, formal contracts or confidentiality agreements govern the relationship between them. In the absence of trust, public blockchains usually require additional mechanisms to judge disputes between participants and to protect the accuracy of the data. This leads to more complexity, because there is no central power to judge in a distributed network. In the Bitcoin blockchain, for example, new transactions can only be added to the blockchain after a network participant solves a complex mathematical problem, or "proof of work." This process is called "extraction". The effort that miners must make to find a solution to this mathematical problem serves as a sign that transactions are valid, although miners may not know each other at all.

Just as Satoshi Nakamoto called this innovation a peer-to-peer electronic money system, blockchain technology can be described as a distributed general office that has been able to attract a great deal of attention in the area of financial services. Researchers and investors are keen to explore the exploitation of the technology's destructive and deliverable potential, with achievements such as facilitating value exchange, securing safe storage, achieving operational efficiency, safe cost savings, increasing industry transparency, and enhancing industry transparency and the customer's experience.

Smart contracts implemented at the blockchain level contain application interfaces, business policies, and data. All of these parameters change over the life of the platform. For this reason, it is crucial that the design patterns of these contracts be such that, if necessary, they can add some new and necessary functions to the system or can remove some unnecessary functions that are problematic or corrupt from the network. The code implemented in these contracts must be constantly changing, even if these changes are to maintain compatibility with the newer versions of the original platform. Considering smart contracts based on blockchain distributed office technology as completely legal contracts, some new cybersecurity considerations and requirements will also be needed to ensure that data can be stored, stored and stored securely in a secure environment.

All data which are registered and stored in a blockchain are immutable. In the sense that they cannot be changed, deleted or manipulated. In a blockchain, it is only possible to add data to the previous data set, without changing the previous data. This consistent or unchanging blockchain audit sequence is one of the most attractive features of distributed general ledger technology for the financial services industry that has attracted many auditors with the desire for greater transparency and reliability.

Users' access to the distributed general office network and the information recorded in it requires the provision of private and public keys. All confidential data that needs to be registered in the blockchain system, so that it is not available to the public, must be encrypted by using private keys. Each organization encrypts its data by using private keys on the chain and then holds the keys (keys without which it would not be possible to retrieve and read this data). This trend suggests that there is a precise and calculated approach to protecting private cryptographic keys so that organizations' confidential data is not made available to the public or attackers.

In his study in 2019, Kozolinsky contended that blockchain assistance in the accounting process is in the form of collecting, grouping, and streamlining or flowing information. Quick access and information provision reduce the distance between receiving information and entering it in the database. Reducing risks or errors in accounting and decision-making processes allow the company to avoid misrepresentation of information in accounting. Blockchain integrates all levels of accounting to create an integrated database, automatic report generation, and ensuring effective operational control.

Liu et al. (2019), in a study entitled How Blockchain Technology Affects Auditing and Accounting, concluded that this technology, through instant transaction validation, speeding up the automation of manual operations, makes it possible to adapt more quickly to the latest recent standards, regulations, and laws. It also assists Financial Accounting and reporting. Schmitts and Leoni (2019), in a study entitled Accounting and Auditing at the Time of Blockchain Technology, articulated that the technology improves the performance when it comes to operations. Audit reporting, decentralized (scattered architecture), authentication, secure encryption of accounting records, ease of matching accounts, records, information and intelligent accounting procedures, fraud reduction, record immutability, human error reduction, simplification and automation accounting and control, integration, reduction of hidden accounts help to improve financial reporting.

By conducting research entitled Internet of Things and blockchain technologies

Improving the quality of accounting information Wu et al. (2019) concluded that this technology, in cases of instantaneous performance improvement, timeliness of information, increase of speed with automation of manual operations, accuracy, decentralized ability to track records, transactions, events, ensure the reliability of information, data, evidence, etc., record encryption accounting safely, the possibility of implementing the accounting approach "three-way registration", reducing fraud, increasing capability comparison of disclosed Information helps accountants to prepare accurate financial statements. On the other hand, Bonson and Badnarova (2019) in a study entitled Blockchain and its implications for accounting articulated that this technique is "one-sided", reduces fraud, and increases the comparability of disclosed information to accountants. In cases of improving information timeliness, decentralization (audit), reducing the problem of information asymmetry, increasing accuracy and precision, consensus mechanism, accuracy, reducing the costs of inherent audit representation, intelligent audit procedures, immutability of records (audit), reducing Human error, non-manipulative, increase comparability disclosures help to facilitate the exchange of information, keep accountants consistent, and provide fair financial reporting.

Kokina et al. (2017) in a study entitled Blockchain: Immediate Acceptance of Industry and Its Consequences for Accounting asserted that this technology in the areas of elimination of intermediaries, decentralization (auditing), authentication of transactions (auditing), pursuit of asset ownership (Audit), the ability to track records, transactions, events, ease of matching accounts, records, information, etc., traceable audit, data transparency (audit), facilitating information exchange, permanence and synchronization helps to provide reliable information to the company's management
Kozolinsky also explored the benefits of using the blockchain in four areas as follows:

A: Organizational management: accelerating the receipt of information for effective decisions, flexible and responsive to changes in outdoor and indoor environment, providing complete information, giving truthful and unbiased information to users to maximize the objectivity of their decisions. is

B: Economic: through cost savings in receiving information; reducing organizational or bookkeeping costs, saving on payroll accounting; saving accounting software helps the company manage

C: Specialized: By creating information technology control to ensure transparency, accounting efficiency, a reasonable assurance that the financial statements are generally free of distortion, expanding the scope and tasks of using accounting information helps the organization

D: Quality: by providing high quality accounting, control, tax and law enforcement.

Given the vast benefits of Blockchain technology mentioned above, it can be argued that its widespread use in the world is inevitable in the near future. In recent years in Iran, little effort has been made to use this technology in accounting and financial reporting of organizations and commercial institutions and no special measures have been taken.

Since the move to electronic accounting and financial reporting processes has started in Iran for several years, it is expected that if recognized and supported by the relevant authorities, blockchain technology will become one of the key components of the process in the future in making the processes electronic, which is in the interest of both the providers of financial information and the users of this information.

Therefore, despite the problems of accounting and financial reporting in Iran, on the one hand, and the introduction of blockchain technology as a registered solution to accounting and financial reporting problems, on the other hand, this study seeks to investigate the important issue of acceptance of blockchain technology by commercial organizations. In order to improve and promote financial accounting and reporting in Iran.

2.1.2. Acceptance

Today, technology and related innovations have become one of the most vital elements of the strategic environment of organizations. Therefore, the acceptance of technology by users is one of the most important factors for the success of an innovation. Understanding and anticipating how potential users will adopt new technologies is one of the key issues when planning the design processes of that technology. To be successful in predicting, it is important to understand the mindset of users and their areas of activity.

There are different models and theories regarding the adoption of technology. Numerous studies have not confirmed the capability of the TAM in relation to measuring and determining effective variables (Jaeger, 2003). The Davis model (TAM) considers the use of technology as a function of a four-step process that during the process, external variables affect users' perceptions regarding the ease of use and usefulness of systems. The two factors raised in the technology acceptance model, namely perceived ease of use and perceived usefulness, have been reviewed and validated in almost all studies.

Technological advances have always played a vital role in business. Advances in technology also expand knowledge. However, as long as it is not accepted or used, technology has little application (Rahim et al., 2012). Therefore, understanding technology is of great importance. Car (1999) has considered the acceptance of technology as a technology selection for the use for an individual organization. Acceptance of technology can be further defined as the willingness of a group of users to apply technology for their benefit.

Technology acceptance models have been developed in response to the need for user satisfaction and as a way to predict system success. Since the TAM is primarily end-user, it is conceptually quite appropriate to examine blockchain technology acceptance. Because according to the goals of the principles of accounting and financial reporting, information must have certain features to be applicable to users. As a result, the positive effect of blockchain technology on the quality characteristics of information will confirm the usefulness of this technology in the field of accounting and financial reporting (Salvara & Taminen, 2009, 158).

In this study, the TAM and the concept of information usefulness from the perspective of the conceptual framework of International Financial Reporting Standards are used and the effect of blockchain technology on each of the qualitative features of financial information is measured.

One of the qualitative features is relevance. In blockchain technology, different levels of access are possible. Some people, such as the CEO or auditing firm, may have access to all information, while other stakeholders may have limited access (only collected information is visible). Based on predefined roles, some content may be available to users who have an encryption key. Therefore, each person, depending on his/ her position, has access to information about himself / herself.

Another qualitative feature of information is timeliness. Blockchain has the capacity to help the instant operation of operations, instant validation of transactions, online transactions. In addition, it increases the speed by automating manual operations. It paves the way to synchronize and reduce the time to perform operations in a timely manner.

Comparability is another qualitative feature of information. This technology helps to make the information comparable by increasing the comparability of the disclosed information and facilitating the exchange of information

Another qualitative feature of information is verifiability. By increasing information accuracy, information authentication, consensus mechanism, decentralized (scattered architecture) information, the possibility of faster compliance with the latest standards, regulations and recent rules and ensuring the reliability of information, data, evidence, etc. blockchain technology help to achieve the qualitative nature of information verification.

Completeness is a qualitative feature of information. This technology helps to increase the quality of information through information integration, permanence and reduction of hidden accounts. Impartiality is also another qualitative feature of information. Blockchain technology can reduce information asymmetry by properly disclosing financial information. It also helps financial accounting and reporting through distributed architecture and the elimination of intermediaries.

Profitability in valuation is another quality feature of information. Blockchain technology improves the quality of accounting information by creating a secure and secure data network, conducting transparent transactions, providing thousands of backups, encrypting accounting records securely, better tax audits and easy access.

In fact, combining TAM with emphasis on perceived usefulness and qualitative features of information based on the conceptual framework of International Financial Reporting Standards (IFRS) will provide the following model, which is the theoretical model of the present study.

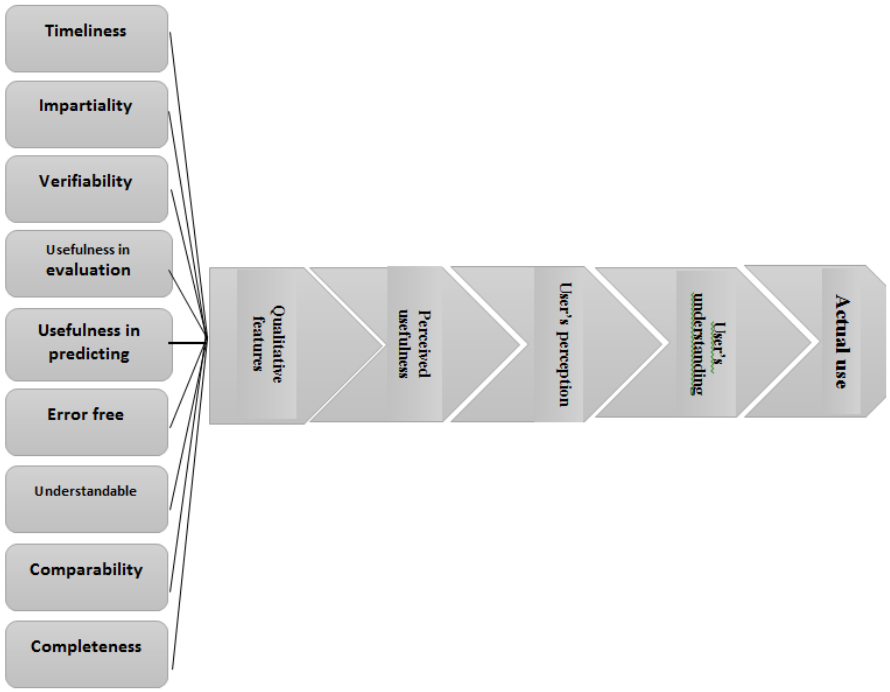

Figure 1: theoretical model of research on the factors affecting the adoption of Blockchain technology in accounting and financial reporting

In short, according to the TAM and with an emphasis on perceived profitability, the main factor in accepting blockchain technology as a new technology in accounting and financial reporting, is to be useful in user decision making.

3. Methodology

This research is cross-sectional in terms of time and in terms of time period, that is to say 2020. The statistical population of this study includes professors in the field of accounting and auditing, members of the Society of Certified Public Accountants and experts in accounting, finance and information technology and specialists in other areas affecting blockchain technology.

3.1. Data Collection Method

The present study is an integrated research and has sequential-exploratory design. In this type of design, first qualitative data is collected and analyzed and, then, in the next stage quantitative data is collected and analyzed and, finally, the general interpretation of the results is done. In the first stage, in order to gain sufficient knowledge about the target topic, the theoretical foundations and literature of using blockchain technology in the field of accounting and financial reporting have been studied. In the second stage of the research, the interviews began with two general questions about the background of the interviewees and were followed by a brief explanation of the stages and phases of the research by the interviewer. Interview questions were categorized and asked in the acceptance of this technology. The interviewee was asked about the factors in the theoretical framework of the first stage of the research. Next, the interviewees were asked to talk about other factors that may be effective, but they may not be mentioned in in the questions and answers of the interviews. All interview sessions ended with questions about introducing other experts with experience in the field. In the third stage of the research, the questionnaire designed by the researcher, which was the result of the first stage surveys and second stage interviews, was distributed among the participants. Finally, 35 questionnaires were collected and all questionnaires were acceptable.

3.2. Sampling Method and Sample Size

According to the research objectives for interviews, object-oriented method (purposeful) was used as the main method of data collection and snowball sampling method was applied to increase the number of sample members who have sufficient experience and expertise regarding blockchain technology. A total of 11 interviews were conducted in October and November 2020. An interview guide has been used to maintain the integrity and coherence of the interviews in this study. Interview questions are qualitative-exploratory in nature that are designed based on the theoretical framework of research and qualitative content analysis of articles in the field of accounting and financial reporting related to blockchain technology. The framework of the semi-structured interview questions is as follows: separate questions are considered for each of the public acceptance factors.

In the third stage of the present study, the questionnaire was used as the tool. Questionnaire is one of the common research tools and a direct method for collecting research data. The questionnaire items used in this research are quantitative-confirmatory questions that are based on the analysis of the results of the second phase of the research. In this stage, which has been done by fuzzy Delphi method, object-oriented sampling method (purposeful) has been used. The statistical population includes accounting professors, members of the Association of Certified Public Accountants, and accounting and technology professionals. Only people with sufficient knowledge, experience and knowledge of the subject have been selected for the interview

3.3. Analysis of Research Data

In this study, a qualitative method was used to analyze the data obtained from the interview and a quantitative method was used to analyze the data obtained from the questionnaire. In fact, due to the exploratory nature of this research, qualitative content analysis is appropriate for analyzing the data obtained from the interview.

To analyze the data obtained from the questionnaire, fuzzy Delphi method has been applied. Fuzzy Delphi is a systematic approach or method of research to extract opinions from a group of experts on a topic or question, or to reach a group consensus through a series of questionnaire rounds while maintaining the anonymity of respondents, and feedback to panel members. Seeking for professional judgments from homogeneous and independent experts on a specific topic at a large geographical level was done by using questionnaires that were repeated until a consensus was reached. In addition, the multi-stage study method has been used to gather feedback on the subjectivity and use of the written answers rather than a group of experts. Therefore, the goal of consensus has been possible through free express and revision of ideas with numerical estimates. One of the most important advantages of the fuzzy Delphi technique over the traditional Delphi technique for selecting and screening options is that a round can be used to summarize and screen. In other words, in this case, a questionnaire is distributed only once among the experts for gathering their opinion (Habibi et al., 2014).

4. Results

Based on the existing theoretical and experimental bases and specialized interviews, research indicators have been identified and screened. Among the extracted indicators, a total of 43 indicators have been identified to enter the research questionnaire. In the continuation of the research and in four steps, users' willingness to accept blockchain technology has been investigated, and existing challenges are identified and possible solutions are proposed.

Table 1: Concepts, dimensions, components, and indicators of research

index	indicators	factors	index	indicators	factors
Q21	Removing intermediaries	impartiality	Q1	Immediate operation	timeliness
Q22	Decentralization		Q2	Instant validation of transactions	
Q23	Problem Reduce tion of information asymmetry		Q3	Online transactions	
Q24	The increase of the comparability of disclosed information	comparability	Q4	Apropos improvement of information	
Q25	Facilitating the exchange of information		Q5	Increasing the speed by automating manual operations	

Q26	Immutable documents	trust in presentation	Q6	Ability to synchronizing	
Q27	Scam reduction		Q7	Time reduction in operation	
Q28	Immutability of records		Q8	the cost reduction of operations	
Q29	Human error reduction		Q9	Transaction authentication	verifiability
Q30	Non-manipulative		Q10	Improving the accuracy and precision	
Q31	Data transparency		Q11	Ability to authenticate	
Q32	Network and data and information security	Usefulness in evaluation	Q12	Consensus mechanism	
Q33	Transaction transparency		Q13	precision	
Q34	Preparing numerous backups		Q14	Decentralized (scattered architecture)	
Q35	Secure Encryption of accounting records		Q15	Ability to adapt more quickly to the latest standards, regulations and rules	
Q36	Better tax inspection		Q16	Ensuring the reliability of information, data, evidence, etc.	
Q37	Ease of access		Q17	Records synchronizing	Usefulness in predicting
Q38	Ability to track records, transactions, events		Q18	Possibility to implement the "three-way registration" accounting approach	
Q39	Accounting secure data storage		Q19	Simplification and automation of accounting and control	understandable
Q40	Ease of matching accounts, records, information, etc.		Q20	Better understanding of operations, department, etc.	
Q41	integration				completeness
Q42	Being permanent				
Q43	Hidden account reduction				

At this stage, the fuzzy Delphi approach method has been used to screen the indicators and identify the final indicator. In order to analyze the opinions received by the experts, the following four steps have been used to identify the final indicators.

4.1. Step 1: Identifying the appropriate target group for fuzzy verbal expressions

In this research, the single-phase fuzzy Delphi method has been used. In order to better and more accurately collect the opinions of experts on the 7-point Likert scale with the corresponding fuzzy triangle numbers, the following table has been used:

Table 2: 7-point Likert scale with corresponding fuzzy triangle numbers

Language variable	Fuzzy numerical scale
Absolutely insignificant	(0,0, 0.1)
Very insignificant	(0,0.1 , 0.3)
insignificant	(0.1 , 0.3 , 0.5)
Fair	(0.3 , 0.5 , 0.75)
important	(0.5 , 0.75, 0.9)
Very significant	(0.75 , 0.9, 1)
Absolutely significant	(0.9 , 1,1)

4.2. Step 2: Aggregating fuzzy values

After selecting the appropriate experts, their opinions were collected and recorded in a fuzzy way (here in the form of a fuzzy triangle). Then, by using fuzzy mean method, the opinions of experts were summarized.

Table 3: Experts' opinions for each of the research indicators

indicator	Absolutely insignificant	Very insignificant	insignificant	fair	important	Very significant	Absolutely significant
Q1	0	0	2	1	6	15	11
Q2	0	1	1	4	6	13	10
Q3	0	0	0	7	13	8	7
Q4	0	0	0	2	8	13	12
Q5	0	0	0	3	7	17	8

indicator	Absolutely insignificant	Very insignificant	insignificant	fair	important	Very significant	Absolutely significant
Q6	0	1	1	1	10	17	5
Q7	0	0	0	4	7	15	9
Q8	0	2	2	4	8	10	9
Q9	0	0	4	3	9	18	1
Q10	0	0	0	6	6	14	9
Q11	1	0	2	3	10	10	9
Q12	0	0	1	3	10	15	6
Q13	0	2	2	3	5	17	6
Q14	0	0	4	2	8	12	9
Q15	0	0	0	3	3	21	8
Q16	1	0	0	6	9	12	7
Q17	0	1	0	5	10	12	7
Q18	0	0	1	4	11	11	8
Q19	0	1	1	5	8	11	9
Q20	0	0	2	4	6	19	4
Q21	0	0	1	1	10	12	11
Q22	1	0	1	4	3	17	9
Q23	0	0	1	5	9	14	6
Q24	0	0	1	3	7	16	8
Q25	0	1	1	1	7	19	6
Q26	0	0	0	3	9	16	7
Q27	0	0	1	4	8	13	9
Q28	1	1	0	0	8	15	10
Q29	1	0	0	4	8	11	11
Q30	0	1	1	3	5	15	10
Q31	0	3	1	2	8	12	9
Q32	1	0	2	6	10	12	4
Q33	1	0	2	3	11	14	4
Q34	0	0	2	9	7	9	8
Q35	0	0	2	1	7	10	15
Q36	0	0	0	1	10	14	10
Q37	0	0	1	2	6	16	10
Q38	1	0	1	1	8	11	13
Q39	1	1	1	2	7	12	11
Q40	0	0	1	2	9	14	9
Q41	1	1	2	3	5	14	9
Q42	0	0	1	2	5	18	9
Q43	0	0	3	3	7	13	9

Table 4: Fuzzy mean of the panel of experts for each of the research indicators

Average scores of experts' views	Minimum score	Probable score	Maximum score	Indicator index
(0/704,0/860,0/947)	0/84	0/86	0/95	Q1
(0/659,0/817,0/920)	0/66	0/82	0/92	Q2
(0/597,0/784,0/913)	0/6	0/78	0/91	Q3
(0/676,0/826,0/906)	0/68	0/83	0/91	Q4
(0/696,0859,0/959)	0/68	0/83	0/96	Q5
(0/647,0/820,0/930)	65	0/82	0/93	Q6

Average scores of experts' views	Minimum score	Probable score	Maximum score	Indicator index
(0/687,0/850,0/951)	0/69	0/85	0/95	Q7
(0/600,0/766.0/880)	0/6	0/77	0/88	Q8
(0/577,0/761,0/896).	0/58	0/76	0/9	Q9
(0/669,0/831,0/940)	0/67	0/83	0/94	Q10
(0/620,0/789,0/896)	0/62	0/83	0/94	Q11
(0/621,0/780,0/871)	0/62	0/78	0/87	Q12
(0/621,0/781,0/896)	0/62	0/78	0/9	Q13
(0/631,0/800,0/906)	0/63	0/8	0/91	Q14
(0/724,0/876,0/970)	0/72	0/88	0/97	Q15
(0/617,0/787,0/906)	0/62	0/79	0/91	Q16
(0/623,0/797,0/916	0/62	0/8	0/91	Q17
(0/636,0/813,0/926)	0/64	0/81	0/93	Q18
(0/627,0/794,0/907)	0/63	0/8	0/91	Q19
(0/636,0/806,0/926)	0/64	0/81	0/93	Q20
(0/694,0/860,0/950)	0/69	0/86	0/95	Q21
(0/676,0/824,0/923)	0/68	0/82	0/92	Q22
(0/629,0/804,0/924)	0/63	0/8	0/92	Q23
(0/677,0/841,0/944)	0/68	0/84	0/94	Q24
(0/673,0/836,0/939)	0/67	84	0/94	Q25
(0/677,0/847,0/953)	0/68	0/85	0/95	Q26
(0/661,0/829,0/934)	0/67	0/83	0/93	Q27
(0/693,0/846,0/931)	0/7	0/85	0/93	Q28
(0/667,0/826.0/923)	0/67	0/83	0/92	Q29
(0/679,0/833,0/930)	0/68	0/83	0/93	Q30
(0/623,0/783,0/889)	0/62	0/78	0/89	Q31
(0/560,0/740,0/874)	0/56	0/74	0/87	Q32
(0/591,0/770,0/893)	0/59	0/77	0/89	Q33
(0/581,0/755,0/887)	0/58	0/76	0/89	Q34
(0/714,0/867,0/944)	0/71	0/87	0/94	Q35
(0/709,0/874,0/964)	0/71	0/87	0/96	Q36
0/706,0/863,0/954)	0/71	0/86	0/95	Q37
(0/696,0/849,0/930)	0/7	0/85	0/93	Q38
(0/660,0/813,0/906)	0/66	0/81	0/91	Q39
(0/680,0/847,0/946)	0/68	0/85	0/95	Q40
(0/634,0/787,0/890)	0/63	0/79	9	Q41
(0/709,0/864,0/957)	0/71	0/86	0/96	Q42
(0/644,0/810,0/916)	0/79	0/81	0/92	Q43

4.3. Step 3: Defuzzification of fuzzy values

The sum of the mean of triangular and trapezoidal fuzzy numbers can usually be summed up by a definite value that is the best corresponding mean. This operation is called defuzzification. There are several ways to for defuzzification. In this research, the centroid point method has been used for defuzzification. In this step, after fuzzification of experts' views by using the centroid point method, the values obtained for each indicator are given according to defuzzification. The results of defuzzification and determination of the definite value are given in the following table.

Table 5: Determining the definite value of each of the research indicators

Indicator index	Average scores of experts' views	Definite amount of indicator
Q1	(0/704,0/860,0/947)	0/837
Q2	(0/659,0/817,0/920)	0/799
Q3	(0/597,0/784,0/913)	0/765
Q4	(0/676,0/826,0/906)	0/802
Q5	(0/696,0859,0/959)	0/838
Q6	(0/647,0/820,0/930)	0/799
Q7	(0/687,0/850,0/951)	0/830
Q8	(0/600,0/766.0/880)	0/749
Q9	(0/577,0/761,0/896).	0/745
Q10	(0/669,0/831,0/940)	0/813
Q11	(0/620,0/789,0/896)	0/768
Q12	(0/621,0/780,0/871)	0/758
Q13	(0/621,0/781,0/896)	0/766
Q14	(0/631,0/800,0/906)	0/779
Q15	(0/724,0/876,0/970)	0/857
Q16	(0/617,0/787,0/906)	0/770
Q17	(0/623,0/797,0/916	0/779
Q18	(0/636,0/813,0/926)	0/791
Q19	(0/627,0/794,0/907)	0/776
Q20	(0/636,0/806,0/926)	0/789
Q21	(0/694,0/860,0/950)	0/835
Q22	(0/676,0/824,0/923)	0/808
Q23	(0/629,0/804,0/924)	0/786
Q24	(0/677,0/841,0/944)	0/821
Q25	(0/673,0/836,0/939)	0/816
Q26	(0/677,0/847,0/953)	0/826
Q27	(0/661,0/829,0/934)	0/808
Q28	(0/693,0/846,0/931)	0/823
Q29	(0/667,0/826.0/923)	0/805
Q30	(0/679,0/833,0/930)	0/814
Q31	(0/623,0/783,0/889)	0/765
Q32	(0/560,0/740,0/874)	0/725
Q33	(0/591,0/770,0/893)	0/751
Q34	(0/581,0/755,0/887)	0/741
Q35	(0/714,0/867,0/944)	0/842
Q36	(0/709,0/874,0/964)	0/849
Q37	(0/706,0/863,0/954)	0/841
Q38	(0/696,0/849,0/930)	0/825
Q39	(0/660,0/813,0/906)	0/793
Q40	(0/680,0/847,0/946)	0/824
Q41	(0/634,0/787,0/890)	0/770
Q42	(0/709,0/864,0/957)	0/843
Q43	(0/644,0/810,0/916)	0/790

4.4. Step 4: Selecting the tolerance threshold and screening the effective indicators

After defuzzification and definite determination of values for each indicator, in order to screen the effective indicators, the tolerance threshold should be

considered. According to type of research and following the research done (habibi et al., 2013), the tolerance threshold was 0.7. If the definite value is greater than the tolerance threshold, the desired indicator is confirmed as an effective one and otherwise it is rejected.

As shown in the table, out of 43 indicators that have been examined in the form of 10 components, all indicators have been supported by the experts.

Table 6: Results of screening Research indicators

Indicator index	Definite amount of indicator	Average scores of experts' opinion	result
Q1	0/837	(0/704,0/860,0/947)	supported
Q2	0/799	(0/659,0/817,0/920)	supported
Q3	0/765	(0/597,0/784,0/913)	supported
Q4	0/802	(0/676,0/826,0/906)	supported
Q5	0/838	(0/696,0859,0/959)	supported
Q6	0/799	(0/647,0/820,0/930)	supported
Q7	0/830	(0/687,0/850,0/951)	supported
Q8	0/749	(0/600,0/766.0/880)	supported
Q9	0/745	(0/577,0/761,0/896).	supported
Q10	0/813	(0/669,0/831,0/940)	supported
Q11	0/768	(0/620,0/789,0/896)	supported
Q12	0/758	(0/621,0/780,0/871)	supported
Q13	0/766	(0/621,0/781,0/896)	supported
Q14	0/779	(0/631,0/800,0/906)	supported
Q15	0/857	(0/724,0/876,0/970)	supported
Q16	0/770	(0/617,0/787,0/906)	supported
Q17	0/779	(0/623,0/797,0/916	supported
Q18	0/791	(0/636,0/813,0/926)	supported
Q19	0/776	(0/627,0/794,0/907)	supported
Q20	0/789	(0/636,0/806,0/926)	supported
Q21	0/835	(0/694,0/860,0/950)	supported
Q22	0/808	(0/676,0/824,0/923)	supported
Q23	0/786	(0/629,0/804,0/924)	supported
Q24	0/821	(0/677,0/841,0/944)	supported
Q25	0/816	(0/673,0/836,0/939)	supported
Q26	0/826	(0/677,0/847,0/953)	supported
Q27	0/808	(0/661,0/829,0/934)	supported
Q28	0/823	(0/693,0/846,0/931)	supported
Q29	0/805	(0/667,0/826.0/923)	supported
Q30	0/814	(0/679,0/833,0/930)	supported
Q31	0/765	(0/623,0/783,0/889)	supported
Q32	0/725	(0/560,0/740,0/874)	supported
Q33	0/751	(0/591,0/770,0/893)	supported
Q34	0/741	(0/581,0/755,0/887)	supported
Q35	0/842	(0/714,0/867,0/944)	supported
Q36	0/849	(0/709,0/874,0/964)	supported
Q37	0/841	(0/706,0/863,0/954)	supported
Q38	0/825	(0/696,0/849,0/930)	supported
Q39	0/793	(0/660,0/813,0/906)	supported
Q40	0/824	(0/680,0/847,0/946)	supported

Q41	0/770	(0/634,0/787,0/890)	supported
Q42	0/843	(0/709,0/864,0/957)	supported
Q43	0/790	(0/644,0/810,0/916)	supported

5. Discussion and Conclusions

Today, fast, accurate and timely access to financial information is a key criterion for the development of organizations and business units. On the other hand, the world is built based on various and numerous technologies, especially information technology. Therefore, accounting needs to improve its efficiency by applying this new technology.

The accounting profession is currently experiencing a paradigm shift as a result of rapid technological advances, and the automated implementation of accounting analysis and other benefits of using blockchain can create a whole new set of challenges for procurement organizations and standard regulators. These threats lead to the need for research to help accountants explain exactly how to make changes to the financial statement items model and how to set up smart accounting procedures in blockchain. Given the increasing importance of blockchain, it is important that accountants Know how this technology affects the profession and what benefits it will bring to the profession. As the business world becomes more complex, managers need more than ever an effective and reliable tool that provides them with the confidence they need.

Recently, blockchain technology is growing rapidly in the global market and offers a variety of solutions to secure transactions and services. Despite the transformational potential and the implicit opportunities and threats of blockchain technology, many companies are struggling for better understanding of the effect of blockchain on their business models. In addition, the general understanding and acceptance of blockchain-based solutions is in its initiative stages. Therefore, it is necessary to increase public awareness about this technology. The purpose of this paper was to estimate the usability of blockchain technology and to determine the factors that affect customer acceptance of cryptocurrency transactions through blockchain-based applications. In this regard, in order to gain a better understanding of the applications and effects of blockchain in accounting and financial reporting, the issue of acceptance of this technology by business units has been investigated. Financial reporting was examined its impact on the components of information quality, including relevance, timeliness, verifiability, completeness, comparability, impartiality and usefulness in evaluation. For this purpose, first through semi-structured interviews, effective factors were identified and then its acceptance rate was examined through fuzzy delphi method.

Qualitative content analysis of 11 semi-structured interviews according to the Technology Acceptance Model (TAM) and the International Financial Reporting Standards (IFRS) Conceptual Framework shows that the main factor in accepting blockchain technology is perceived usefulness and ease of use. As a result, the positive effect of this technology is on the quality characteristics of information. Also, according to the results of 35 questionnaires conducted by fuzzy Delphi method, it became apparent that this technology has positive effects on the intention to use accounting software based on blockchain to improve the quality of financial information in Iran.

The results of this study in order to accept this technology by stakeholders and users of accounting and financial reporting show that due to the strengths and extensive advantages of this technology in the field of accounting and financial reporting as well as the positive effects of blockchain technology on most The qualitative characteristics of accounting information, and the consequent increase in the usefulness of financial information in the decision-making process in the field of accounting and financial reporting, indicate the acceptability of this technology. The adoption of this technology as a great solution to improve financial accounting and reporting is undoubtedly a turning point for future fundamental developments.

This point reflects the acceptance and behavior tendency to use the technology. That is, the acceptance model of Blockchain technology by business units shows the intention of users to apply the system and it is believed that the positive opinion of users to use this technology can lead users to benefit from accounting information systems.

This scientific research helps to better understand the factors that influence the acceptance of new techniques by financial reporting developers and their impact on the current intention and application of the system in the field of financial reporting. Finally, more in-depth studies on TAM have been proposed to identify factors influencing the intentional and current use of information systems in other professional groups.

This study helps to investigate the behavioral intention of using TAM-based information technology. However, there are certain limitations in this study. The critical limit is the small sample size in the research process due to the small number of experts in this field.

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