

The Role of Top Management Support toward Blockchain Technology Adoption among Small and Medium-Sized Enterprises Managers

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ABSTRACT

The rapid development of Blockchain Technology (BCT) has made it an increasingly significant topic, particularly for Small and Medium-Sized Enterprises (SMEs). This study examines the Behavioural Intention (BI) to adopt BCT among SMEs in Iraq, drawing on the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and Top Management Support (TMS). Data were collected through purposive sampling of SME managers who have adopted BCT, with 120 valid questionnaires analysed using Structural Equation Modelling (SEM). The results indicate that Perceived Ease of Use (PEOU), Subjective Norms (SN), and TMS positively and significantly influence Perceived Usefulness (PU). Both PEOU and PU also positively and significantly affect attitude (ATT). In addition, PU, ATT, and Perceived Behavioural Control (PBC) positively and significantly influence BI to adopt BCT. TMS was found to have a strong positive impact on both PEOU and PU, while SN had no significant effect on BI. Among the predictors, PBC emerged as the most crucial factor driving BI to adopt BCT. These findings suggest that Information Technology (IT) service providers, universities, government agencies, and the blockchain community should develop more effective strategies to promote BCT adoption and highlight its value to SMEs. Furthermore, strong TMS may encourage the allocation of resources toward new technologies and strategic decision-making, ultimately enhancing employees' knowledge and expertise in blockchain applications.

Keywords: Blockchain Technology (BCT), Small and Medium-Sized Enterprises (SMEs), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Top Management Support (TMS)

1. INTRODUCTION

Small and Medium-Sized Enterprises (SMEs) are crucial to the economic growth of most Middle East countries, especially Iraq (Jameel & Ahmad, 2018; Thabit & Raewf, 2016). According to De Villiers et al. (2020), the conventional approach utilised by SMEs is not sufficient to keep up with the operations of global businesses today. The recent development of blockchain technology (BCT) has enabled SMEs to provide accurate and timely information to their clients and staff. In addition, BCT offers several benefits to SMEs, including smart contracts, transparency, protection of data, and auditing improvement. Moreover, this technology helps SMEs align their international operations more efficiently. Nevertheless, SMEs in Iraq confront several obstacles when it comes to implementing BCT. For example, SMEs managers and owners in Iraq demonstrated continuous negative attitudes toward technology adoption (Jameel & Ahmad, 2018; Thabit et al., 2016). Due to the complexity of the Iraqi economy, conducting business is not straightforward. Therefore, the World Bank ranked Iraq at 172 out of 190 countries in terms of business ease (Economic, 2022).

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Since SMEs comprise more than 90% of businesses in most countries, they play a significant role in the national economy (Mujahed et al., 2022). Accordingly, the growth and stability of the Iraqi economy heavily rely on SMEs' performance, which can be increased by adopting innovative technology. The adoption of new Information Technology (IT) services has made substantial progress over the past 10 years. This development has been made possible by technological advancements. To be more specific, there is a growing body of data, both theoretical and experimental, that supports the Technology Acceptance Model (TAM) (Abbad et al., 2019; Gangwar et al., 2015; Sciarelli et al., 2022). A considerable number of academics have demonstrated that TAM is a trustworthy model for assessing the degree to which users embrace new technology (Albayati et al., 2020). Given the complex nature of implementing BCT in the context of the current business system, this study argues that the TAM model should be used in conjunction with other critical theories in order to create a conceptual foundation for the existing architecture that is compatible with BCT.

Accordingly, several conceptual models based on adoption theories have been developed to understand the processes that influence businesses' decisions to use IT (Chaudhuri et al., 2024; Ullah et al., 2021). These proposed models, such as TAM and Theory of Planned Behaviour (TPB) have become much more prevalent in the literature (Venkatesh & Davis, 2000) due to their success in determining the deployment of IT. However, these theories have primarily been examined in the context of Western countries, leaving a research void related to developing countries, particularly Iraq (Jameel & Ahmad, 2018). Several new platforms have recently made BCT trendy, notably for supply chain management in organisations (Gökalp et al., 2022; Mukherjee et al., 2023; Sharma et al., 2023; Ullah et al., 2021). Despite this trend, the level of SME usage has been found to be lower than initially expected, particularly in Iraq (Thabit et al., 2016). Iraqi SMEs face limited financial resources for acquiring cutting-edge technology, yet they are required to maximise productivity in resource allocation and management (Jameel & Ahmad, 2018; Thabit et al., 2016).

Thus, SMEs in Iraq need to start thinking of technology as an investment rather than an expense to continue expanding successfully (Jameel & Ahmad, 2018). Even though blockchain might help increase SMEs' visibility, adopting blockchain in Iraqi SMEs seems to require more time, and the advancement of digital transformation in SMEs necessitates the collaboration between various internal functional units and external stakeholders. This cooperation is crucial for driving progress and establishing a competitive edge. Hence, this study aims to integrate the TAM, TPB, and TMS to align with this study's context in order to better understand how Iraqi SMEs can ride the waves of digital transformation to manage operations. Furthermore, the findings of this investigation will offer valuable insights for other developing economies to evaluate the organisational and technological problems that SMEs face in a world where markets and industries are becoming more connected.

2. LITERATURE REVIEW

2.1 Blockchain Technology (BCT)

Industries and service sectors in developing nations demonstrate heavy dependence on the conventional double-entry bookkeeping technique commonly associated with trust issues. However, BCT eliminates these issues and enhances transaction traceability (Davidson et al., 2016). Blockchain transactions are direct between users (peer to peer) without requiring a third party. Different corporate entities function as nodes, and cryptography validates the process (Kamble et al., 2019; Thoukidides et al., 2025). All entities participating in this activity contribute to a shared and decentralised ledger that stores records of the transactions.

For this reason, it is well understood that BCT provides a safe environment for recording transactions. Several technologies, such as smart contracts and distributed ledger systems, are built into the blockchain's infrastructure (Albayati et al., 2020). Blockchain is referred to as a meta-technology because it combines many other technologies, such as computer programming, cryptography, databases (among others) (Asante Boakye et al., 2025). The use of BCT removes the limitations associated with trust-related issues, thereby reducing the friction involved in transactions (Davidson et al., 2016). Blockchain not only accelerates but also reduces the cost of transactions (Kamble et al., 2019). The ability of BCT to record all transactions enables organisations to manage assets more effectively and reduce stock delivery costs (Ullah et al., 2021).

Since its introduction to the global market more than 10 years ago, blockchain has significantly transformed many industries and threatened the survival of traditional businesses (Albayati et al., 2020). Blockchain provides several benefits for organisations, including smart contracts (Albayati et al., 2020), transparency (Kumar et al., 2023; Malik et al., 2021; Sharma et al., 2023), data protection (Zyskind et al., 2015), efficient supply chain management (Asante Boakye et al., 2025; Gökalp et al., 2022), high service quality (Aste et al., 2017), the facilitation of transactions without third parties (Fernando et al., 2021), cost reduction and auditing improvements (Castro et al., 2020) and financial performance (Abdelwahed et al., 2024).

2.2 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is considered one of the most recognised theories among academics who measure the adoption of new technology. Davis (1989) proposed the TAM to explain users' perceptions regarding new technology and information systems adoption. According to this theory, a user's attitude toward technology is impacted by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which play an important role in the decisions about the use of technology. One of the critical strengths of TAM is its ability to predict the Behavioural Intention (BI) for using the technology to ensure that the TAM model is successfully adapted to the particular conditions of the investigation, to produce a more successful outcome. Davis et al. (1989) advised taking into account external variables while determining the drivers behind the cognitive and emotive reaction to the technical qualities. Additionally, in order to gain an understanding of blockchain adoption, the TAM model was applied. In order to explore the elements that influence the implementation of BCT, a number of academics have expanded their models to include variables from external factors. The TAM, the TPB, the incorporation of top management support was included in this study to accurately reflect the setting of the investigation.

2.3 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) extended the Theory of Reasoned Action (TRA), which postulates the crucial roles of attitude and subjective norm toward behavioural intention, by introducing a new concept known as Perceived Behavioural Control (PBC). This construct was developed to account for situations in which individuals have little or no control over the behaviours being examined (Ajzen, 1991). The TPB holds to the premise that people's conduct is not entirely under their control. PBC refers to the belief that one possesses the abilities, opportunities, and the necessary resources to perform the behaviour (Kumari & Devi, 2022). This study argues that training and resources are PBC factors that may affect a manager's desire to adopt BCT. Attitude (ATT) is a term that describes the positive or negative evaluative outcomes that an individual experiences as a result of engaging in a certain action. The willingness of a manager to use BCT depends on their attitude toward it. Even among managers who share similar moral values, differences may exist in their comfort level and readiness to adopt BCT. This

variation can be attributed to the influence of PBC on managerial behaviour and decisions-making (Ajzen & Madden, 1986).

2.4 Hypotheses Development and Research Model

On the basis of two theoretical frameworks, namely the TPB and the TAM, the hypotheses were developed to measure BI to adopt BCT among Iraqi SME managers. This study posits that the SMEs manager's perceptions of the different factors of TAM and TPB play an essential role in understanding the blockchain adoption process in SMEs. This study defined managers' intention to adopt BCT as BI. The term BI refers to the extent to which an individual intends to engage in a particular activity (Fishbein & Ajzen, 1975). An individual's intention represents the level of effort they plan to exert to perform the behaviour. In general, a more desirable attitude toward the behaviour is associated with stronger motivation to engage in the action (Ajzen, 1991). The TAM provides a framework for examining BI, specifically by assessing how PU and PEOU influence BI to adopt blockchain. In contrast, the TPB explains adoption through the influence of attitude, subjective norms, and perceived behaviour control.

2.5 Technology Acceptance Model (TAM) and Blockchain

Perceived Ease of Use (PEOU) refers to the extent to which managers believe that using blockchain in SMEs would be easy to understand, learn, and operate. PEOU is evaluated by how effortless a system is to use (Davis, 1989). It has been established that PEOU significantly influences how people utilise technology to lessen their cognitive strain (Kamble et al., 2019). In the event that a system is regarded as being straightforward to operate, individuals are more inclined to make use of it. In contrast, Perceived Usefulness (PU) refers to the extent to which users believe that employing a given technology will aid them in completing their duties more efficiently (Davis, 1989). PU also reflects the subjective likelihood that users will form higher expectations after utilising a specific application. PU is considered the most important aspect that determines whether an individual adopts an information system (Venkatesh & Davis, 2000). Previous studies have demonstrated that PU exerts a strong and significant effect on behavioural intention (BI) to adopt blockchain technology (Kamble et al., 2019; Kumari & Devi, 2022; Sciarelli et al., 2022; Ullah et al., 2021). Therefore, Albayati et al. (2020) claimed that two specific behavioural beliefs, PEOU and PU, are crucial predictors of users' acceptance of accepting technology.

According to Davis et al. (1989), PEOU is an antecedent of PU. Similarly, previous studies indicated that PEOU significantly influences PU (Kamble et al., 2019; Kumari & Devi, 2022; Sciarelli et al., 2022; Ullah et al., 2021). TAM further posits that both PEOU and PU are primary factors of Attitude (ATT) toward system use (Davis, 1985). PEOU and PU not only shape an individual's attitude but also influence social expectations related to the adoption of information systems (Kamble et al., 2019). Despite these insights, there is a lack of clear information about the impact that PEOU and PU have on ATT. Previous studies have shown that PU has a significant positive influence on attitude (Albayati et al., 2020; Kamble et al., 2019; Sciarelli et al., 2022; Ullah et al., 2021). This relationship was consistently reported in the majority of prior research. However, there is less agreement regarding the effect of PEOU on ATT. Ullah et al. (2021) and Albayati et al. (2020) found that PEOU had a substantial effect on ATT, whereas Sciarelli et al. (2022), Kamble et al. (2019), and Kumari and Devi (2022) reported no significant effect. As a result of discrepancies, this research examines how PEOU and PU influence ATT among SMEs in Iraq. The present investigation formulates the following hypotheses based on the preceding discussion:

H₁: PEOU positively affects PU of BCT in SMEs.

H₂: PEOU positively affects ATT towards using BCT in SME s.

H₃: PU positively affects ATT towards using BCT in SMEs.

H₄: PU positively affects BI to use BCT in SMEs.

2.6 Theory of Planned Behaviour (TPB) and Blockchain

According to the TRA, individuals are more likely to experience motivation when they possess a favourable disposition towards a certain subject matter and exhibit positive regard towards their peers. TPB, which extends TRA, usually looks at situations where people do not have full control over what they do. The TPB consists of the following:

Attitude (ATT) describes a person's positive or negative perspectives on exhibiting the desired behaviour (Fishbein & Ajzen, 1975). People choose to do things that will help them, so this is related to the idea of BI. An attitude is thought to have cognitive, emotional, and conative elements (Kamble et al., 2019). Ajzen and Fishbein (2005) found that attitude assessment techniques often only captured the emotional side of an attitude. An individual's attitude toward engaging in the target behaviour is defined as their positive or negative sentiments about it (Davis et al., 1989; Venkatesh et al., 2003). In other words, attitudes are frequently viewed as comprehensive emotional assessments (Ajzen et al., 1980). A person's positive reaction when using technology is described as their attitude toward user acceptance of IT (Ullah et al., 2021). Previous studies indicated that attitude has a positive and significant impact on BI to use BCT (Albayati et al., 2020; Kamble et al., 2019; Kumari & Devi, 2022; Mukherjee et al., 2023; Sciarrelli et al., 2022).

H₅: ATT positively affects BI to use BCT in SMEs.

Subjective Norms (SN) refer to an individual's perception of the collective opinion held by significant others regarding their appropriate or inappropriate behaviour in a certain context (Ajzen, 1991). A person's impression of society's ideas regarding the acceptability or attractiveness of engaging in a certain behaviour is referred to as SN. People prefer to behave according to what they perceive others expect of them; hence, SN is assumed to impact BI (Kumari & Devi, 2022). It has been found that SN influences how a person thinks about how useful a technology is (Kamble et al., 2019).

Empirically, there are inconsistencies in previous results regarding the impact of SN on BI. Several studies reported that SN has a positive and significant impact on BI (Handoko & Suryadharma, 2020; Kumari & Devi, 2022; Schaupp et al., 2022) and PU (Kamble et al., 2019; Ullah et al., 2021). On the other hand, some studies reported that SN has an insignificant impact on BI (Kamble et al., 2019; Mazambani & Mutambara, 2020; Ullah et al., 2021). Thus, this study tests the following hypotheses:

H₆: SN positively affects PU of BCT in SMEs.

H₇: SN positively affects BI to use the BCT in SMEs.

2.7 Perceived Behaviour Control (PBC)

Perceived Behaviour Control (PBC) reveals how individuals feel about accessing the possibilities and resources they have to engage in a behaviour (Ajzen, 1991). PBC is a person's perception of the skills and resources needed to do a particular behaviour and how easy or hard it is to conduct it (Kumari & Devi, 2022). People's beliefs about their capacity to carry out a particular behaviour are referred to as PBC to the degree that they accurately represent the possibility that PBC, in conjunction with BI, might be utilised to predict behaviour (Kamble et al., 2019; Mukherjee et al., 2023). Previous studies indicated that PBC has a positive and significant impact on BI (Kamble et al., 2019; Mazambani & Mutambara, 2020; Schaupp et al., 2022; Ullah et al., 2021). Therefore, the following hypothesis is proposed.

H₈: PBC positively affects BI to use BCT in SMEs.

2.8 Top Management Support (TMS)

Blockchain adoption is a strategic decision that is highly influenced by a company's top executives. An organisation usually faces employees' resistance when changing the existing system during the adoption of new technology. However, a better workplace and less resistance can be achieved by increasing employees' awareness of the advantages of BCT. Accordingly, they will be more encouraged to accept the new system and demonstrate strong support for migrating to BCT (Gangwar et al., 2015; Gökalp et al., 2022; Şener et al., 2016). The adoption of BCT requires strong financial support and employee expertise. Furthermore, an organisation must develop employees' skills and capabilities and restructure the organisation to support the new technology adoption (Gökalp et al., 2022; Pilkington, 2016). However, all these BCT adoption enablers are subject to top management decision. TMS is expected to reduce the effect of employee resistance and aid in overcoming internal barriers (Badi et al., 2021). TMS may also affect the blockchain adoption process by clarifying the SME's values and goals and reiterating them. Therefore, the ability to successfully implement new technology in a company highly depends on TMS (Malik et al., 2021). The lack of leadership support makes it less likely that innovations like BCT will be adopted.

In terms of the influence that TMS has on PU and PEOU, there are a variety of conflicting empirical conclusions. PU has been shown to be significantly improved by TMS, according to the findings of a number of studies (Abbad et al., 2019; Hussein et al., 2019; McNamara & Sepasgozar, 2020) and has PEOU (Gea et al., 2019; Hussein et al., 2019; McNamara & Sepasgozar, 2020). On the other hand, other studies reported that TMS has an insignificant impact on PU (Gea et al., 2019; Mohd Nor et al., 2021) and PEOU (Abbad et al., 2019; Mohd Nor et al., 2021). As a result, one of the objectives of the present research is to investigate the influence that TMS has on PEOU and PU in the context of Iraqi SMEs. In light of this, the theories that are presented below are formed.

H₉: TMS positively affects PEOU.

H₁₀: TMS positively affects PU.

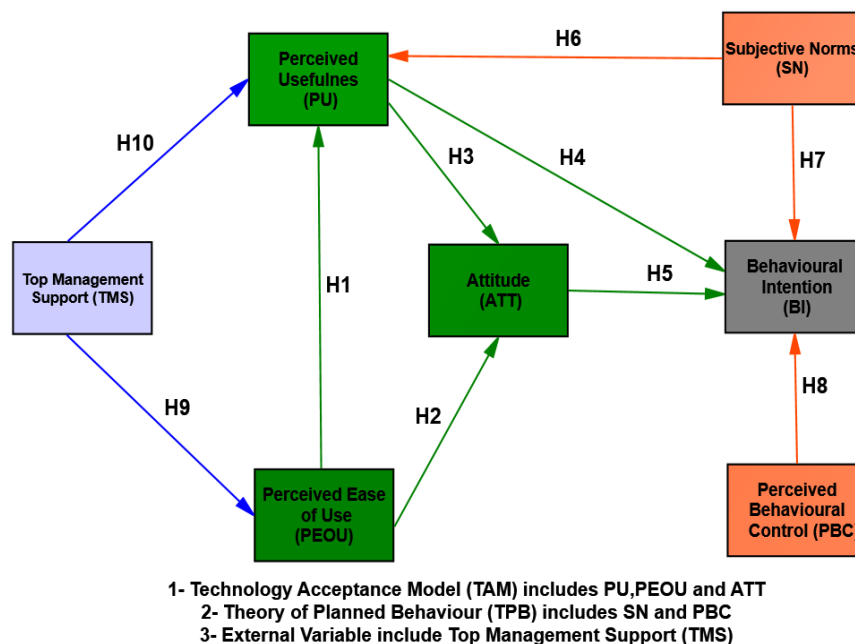


Figure 1. Proposed Model

Overall, this study emphasises three reasons behind adopting TAM and TPB models with the extension of TMS in BCT adoption. First, TAM has been proven to explain the acceptance of technology from a user's perception (Ajzen, 1991; Davis et al., 1989). Second, TPB factors such as SN and PBC capture the control elements of users and offer further information on how well the technology is received when coupled with TAM structures. Third, the adoption of BCT in SMEs will be unsuccessful unless TMS supports it. Therefore, based on TAM, TPB, and TMS, this study proposes the research model shown in Figure 1.

3. METHODOLOGY

Based on the positivist philosophy and the deductive approach, this study examined the proposed hypotheses that postulate the effects of TMS, TAM, and TPB factors in order to gain insights into BCT adoption in Iraqi SMEs. The managers of Iraqi SMEs, who were chosen at random for this study, filled out a questionnaire. The survey consisted of two sections: Part One collected demographic information from the respondents, whereas Part Two examined the TMS, TAM, and TPB constructs. The surveys were evaluated using a five-point Likert scales.

Table 1 shows that all of the questions were taken from prior research. The surveys were first written in English and then translated into Arabic so that those whose native language is Arabic could fill them out. The questionnaire was mailed to five experts affiliated with public universities in Iraq to verify its content validity. Their comments and suggestions led to minor improvements, such as rewording some items to make them easier to understand for respondents and more suitable for the Iraqi context. Because all the items had been adapted from studies conducted in a Western context, no major changes or removals were suggested. Nonetheless, the response rate was limited, with only three experts providing input.

Table 1 Research Instrument

Construct	Number of Items	Source(s)
Attitude (ATT)	4	(Davis, 1989)
Behavioural Intention (BI)	6	(Venkatesh et al., 2003; Kamble et al., 2019)
Perceived Behaviour Control (PBC)	6	(Kamble et al., 2019; Taylor & Todd, 1995)
Perceived Ease of Use (PEOU)	4	(Davis, 1989; Kamble et al., 2019)
Perceived Usefulness (PU)	4	(Davis, 1989; Kamble et al., 2019)
Subjective Norms (SN)	3	(Kamble et al., 2019)
Top Management Support (TMS)	5	(Badi et al., 2021; Malik et al., 2021)

4. RESULTS AND DISCUSSION

4.1 Demographic Profile

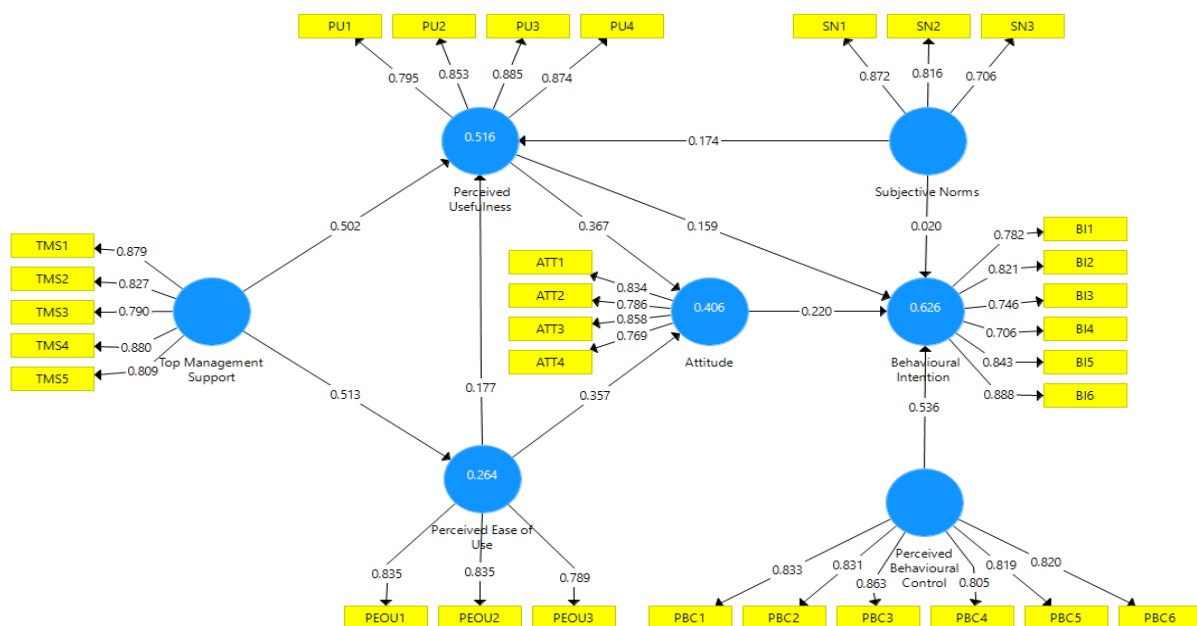
Table 2 exhibits respondents' demographic information. Based on Table 2, 77% (n=92) of the managers were male, and 23% (n=28) were female. Most managers were between 26 and 35 years old (49%, n=59). Thirty-six percent (n=43) were between 36 and 45 years old, and 14% (n= 17) were above 45 years old. Only 1% (n=1) of the managers was below 25 years old. Moreover, most managers held a bachelor's degree (58%, n=69) compared to a master's degree (15%, n=18), diploma (12%, n=14), and doctoral degree (10%, n=12). Additionally, 88% (n=106) of managers having high awareness of blockchain, whereas 12% (n=14) reported moderate awareness.

Table 2 Demographic Results

Category	Category Measures	Frequency	(%)
Gender	Male	92	77%
	Female	28	23%
Age	Below 25 years	1	1%
	26 to 35 years	59	49%
	36 to 45 years	43	36%
	Above 45 years	17	14%
Managers' Qualifications	Ph.D	12	10%
	Master's	18	15%
	Bachelor	69	58%
	Diploma	14	12%
	Others	7	6%
Blockchain Awareness	Yes, I know well	106	88%
	Yes, I know moderately	14	12%

4.2 Measurement Model

Evaluating the measurement model's validity, reliability, and convergent validity represents the first stage of inferential analysis. According to Hair et al. (2019), item loadings should reach at least 0.708 to be considered acceptable. Therefore, based on Table 3 and Figure 2, all the item loadings exceeded 0.708, except for PEOU4, which was not acceptable and was therefore removed to enhance model validity. Additionally, Cronbach's Alpha (CA) and Composite Reliability (CR) were used to assess the reliability of the model. A model is considered reliable if CA and CR are 0.70 or above (Hair et al., 2019).

**Figure 2.** Measurement Mode

Based on Table 3, the CA and CR values for all the constructs were above 0.7. Therefore, the model does not exhibit issues of internal consistency. On the other hand, convergent validity was assessed using the Average Variance Extracted (AVE), which should be at least 0.5 (Hair et al., 2019). Results in Table 3 show that the AVE for all constructs was above 0.5, indicating acceptable convergent validity of the model. It is also necessary to evaluate the discriminant validity to ensure that each construct is distinct from the others. The Heterotrait-Monotrait Ratio (HTMT), which should be less than or equal to 0.90, was used to evaluate discriminant validity in this study.

Table 3 Construct Reliability and Validity

Constructs	Outer Loadings	CA	CR	AVE	VIF
ATT					
ATT1	0.834				2.128
ATT2	0.786	0.886	0.886	0.660	2.385
ATT3	0.858				2.683
ATT4	0.769				2.227
BI					
BI1	0.782				2.120
BI2	0.821				3.043
BI3	0.746	0.913	0.914	0.640	2.310
BI4	0.706				2.354
BI5	0.843				3.763
BI6	0.888				3.372
PBC					
PBC1	0.833				1.792
PBC2	0.831				3.273
PBC3	0.863	0.930	0.929	0.687	3.478
PBC4	0.805				4.478
PBC5	0.819				4.142
PBC6	0.820				3.919
PEOU					
PEOU1	0.835	0.859	0.860	0.672	2.403
PEOU2	0.835				2.483
PEOU3	0.789				1.882
PU					
PU1	0.795				1.869
PU2	0.853	0.912	0.914	0.726	3.424
PU3	0.885				4.747
PU4	0.874				4.592
SN					
SN1	0.872	0.839	0.842	0.642	2.216
SN2	0.816				2.250
SN3	0.706				1.714
TMS					
TMS1	0.879				2.881
TMS2	0.827	0.922	0.922	0.702	2.710
TMS3	0.790				2.526
TMS4	0.880				2.774
TMS5	0.809				3.051

Table 4 shows that all constructs have HTMT values below 0.90. Therefore, the model does not suffer from discriminant validity issues. The Variance Inflation Factor (VIF) is used to identify whether items are too closely related; a VIF greater than 5 suggests a problem with this multicollinearity, which can be addressed by removing items or combining similar ones. A VIF between 3 and 5 indicates a potential but minor issue, whereas the ideal VIF is below 3 (Hair et al., 2019). According to Table 3, all items have VIF values below 5, indicating no collinearity

problem in the model. Out of 31 items, 12 have VIFs between 3 and 4, while the remaining 19 have values below 3, which are considered ideal.

Table 4 The Heterotrait-Monotrait Ratio (HTMT)

	ATT	BI	PBC	PEOU	PU	SN	TMS
ATT							
BI	0.580						
PBC	0.480	0.734					
PEOU	0.558	0.584	0.510				
	ATT	BI	PBC	PEOU	PU	SN	TMS
PU	0.564	0.580	0.529	0.548			
SN	0.562	0.544	0.593	0.648	0.491		
TMS	0.554	0.525	0.433	0.514	0.663	0.404	

4.3 Structural Model

Figure 2 depicts the R^2 for the main endogenous construct, BI as 0.626. This indicates a moderate level of R^2 , as recommended by Chin (1998), with the exogenous constructs explaining 62.6% of the variance. Similarly, the R^2 values for ATT and PU as endogenous constructs are 0.406 and 0.516, respectively, accounting for 40.6% and 51.6% of the variance. Thus, the R^2 values are considered moderate (Chin, 1998). In contrast, the R^2 values for PEOU is 0.264, which is considered weak (Chin, 1998). Users may find the system easier to use for reasons not included in this model. This aspect should receive more attention in future studies by adding items and factors related to IT infrastructure or users' prior experience.

Q^2 assesses whether the proposed model predicts the endogenous constructs. The Q^2 value, which measures predictive relevance, should be above zero (Hair et al., 2019). Accordingly, the results showed that the Q^2 values for all endogenous constructs were above zero (0.245 for ATT (medium predictive), 0.377 for BI (large predictive), 0.159 for PEOU (medium predictive), and 0.349 for PU (large predictive)). Therefore, the model's predictive capability is confirmed. To assess the effect size (F^2) of exogenous constructs to endogenous constructs, Table 5 presents the effect sizes for each path: four paths exhibited a small effect, two paths exhibited a medium effect, three paths exhibited a large effect, and one path showed no effect, which resulted in the rejection of the corresponding hypothesis.

Table 5 Effect Size (F^2)

Path	Values	Decision
PEOU -> PU	0.033	Small
PEOU -> ATT	0.151	Medium
Path	Values	Decision
PU -> ATT	0.159	Medium
PU -> BI	0.040	Small
ATT -> BI	0.074	Small
SN -> PU	0.036	Small
SN -> BI	0.001	Negligible
PBC -> BI	0.438	Large
TMS -> PEOU	0.358	Large
TMS -> PU	0.379	Large

Table 6 Hypotheses Results

	Hypotheses Path	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Supported
H ₁	PEOU -> PU	0.177	0.176	0.087	2.043	0.041	Yes
H ₂	PEOU -> ATT	0.357	0.360	0.089	4.031	0.000	Yes
H ₃	PU -> ATT	0.367	0.365	0.085	4.319	0.000	Yes
H ₄	PU -> BI	0.158	0.159	0.075	2.114	0.035	Yes
H ₅	ATT -> BI	0.219	0.222	0.070	3.149	0.002	Yes
H ₆	SN -> PU	0.174	0.175	0.080	2.180	0.029	Yes
H ₇	SN -> BI	0.018	0.014	0.079	0.225	0.822	No
H ₈	PBC -> BI	0.540	0.540	0.075	7.165	0.000	Yes
H ₉	TMS -> PEOU	0.513	0.513	0.070	7.373	0.000	Yes
H ₁₀	TMS -> PU	0.503	0.502	0.061	8.195	0.000	Yes

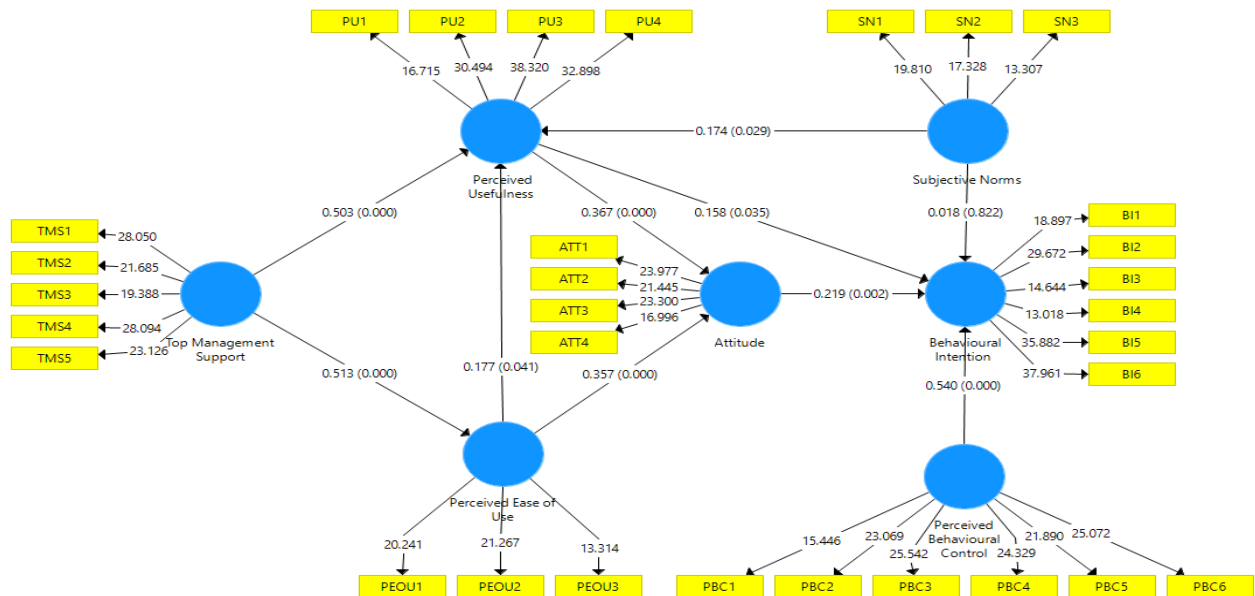


Figure 3. Structural Model

Based on Table 6 and Figure 3, the results indicate that PEOU and SN have a positive and significant impact on PU. Thus, H₁ and H₆ are supported. Moreover, this study found that PEOU and PU have a positive and significant impact on ATT. Thus, H₂ and H₃ are supported. PU, ATT, and PBC positively and significantly impact BI to use blockchain. Thus, H₄, H₅, and H₈ are supported. TMS positively and significantly impact on PEOU and PU. Thus, H₉ and H₁₀ are supported. However, SN has no significant impact on BI to use blockchain. Thus, H₇ is not supported.

4.4 Discussion

The theoretical model is appropriate based on the reported results from the previous section. The model consists of seven predictors: four derived from TAM (PU, PEOU, ATT, and BI), two from TPB (SN and PBC) and one external predictor (TMS). This study confirmed that PU and ATT positively and significantly impact BI to adopt BCT, which is in line with previous findings (Kamble et al., 2019; Kumari & Devi, 2022; Sciarelli et al., 2022). When certain conditions are met, managers are more likely to choose new technology over the existing systems. Additionally, the findings show how managers believe technology could provide a valuable resource when information and materials are readily available online. The research also indicates that BI towards adopting blockchain has a significant impact on SME managers and is advancing rapidly, even though many businesses were slow to adopt the technology in the past. SMEs managers should utilise the benefits of BCT to enhance their services. Conversely, the results of this study indicated that SN does not have a substantial influence on BI regarding the use BCT, which is consistent with the findings of other studies (Kamble et al., 2019; Mazambani & Mutambara, 2020; Ullah et al., 2021).

Some managers claimed to have heard of BCT frequently. Nevertheless, they lacked a clearer understanding of the fundamental concepts and applications of BCT in business. Even though Iraq is just starting to use BCT, some managers still require more information on how it can be applied. Several well-known Iraqi media outlets have helped the blockchain industry grow by explaining what blockchain is and how it can be used in innovative ways. In line with prior findings (Kamble et al., 2019; Ullah et al., 2021), this study further confirmed that SN significantly impacts PU. This result indicates that the managers' behaviour is influenced or altered depending on how other significant individuals perceived BCT's effectiveness. Based on these results, BCT adoption can be increased if SMEs that have adopted BCT share and highlight the advantages they have gained from BCT compared to conventional method without BCT with other SMEs considering adoption.

On a different note, the positive impact of TMS on PEOU and PU verified in this study corroborates previous findings (Hussein et al., 2019; McNamara & Sepasgozar, 2020). This finding suggests that SMEs' perceptions of the usefulness of new technology are significantly influenced by the support of top management in integrating BCT into their everyday processes. Organisations that use traditional centralised databases may recognise the benefits of BCT and view it as innovative technology, but they may still be unprepared to adopt it. This study shows how TMS, an organisation's ability to innovate, and competitive pressure can affect PEOU and PU. This study also revealed that BI to adopt BCT is significantly impacted by PBC, which concurs with previous findings (Mazambani & Mutambara, 2020; Schaupp et al., 2022; Ullah et al., 2021). The result indicates that intention and PBC could be utilised to predict BCT behaviour in SMEs.

The powerful effect of PBC may be explained by the introduction of BCT within SMEs in Iraq. The managers who participated in the study believed that user training, help, and easy access were the most important things to encourage BCT adoption. Moreover, this study found a positive and significant impact of PU and PEOU on ATT, which supports prior studies (Albayati et al., 2020; Ullah et al., 2021). Echoing earlier studies (Kumari & Devi, 2022; Sciarelli et al., 2022; Ullah et al., 2021), PEOU significantly impacts PU. The results demonstrate that managing the systems and using BCT in SMEs requires mental effort despite managers' impressions of the PEOU. Users' PEOU will increase along with the level of assistance they receive from the technology. Managers in SMEs view adopting BCT as being effortless, and this feature enables them to get the most out of this technology while operating their enterprises.

5. THEORETICAL AND PRACTICAL IMPLICATIONS

The existing literature regarding blockchain adoption based on TAM and TPB with TMS is extended using the findings of this study. The current study makes a significantly contribution to the literature in the context of Iraqi SMEs' adoption of BCT. Therefore, this study focuses on the adoption intentions of BCT in the SMEs sector. Blockchain service companies might need to wait until the technology is better developed before they can attract more customers. However, the data also indicate that only a few SMEs in Iraq have used BCT, indicating a sign of market potential.

The results of the measurement model showed a strong explanatory capability, with $R^2 = 0.626$ and adjusted $R^2 = 0.620$. This means that the variance of BI to adopt the blockchain is 62.0%. Additionally, the variance of attitude was $R^2 = 0.406$, while PEOU showed $R^2 = 0.264$. Moreover, PU exhibited $R^2 = 0.516$. The findings of this study provide a more in-depth understanding of the factors that drive the use of BCT in SMEs. Blockchain has the potential to increase SMEs' profits and improve consumer interactions. It was shown that TMS significantly enhances managers' desire to utilise blockchain in SMEs. As a result, vendors of BCT ought to pay special attention to the significant responsibilities that senior management plays in determining whether or not a user intends to employ this technology. Having an accurate grasp of the PEOU and PU procedures of BCT is crucial for increasing managers' confidence in its application. Furthermore, BCT service providers must invest their time in educating managers about the various aspects of PEOU and PU related to BCT adoption.

6. CONCLUSION

The purpose of this research was to use a model incorporating TAM, TPB, and TMS components to analyse the BI to implement BCT in Iraqi SMEs. The results indicated that PBC is the most crucial factor for enhancing BI to adopt BCT. However, TMS showed a high impact on PEOU and PU. Meanwhile, the results indicated that PEOU, SN, and TMS positively and significantly impact PU. Similarly, PEOU and PU have a positive and significant impact on attitude. Likewise, PU, ATT, and PBC positively and significantly impact BI to adopt BCT. Furthermore, TMS significantly and positively affects PEOU. Conversely, BI's decision to implement BCT is unaffected by SN. Based on these findings, the blockchain community, academic institutions, the government, and IT service providers may work together to promote BCT and its benefits to SMEs. A company's staff can become more proficient in a certain technology if upper management invests in its adoption and makes strategic decisions regarding it.

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