Identification of Critical Success Factors for Blockchain Adoption in Accounting and Bookkeeping

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Abstract

The main purpose of this paper is to study the critical success factors (CSFs) of the blockchain technology adoption in Accounting and bookkeeping which might be literally a first attempt and also propose a conceptual framework of an accounting model adopting the Blockchain technology, which will be promoting the combination of these two areas in the future. Acritical literature review of the blockchain technology, accounting, and blockchain based accounting was conducted to identify the most relevant factors of Blockchain adoption, followed by the model formulation with the help of interpretive structural modelling (ISM) consisting of CSFs and relationships between those based on experts' views. In the study we have attempted to develop a contractual relationship among Trust, Resistance to Change, Scalability, Energy Consumption, Use of External Network, Perceived Cost, Data Immutability, Government Policy, Facilitating Conditions and Behavioural Intention to Adopt; with view of blockchain implementation in accounting. This study supports previous conceptual work on Blockchain Technology and accounting could serve as a starting point to assist in decision-making.

Keywords
Blockchain Technology, Accounting, Auditing, ISM and Adoption

1. Introduction

In India, the accounts and financial record-keeping has undergone tremendous changes. In the starting the financial records were maintained in written form termed as bahi-khata, these record keeping was a time taking activity and these were not that reliable as the records can be easily altered by anyone with access to the records even the legal reporting and the financial result calculation was long process. So, with the evaluation of technology the computerised system come to light these record keeping was fast and less time taking, and the reporting can be done quickly even the financial results can be obtained with few clicks (Zhang and Shah, 2023; Bellucci et al., 2022). But these computerised systems are also having some inherent limitation of chances of tempering and alteration of data (Turker and Bicer, 2020; Bonson and Bednárová, 2019).

System for acquiring, categorising, sorting, interpreting and disseminating financial and quantitative data to decision-makers through computers is the accounting information system (Granlund 2003; Zhang and Shah, 2023). In other words, it is a system that uses computers to transform accounting data into information and to manage the financial information of an entire organisation. For the most part, it serves as a repository for accounting data and a source of reference for those in charge of running the business and making strategic decisions. MIS (Management Information System) and EDP (Electronic Data Processing Accounting) make up the majority of modern accounting information systems (Aljarallah 2020; Kwilinski, 2019). A cloud computing platform involves a large investment of time and money, as well as a large amount of research and development (Yang 2021; Bonson and Bednárová, 2019).

Even while other fields have seen significant changes as a result of technological advances, the digitalization of accounting systems is still in its infancy. Regulations governing authenticity and integrity, which are exceedingly strict, may be a contributing factor (Kwilinski, 2019; Tyma et al., 2022; Bonson and Bednárová, 2019). To make counterfeiting as difficult as possible, the accounting system can use Blockchain technology to prevent it from happening in the first place. This can be accomplished through the employment of both mutual

control systems and checks and balances. Operational activities would be adversely affected. Additionally, there is a lot of systematic task redundancy as well as extensive documentation and regular checks and audits. The vast majority of these jobs require a great deal of manual labour and are not amenable to automation. Truth-telling had hitherto seemed to come at a price. Blockchain is a decentralised ledger with zero central authority that can be accessed by anyone, anywhere, at any time (Spanò et al., 2022; Bonson and Bednárová, 2019). Simpler regulatory compliance can be achieved by modifying commonly utilised double entry bookkeeping.

A double entry system is used in modern financial accounting. During the Renaissance, double entry bookkeeping revolutionised financial accounting by allowing managers to determine whether or not they could trust their own records (Bellucci et al., 2022; Tyma et al., 2022). In contrast, independent public auditors verify the company's financial information in order to gain the public's trust. Stakeholders have faith in the auditors employed by management to testify on their behalf (Kwilinski, 2019). This raises an obvious agency problem: do auditors serve the management that recruits and pays them, or the public that relies on their integrity to make decisions? (Suri et al. 2019). Each audit is costly and ties up the company's accountants for extended periods of time. The triple entry method demonstrates that blockchain technology could be the next stage in accounting (Grigg, 2005).

1.1 Research Objectives

Based on our initial interpretation and evidence from the literature on Blockchain adoption in accounting and bookkeeping, the following research objectives are addressed:

i. To carry out state of the art literature review in the area of blockchain implementation accounting and bookkeeping.
ii. To identify the critical success factors affecting the adoption level of blockchain in the field of accounting and book-keeping.
iii. To identify the relationship between various identified critical success factors.
iv. To study the contextual relationship between the identified variables from the literature.
v. To develop a model for understanding the impact of CSF to the adoption intention of Blockchain technology.
vi. To draw a set of recommendations for minimizing the risk associated.

2. Literature Review

Distributed ledgers and blockchain technology are gaining popularity and igniting several projects across numerous industries. However, the financial sector is widely considered to be the primary user of blockchain technology. Not only is Bitcoin the most well-known application of this technology, but there are also serious process inefficiencies and an industry-specific cost base issue. The 2008 financial crisis proved that it is not always possible to verify the correct existing owner of an asset, even in the financial services industry. When the failed US investment bank Bear Stearns was acquired by JP Morgan Chase, the number of shares handed to the buyer exceeded the number of existing shares on Bear Stearns' records. In global financial transaction services, tracing ownership over a wider chain of shifting buyers is even more challenging. Due to the inability to rectify the accounting irregularities, JP Morgan Chase was obligated to pay the consequences of (digital) additional shares. While verifying back title in complex transaction networks is already a significant issue in financial markets, it is as important for physical objects like (blood) diamonds or vegetables. Intermediation is the most popular method for verifying asset ownership and processing transactions today. Intermediaries conduct thorough checks on each party involved in a chain of intermediaries. Because individual engagement is no longer necessary, blockchain technology promises to resolve these essential features, signalling a shift from trusting people to trusting numbers (Antonopoulos 2014).

Accounting has always been impacted by digital technology, despite the fact that the majority of it has been replaced analogue instruments by digital counterparts (Osmani et al. 2020). However, blockchain, a relatively new technology, is poised to fundamentally alter the way accounting is done. Utilization of blockchain in the finance industry is primarily exploratory at this time. At present time, accountants and auditors do not need to be specialists on blockchain technology, but it is time to monitor advancements within your institution. Recently, organizations such as Verady have established solutions that serve as a bridge between cryptocurrencies, exchanges, and accounting software.

Some accountants believe that the blockchain may diminish the demand for traditional accounting services if it is successfully deployed, as it provides a high level of confidence. However, as blockchain technology becomes more integrated into conventional finance, it brings with it a variety of new regulations. In conjunction with data analytics and machine learning, the blockchain will automate some of the most time-consuming operations; however, accountants would still be needed to assure accuracy and offer firms and customers with the essential

information. Therefore, the blockchain's implementation is relevant in terms of financing, documenting, and bookkeeping. For enhancing the credibility, reliability, and efficacy of a practising professional's talents.

Accounting and auditing have evolved gradually over time as a technique of building mutual confidence and protecting investors. Modern accounting originated with the business operations of thirteenth-century Italy. After Luca Pacioli described the double-entry bookkeeping method in his 1494 mathematics textbook released in Venice, entrepreneurs began employing the method to improve the precision of their financial information (WaymireandBasu 2008). The independent external auditing system was created to ensure the integrity of financial statements and disclosure (Watts and Zimmerman 1983).

Financial innovations have ushered in a new era of financial sector innovation, with blockchain technology playing a key role (Lee and Shin 2018). A distributed database of records or public ledger of all transactions or digital events that have been carried out and shared among participating parties is what a blockchain fundamentally is. Every transaction that has ever taken place is recorded on the Blockchain, making it possible to verify them all (Crosby et al.2016). Although blockchain technology is still in its experimental stages, it will gradually find its way into financial accounting (Yu et al. 2018). In terms of their impact on or interaction with different organisational structures and accounting systems, blockchain and its hybrids have received limited research (O'Leary 2019).

Accounting and bookkeeping system using Blockchain technology offers properties of decentralisation and irreversibility, which meets the need of reliability (Zhou and Xiao 2017). In respect of Facilitating conditions, Implementation of Blockchain in the area of accounting will required various high-end storage and computing resources (Zhou and Xiao 2017). Accounting data's completeness, impartiality, timeliness, and cost-benefit analysis can all benefit from the use of blockchain technology (Wu et al. 2019).

There is a slew of crucial success variables that determine whether and how a new technology can be adopted and used effectively (Zaman and Sedera 2016). So, based on the extensive literature review and context of the study, we have identified few variables from propounded theoretical model and few other variables found crucial by various studies which are further being described in Table 1. whereas variables chosen for the study have relevance in both accounting and bookkeeping context (Table 1).

Table 1. Table of Variables

Variable	Description	Reference
Trust (TR)	A state of perceived vulnerability or risk that is derived from uncertainty associated with the actions of other entities upon which an individual depends.	Kramer 1999
Resistance to Change (RC)	Any phenomenon that hinders the process at its beginning or its development aiming to keep the current situation.	Del Val and Fuentes 2003; Ansoff 1990
Scalability (SC)	Larger parallel systems are compared favourably to sequential versions of the same system or to a theoretical parallel computer.	Hill 1990; Bondi 2000
Energy Consumption (EC)	The power or energy needed to use the concerned technology.	Sedlmeiret al. 2020
Use of External Network (UEN)	Using of such technology or services which are not fully owned or controlled by the user of such network or service	Rahimi et al. 1996
Perceived Cost (PC)	The extent by which user thinks about use of a specific framework will lead to additional requirement of expenditure on operation or technology	Salem 2019; Yooet al. 2020
Data Immutability (DI)	The characteristics of a data in a database that cannot be or should not be deleted or modified, if deleted or modified it should have the ability to recover itself to original unmodified state	Helland 2015; Hofmann 2017
Government Policies (GP)	The government Policies in any country are outlined regarding government support, grants and financial aid.	Pathaniaet al. 2017
Facilitating Conditions (FC)	The extent to which a user feels that an organisational and technical infrastructure exists to support system usage.	Venkatesh et al. 2003

Behavioural Intention to Adopt (IA)	The measure or degree of intensity of an individual's intention to perform a specific behaviour.	Fishbein and Ajzen 1975

3. Methodology

Interpretive Structural Modelling (ISM), being an effective method to develop and validate a research model methodology; has been frequently used in most of previous studies to understand and develop conceptual interrelationships among the identified variables. To study problems that are complex and subjective, J. Warfield introduced ISM in 1973 (Warfield 1974; Malone 1975) and Malone was the one who conducted brief review of the ISM introduced by J. Warfield (Malone 1975). ISM is a Mapping conceptual method associated with the casual mapping methodology. Whereas Figure 1 describes the ISM process in systematic manner. ISM is used to discover and describe connections between particular factors that characterize an issue, as well as to analyse the effect of one variable on another (Thakkar et al. 2007). ISM is useful when a multilevel research model is required in which the results of the study cannot be predicted based on available research. ISM's main concept is to deconstruct a complex system into subsystems and devise a multilayer structural model using experts' practical knowledge and experience (Warfield 1974).

With the help of interpretive structural modelling (ISM) – Matrice d' Impacts Croises – Multiplication Applique a Classment (MICMAC) method, the qualitative study aims to bridge the literature gap regarding factors that determine the acceptance or rejection of Blockchain technology in the area of accounting and bookkeeping by developing a detailed model that describes the determinants and their interactive contextual relationships. The interrelationships between the discovered variables were formulated using interpretative structural modelling, which is an efficient technique for developing and validating a research model. In addition, the results of the ISM model and MICMAC analysis are used to assess the driving and dependent power of the selected variables. SSIM is developed based on experts' input. To create a reachability matrix, SSIM results are converted into binary form. Blockchain adoption in accounting and bookkeeping is theoretically verified using a reachability matrix that detects various levels.

4. Interpretive Structural Modelling (ISM)

ISM Technical Data is a compilation of expert opinions as a panellist when addressing questions about element interrelationships. ISM examines system aspects and depicts direct correlations between criteria and hierarchy levels in a graphical format. For conduction of the qualitative analysis using ISM methodology, data collection was started with semi-structured questionnaire-based interview of professionals and academicians in the field of accounting and bookkeeping and having knowledge regarding the block chain technology. The ISM approach is used to recognise the relationship between the system's variables, and the MICMAC analysis is used to validate the model. For conduction of study following ISM approach, following steps are required to be followed, which we used in our study to develop the interrelationships among the identified variables. Figure 1 also represents the steps involved while conducting the study.

Step 1: Recognizing and ascertaining the variables for the study.
Step 2: Preparing structural self-interaction matrix (SSIM) from the variables.
Step 3: Development of Reachability Matrix
Step 4: Partition of variables
Step 5: Hierarchy of variables
Step 6: MICMAC Analysis

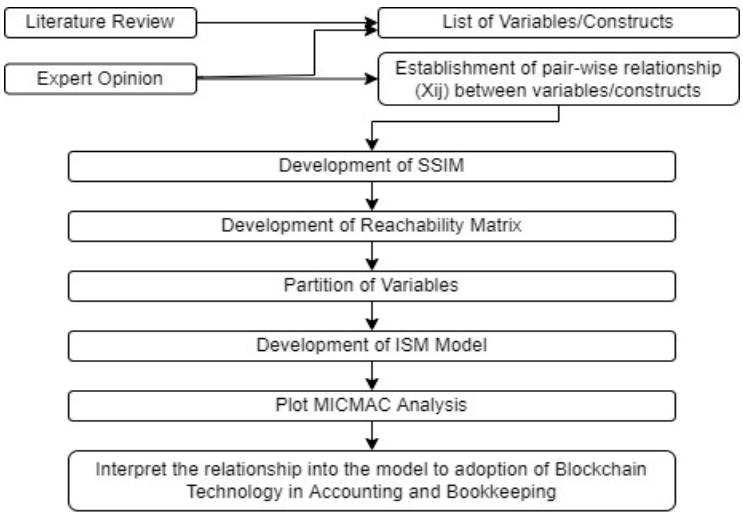

Figure 1. Interpretive Structural Modelling (ISM) Process

4.1 Recognizing Variables/ Constructs

For the examination through ISM methodology, all ten variables described in literature review were used which were previously identified through in-depth literature review. Additionally, in the interview these variables are confirmed by the experts.

4.2 Development of Structural Self-Interaction Matrix (SSIM)

SSIM is developed for variables, which indicates pair wise relationships among variables of the system under consideration. SSIM matrix portrays a preliminary imprint relationship among the variables, that which variable how and in what order (direction) effect other factors. For this, experts were asked to establish the relationship among the various variables influencing the adoption and application of Blockchain technology in the area of accounting and bookkeeping. The four symbols that define the filling rules for the matrix show the presence of a relationship between the two variables (i and j) and the position of that association.

1. A, if construct 'i' is dependent on construct 'j'
2. B, if construct 'j' is dependent on construct 'i'
3. C, if construct 'i' and construct 'j' are dependent on each other
4. D, if construct 'i' and construct 'j' are not dependent on each other

Table 2 represent the SSIM, where all the factors are correlated by A, B, C, D using the above-described interrelation logics by the experts. It was requested from the experts to fill only first half, i.e., area above '$' symbol. The empty cells in the matrix reflect the replication area, where relationships are not covered.

Table 2. Structural Self-Interaction Matrix (SSIM)

i/j		IA (10)	FC (9)	GP (8)	DI (7)	PC (6)	UEN (5)	EC (4)	SC (3)	RC (2)	TR (1)
TR	(1)	A	D	B	B	D	C	D	B	C	$
RC	(2)	A	B	B	D	B	C	B	B	$	-
SC	(3)	A	B	D	D	A	C	A	$	-	-
EC	(4)	A	D	A	B	A	B	$	-	-	-
UEN	(5)	C	C	C	C	C	$	-	-	-	-
PC	(6)	A	B	B	B	$	-	-	-	-	-
DI	(7)	A	D	D	$	-	-	-	-	-	-
GP	(8)	A	A	$	-	-	-	-	-	-	-
FC	(9)	A	$	-	-	-	-	-	-	-	-
IA	(10)	$	-	-	-	-	-	-	-	-	-

Note:
1. '$' indicates common cells (it is always equal to '1' in reachability matrix)
2. '-' Replicated empty cells

4.3 Development of Reach ability Matrix

On the basis of the above information given in Table 2 as compiled SSIM, is transformed into reachability matrix by following certain rules. This is accomplished by substituting A, B, C, and D with 1 or 0 as appropriate. The subsequent criteria are adopted to generate reachability matrix from the SSIM:

1. If A is provided in the (i, j) in the SSIM, then in the reachability matrix (i, j) entry would be 1 and the (j, i) entry would be 0.
2. If B is provided in the (i, j) in the SSIM, then in the reachability matrix (i, j) entry would be 0 and the (j, i) entry would be 1.
3. If C is provided in the (i, j) in the SSIM, then in the reachability matrix (i, j) entry would be 1 and the (j, i) entry would also be 1.
4. If D is provided in the (i, j) in the SSIM, then in the reachability matrix (i, j) entry would be 0 and the (j, i) entry would also be 0.

Fundamentally, the reachability matrix retorts the interrogation by yes or no i.e., can we reach to construct 2 from construct 1, here, reach denotes direct or indirect relationship between construct 1 and construct 2 (Singh et al., 2007). Table 3 represents the reachability matrix. In the reachability matrix, the driving power and dependence of each variable is also calculated for further analysis i.e., MICMAC analysis. The entire number of

variables (including itself) that may assist in achieving a goal is referred to as a variable's driving power or dependence (Table 3).

Table 3. Reachability Matrix

i/j	Variables	TR	RC	SC	EC	UEN	PC	DI	GP	FC	IA	Driving Power
Sr.		1	2	3	4	5	6	7	8	9	10	
1	TR	1	1	0	0	1	0	0	0	0	1	4
2	RC	1	1	0	0	1	0	0	0	0	1	4
3	SC	1	1	1	1	1	1	0	0	0	1	7
4	EC	0	1	0	1	0	1	0	1	0	1	5
5	UEN	1	1	1	1	1	1	1	1	1	1	10
6	PC	0	1	0	0	1	1	0	0	0	1	4
7	DI	1	0	0	1	1	1	1	0	0	1	6
8	GP	1	1	0	0	1	1	0	1	1	1	7
9	FC	0	1	1	0	1	1	0	0	1	1	6
10	IA	0	0	0	0	1	0	0	0	0	1	2
	Dependence	6	8	3	4	9	7	2	3	3	10	

4.4 Determining Reachability Set:

After developing the reachability matrix, reachability set are determined by the matrix for each construct. In the reachability set, constructs comprise itself and other constructs which it may help to achieve. The antecedent set entails of construct itself and the other constructs which assist in reaching it as depicted in Table 4.

Table 4. Reachability set of constructs

i	Reachability Set	Antecedent Set	Intersecting Set
TR	1,2,5,10	1,2,3,5,7,8	1,2,5
RC	1,2,5,10	1,2,3,4,5,6,8,9	1,2,5
SC	1,2,3,4,5,6,10	3,5,9	3,5
EC	2,4,6,8,10	3,4,5,7	4
UEN	1,2,3,4,5,6,7,8,9,10	1,2,3,5,6,7,8,9,10	1,2,3,5,6,7,8,9,10
PC	2,5,6,10	3,4,5,6,7,8,9	5,6
DI	1,4,5,6,7,10	5,7	5
GP	1,2,5,6,8,9,10	4,5,8	5,8
FC	2,3,5,6,9,10	5,8,9	5,9
IA	5,10	1,2,3,4,5,6,7,8,9,10	5,10

4.5 Level Partition

The reachability set for each variable is determined. The construct for which the reachability set have the lowest number will be on the first level of ISM pyramid. In this case, BI and PE are on level I.

As the construct on first level would not assist achieve other construct above its own level, therefore once the first level construct is identified, that will eliminate from other constructs to find the next level. This iterative process will be done to find out all levels of all constructs. From Table 5 to Table 11, the level-wise partition of the constructs has been shown.

Table 5. Level Partition- I

i	Reachability Set	Antecedent Set	Intersecting Set	Level
TR (1)	1,2,5,10	1,2,3,5,7,8	1,2,5	
RC (2)	1,2,5,10	1,2,3,4,5,6,8,9	1,2,5	
SC (3)	1,2,3,4,5,6,10	3,5,9	3,5	
EC (4)	2,4,6,8,10	3,4,5,7	4	
UEN (5)	1,2,3,4,5,6,7,8,9,10	1,2,3,5,6,7,8,9,10	1,2,3,5,6,7,8,9,10	
PC (6)	2,5,6,10	3,4,5,6,7,8,9	5,6	
DI (7)	1,4,5,6,7,10	5,7	5	
GP (8)	1,2,5,6,8,9,10	4,5,8	5,8	

FC (9)	2,3,5,6,9,10	5,8,9	5,9	
IA (10)	5,10	1,2,3,4,5,6,7,8,9,10	5,10	I

Table 6. Level Partition- II

i	Reachability Set	Antecedent Set	Intersecting Set	Level
TR (1)	1,2,5	1,2,3,5,7,8	1,2,5	
RC (2)	1,2,5	1,2,3,4,5,6,8,9	1,2,5	II
SC (3)	1,2,3,4,5,6	3,5,9	3,5	
EC (4)	2,4,6,8	3,4,5,7	4	
UEN (5)	1,2,3,4,5,6,7,8,9	1,2,3,5,6,7,8,9	1,2,3,5,6,7,8,9	II
PC (6)	2,5,6	3,4,5,6,7,8,9	5,6	
DI (7)	1,4,5,6,7	5,7	5	
GP (8)	1,2,5,6,8,9	4,5,8	5,8	
FC (9)	2,3,5,6,9	5,8,9	5,9	

Table 7. Level Partition- III

i	Reachability Set	Antecedent Set	Intersecting Set	Level
TR (1)	1,	1,3,7,8	1	
SC (3)	1,3,4,6	3,9	3	
EC (4)	4,6,8	3,4,7	4	
PC (6)	6	3,4,6,7,8,9	6	III
DI (7)	1,4,6,7	7		
GP (8)	1,6,8,9	4,8	8	
FC (9)	3,6,9	8,9	9	

Table 8. Level Partition- IV

i	Reachability Set	Antecedent Set	Intersecting Set	Level
TR (1)	1,	1,3,7,8	1	IV
SC (3)	1,3,4	3,9	3	
EC (4)	4,8	3,4,7	4	
DI (7)	1,4,7	7		
GP (8)	1,8,9	4,8	8	
FC (9)	3,9	8,9	9	

Table 9. Level Partition- V

i	Reachability Set	Antecedent Set	Intersecting Set	Level
SC (3)	3,4	3,9	3	
EC (4)	4,8	3,4,7	4	V
DI (7)	4,7	7		
GP (8)	8,9	4,8	8	
FC (9)	3,9	8,9	9	

Table 10. Level Partition- VI

i	Reachability Set	Antecedent Set	Intersecting Set	Level
SC (3)	3	3,9	3	VI
DI (7)	7	7		
GP (8)	8,9	8	8	
FC (9)	3,9	8,9	9	VI

Table 11. Level Partition- VII

i	Reachability Set	Antecedent Set	Intersecting Set	Level
DI (7)	7	7		VII

GP (8)	8	8	8	VII

4.6 ISM model development:

In the model development, the first level construct(s) is positioned at the top of the hierarchy and then the second level construct(s) is positioned below the first level. Similarly, all the constructs are positioned in the hierarchy, according to their particular level. Level I describe the highest impact on blockchain adoption in the area of accounting and bookkeeping, followed by level II, level III and so on. Figure 2 represents the ISM model, in which 'DI' and 'GP' are at lowest level (i.e., level VII), 'SC' and 'FC' are at level VI, 'EC' is at level V, 'TR' is at level IV, 'PC' is at level III, 'RC' and 'UEN'are at level II, whereas 'IA' is on the top the level (i.e., level I).

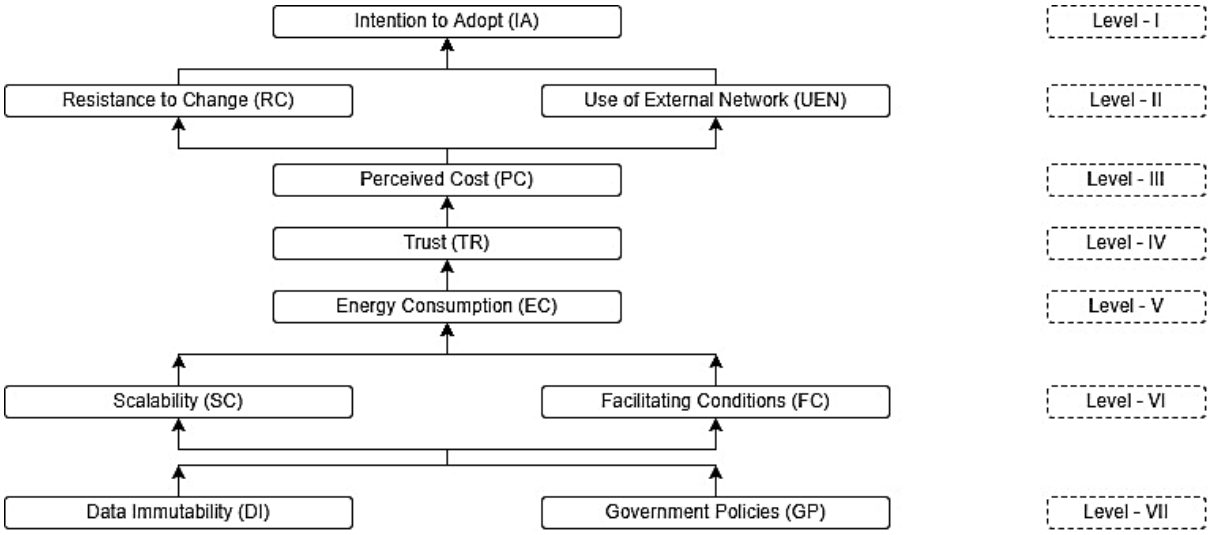

Figure 2. ISM Model

4.7 MICMAC Analysis

Michel Godet and François Bourse developed the Matriced impactscroisés multiplication appliquée an un classment (MICMAC) methodology (Chandramowli et al. 2011) to measure the position and value of variables through direct and indirect relationship among variables. MICMAC is a structural prospective analysis used to explore indirect interactions. It is a cross-impact matrix multiplication used to classification (Saxena and Vrat 1990). It examines the factors' driving force and interdependence (Faisal et al. 2006). This principle is referred as cross-impact matrix exponentiation employed to classification, (Mathiyazhagan et al. 20013; Thakkar et al. 2005) to measure the scope of the constructs.

Table 3 indicates the dependence and driving power respectively by an entry of 1 along the columns and rows. Figure 3 represents the MICMAC analysis i.e., driving power-dependence diagram between the constructs. These constructs or variables will influence the other constructs and get influenced by other constructs, if change occurred.

The variables are divided into four clusters forming the driving power-dependence diagram. These four quadrants are autonomous (I) i.e.,comprises the constructs that have low driver power and weak dependence; dependent (II) i.e.,comprises of constructs having weak driver power and strong dependence power; linkage (III) i.e., comprises of the constructs having strong driving power as well as strong dependence power; and independent (IV) i.e., comprises of the constructs having strong driving power and weal dependence power.

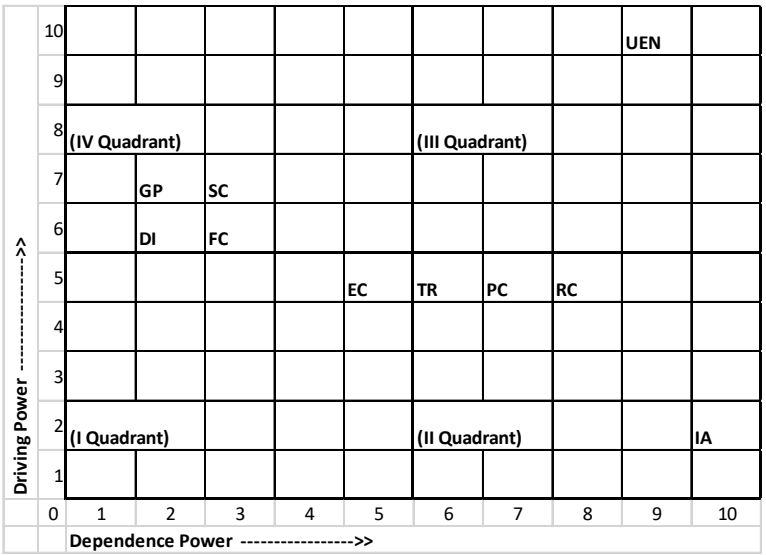

Figure 2. MICMAC analysis plot

In the MICMAC analysis plot, first quadrant, i.e., autonomous quadrant contains EC. While in the second quadrant i.e., dependent quadrant; TR, PC, RC, IA have fallen. The existence of Behavioral Intention to Adopt (IA) in this cluster indicates that this variable is highly dependent on this other variable. The third quadrant i.e., linkage quadrant; contains UEN variable. Being in the third quadrant, the fact that any action on this variable will impact others and response back to this variable lead to making these variables unstable. Fourth quadrant i.e., independent quadrant; cluster comprises GP, SC, DI, FC.

5. Discussion

In this chapter Interpretive Structural Modeling (ISM) model have been developed for the ten constructs i.e., TR, RC, SC, EC, UEN, PC, DI, GP, FC and IA. The model provides the hierarchy of the critical success factors to be considered for the adoption and application of Blockchain technology in the area of accounting and bookkeeping. The ISM results are interpreted and discussed below.

The ISM model shown in Figure 2 explores the hierarchy of the constructs (CSFs) in order to enhance the application and adoption of Blockchain technology. The diagram shows the direct and indirect relationships among the constructs and level of constructs. DI and GP belong to level VII indicating the indirect relationship and less impact on IA, SC and FC belongs to level VI indicating the high impact and indirect relationship over IA than level VII, EC belongs to level V indicating the high impact and indirect relationship over IA than level VI. TR belongs to level IV indicating the high impact and indirect relationship over IA than level V. PC belongs to level III having high impact and indirect relationship over IA than level IV. Level II variable i.e., Resistance to Change (RC) and Use of External Network (UEN); have the highest impact and direct relationship with IA.
The outcomes of the conducted MICMAC analysis explore that interoperability construct belongs to quadrant one i.e., autonomous construct; and have weak driver power as well as weak dependence power. These constructs have dis-connectivity or the weakened linkage with the rest of the constructs. Weak linkage does not mean that the construct is unimportant or not useful. These constructs should be handled separately during the adoption process. Energy Consumption (EC) is an autonomous variable, as seen in Figure 3 i.e., driving power dependence diagram. This means Energy Consumption is little bit detached from the system and it get less affected by other factors and having less impact on other factors.

With reference to second quadrant i.e., dependent quadrant; Behavioral Intention to Adopt (IA), Trust (TR), Perceived Cost (PC) and Resistance to Change (RC) belong to this quadrant. This quadrant has high dependence power but low driving power. The constructs which belong to this quadrant have dependence on rest of the constructs. The existence of Behavioral Intention to Adopt (IA) in this cluster indicates that this variable is highly dependent on other variables. It could be improved by handling the driving constructs more attentively.
The constructs belonging to third quadrant is Use of External Network (UEN). This is the linkage constructs and has high driving power and high dependence power. Forth quadrant i.e., independent quadrant; have high driving power but low dependence power. The constructs which belong to this quadrant can be inferred and behave like a root cause of other constructs. In this study, Government Policies (GP), Scalability (SC), Data Immutability (DI) and Facilitating Conditions (FC) were found to be in this quadrant. In order to adopt or apply

Blockchain Technology in the area of accounting and bookkeeping, the constructs belonging to quadrants third and fourth are required to be considered foremost. If during the adoption process high attention will be given to these constructs, then the risk of failure will be lesser.

Figure 2 depicts the development of a model that has been theoretically validated. This model illustrates the link between all influencing factors to the application and adoption of Blockchain technology in the area of accounting and bookkeeping. This model shows that DI and GP are at level VII, which indicate that these variables are least affecting IA but have an impact on Blockchain application and adoption. SC and FC lie at level VI which is the second last level. This shows that if the facilitating conditions are available so it will affect the intention of adoption of blockchain technology, availability of Facilitating condition and scalability of technology will leads to positively impact on the Behavioral intention to adoption. Level V included Energy consumption. This indicant that it has much higher impact on IA as compared to level VI. Variation in the level of energy consumption will lead to changes in the Behavioral intention to adopt blockchain technology, it is found that energy consumption of a technology is a considerable factor that affect the intension of its prospective uses to use it or searching for alternatives. Level IV includes TR, which implicates that it has Trust on a technology affect the perception of user or proposed user. A person having trust on a technology is more likely to adopt or use a new technology, so here enhanced trust will lead to enhanced Behavioral intention to adopt blockchain technology. Level III is consisting of PC; perceived cost of a technology has impact on the adoption level of the technology. If the perceived cost of using a technology is high than people most likely hesitate to use the technology. So, lower price and lower perceived cost of blockchain technology will enhance the behavioral intention to adopt Blockchain. Resistance to Change (RC) and Use of External Network (UEN) lie on the level II which indicates these have the highest impact on the behavioral intention to Adopt. Resistance to change has negative impact on the behavioral intention to adoption blockchain technology if the resistance to change is high it will negatively impact the intension to adopt the blockchain technology and vice versa. So, this clearly states that for blockchain technology to be adopted, RC and UEN must be changed accordingly and taken care of at a much higher pace.

Adoption and application of blockchain technology in the accounting and bookkeeping will lead to increased authenticity and reliance on the records and will also lead to automated reconciliation of records. In this research variables are identified which influence the application and adoption of blockchain technology in the area of accounting and bookkeeping. The ISM method is employed to examine the interrelationships among the many factors that have an impact on the acceptance and use of Blockchain technology. As a result, a theoretically based model is developed, showing how the various variables are linked (Figure 2). The driving power dependency graphic shows that Energy Consumption is an independent variable according to MICMAC analysis (Figure 3), which means it will be having the less driving and dependence power. All other variables found to have influence on the intension to adopt the blockchain technology in the area of accounting and bookkeeping. The model proposed in the research may be empirically examined to ensure its accuracy.

6. Theoretical Implications

This research study is to assess the of Blockchain adoption in context to the accounting and bookkeeping. As a result, the findings might be used as a theoretical reference for future study into blockchain technology implementation in the similar context as well as a comparison of the findings here with future discoveries. Thus, this research will contribute to the literature by investigating the CSFs that influence blockchain technology adoption and application in accounting and bookkeeping context.

The study's first theoretical contribution is the identified of critical success factors affecting the application and behavioural intention to adopt the blockchain technology in the accounting and bookkeeping context. After identification of the critical success factors, the contextually validated model of CSF was framed that affect the application and adoption of blockchain technology in the context of this study. Furthermore, it could also be used as a basic for further research and also as a decision-making tool to aid government and other associated organisations in their efforts to deploy the blockchain technology.

7. Implication for practice

The Current study is conducted using the qualitative analysis only, the managerial implications will be further provided after the further quantitative analysis of the factors of this study. We choose all the components, having driving and driving relationships with each other, to construct a parsimonious model for blockchain adoption in the accounting and bookkeeping environment, based on the ISM framework. We also built associations based on these ten constructs for which the hypothesis would be developed in such a way that future researchers might validate them using primary data. These are the hypotheses that have been proposed:

PH1: Trust (TR) positively affects the Behavioural Intention to Adopt (IA)

PH2: Resistance to Change (RC) negatively affects the Behavioural Intention to Adopt (IA)
PH3: Scalability (SC) positively affects the Behavioural Intention to Adopt (IA)
PH4: Energy Consumption (EC) positively affects the Behavioural Intention to Adopt (IA)
PH5: Use of External Network (UEN) negatively affects the Behavioural Intention to Adopt (IA)
PH6: Perceived Cost (PC) negatively affects the Behavioural Intention to Adopt (IA)
PH7: Data Immutability (DI) positively affects the Behavioural Intention to Adopt (IA)
PH8: Government Policies (GP) positively affects the Behavioural Intention to Adopt (IA)
PH9: Facilitating Conditions (FC) positively affects the Behavioural Intention to Adopt (IA)

8. Conclusion, Limitations, and direction for future scope

The study is focused on identifying the critical success factors important to lead effective adoption and application process of Blockchain technology in the area of accounting and bookkeeping. This study used the ISM methodology to develop a hierarchical model, which provides contextual, hierarchy and interpretive relationship between the variables and factors identified to be crucial. The finding reveal that Data Immutability and Government Policies have the most significant impact on Intention to adopt the blockchain technology in accounting and bookkeeping, followed by facilitating conditions and scalability. Whereas Use of External Network and Resistance to change are the factors those are dependent of other factors of the study. Therefore, this research contributes to the literature of blockchain implementation by knowledge and information that can be helpful to other researchers to access literature for reference in their future research studies in the area of blockchain implementation in accounting and bookkeeping context.

Limitations of the research were unavoidable in any research procedure. As this is a techno behavioural study, so the responses were based on the respondents' perceptions; but, as time passes and technology advances, people's attitudes on blockchain technology adoption in the field of accounting and bookkeeping may shift. Future research in this area has a lot of potential, because the adoption of blockchain in the area of accounting and bookkeeping can enhance the accuracy, comparability, authenticity, transparency, trust can reduce the risk alteration and duplication of work. The research model created here can be further verified through the quantitative study. The study can further be explored with the respondent as corporate and business and government officials.

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