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Adoption of Blockchain Technology among Australian Organizations: A Mixed-Methods Approach

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Abstract

There are several applications and benefits of Blockchain Technology (BCT) reported for different industries e.g. health, finance, supply chain, government, and energy. However, despite the benefits reported in the scholarly and commercial literature, organizations have not adopted BCT heavily across the globe including Australia. This lack of uptake provides the rationale to initiate this research to identify the factors that influence the adoption of BCT among Australian organizations. We use a mixed-methods approach based on the Technology, Organization, Environment (TOE) framework. First, we develop a theoretical model grounded on the findings of qualitative interviews of BCT experts and decision-makers working with different Australian organizations, and then confirm it through a quantitative study with an online survey. The results of the study show that the organizational adoption of BCT is influenced by the different factors that belong to the technological, organizational, and environmental contexts of the TOE framework.

Keywords blockchain, organizational, adoption, TOE, Australia

1 Introduction

Blockchain Technology (BCT) is a disruptive digital innovation that helps to manage data over a distributed and peer-peer network without the involvement of any intermediary (Nakamoto 2008). There are several benefits of BCT, for example, information transparency, security, traceability, cost reduction, speed, are proposed for different industries such as finance, healthcare, supply chains, government, and energy (Friedlmaier et al. 2018). Various global leading organizations such as IBM, Walmart, Microsoft have been finding ways to utilize BCT to enhance their business process and value. Despite all this, the review of scholarly and commercial literature reveals that the BCT has not been gaining heavy organizational adoption all over the globe (Woodside et al. 2017).

Researchers tried to investigate the organizational adoption of BCT in different contexts and countries. Holotiuk and Moormann (2018) examined the factors influencing organizational adoption of BCT in the finance industry of Germany. However, they did not include BCT-specific aspects and developed a general framework, based on the existing knowledge of IT adoption. Wong et al. (2019) conducted a similar study for the adoption of BCT among Malaysian SMEs in the supply chain business. Clohessy and Acton (2019) explored the impact of top management support, organization size, and organizational readiness on the adoption of BCT in Ireland. Their study is limited to the selected factors. Albrecht et al. (2018) investigated the implementation of BCT in the energy sector. Werner et al. (2020) applied the mixed-methods approach for BCT adoption. However, their study focused on the implementation stage of the adoption process and explained the impact of BCT adoption on organization performance.

From the above studies on BCT adoption, and further reviewing the IS adoption literature, we came to know that there is an absence of studies that explore the factors influencing BCT adoption among Australian organizations. This lack of uptake motivated us to initiate this research. We chose Australia because of the following certain reasons.

Australia has been working to find ways to offer its e-services through BCT for a long time. The CSIRO's Data61, one of the leading research agencies in Australia, aims to develop a national blockchain to integrate different government departments to enhance their coordination, cooperation, and data sharing (Austrade 2018; DFAT 2018). The government has started a pilot project for trading water rights through BCT (CRCNA 2020). Recently, the Australian government has announced a BCT-roadmap to provide support and funding for the government, private sector, and researchers to foster innovation and collaboration around BCT (DISER 2020). There is also great support for BCT at the private level. Blockchain Australia, a private association, has actively been promoting the adoption of BCT among Australian organizations (Australia 2020). The Economist Intelligence Unit (EIU), a research and analysis corporation, ranked Australia first in its technology readiness index (Unit 2018), indicating that the country has all the required infrastructure to embrace new technology like BCT.

Having all the above-mentioned support and initiatives from the Australian government and private sector, the Australian organizations have not adopted BCT heavily (ACS 2019; Australia 2016). Therefore, the primary aim of this study is to find the answer of the research question:

"What are the factors that influence an organization's intention to adopt BCT in Australia?"

To address the above research question, we chose an exploratory sequential mixed-methods design including qualitative inquiry (phase 1) followed by a quantitative study (phase 2). The mixed-methods design is considered appropriate when there is a lack of research on the topic, as is our case. Venkatesh et al. (2016) suggest that when qualitative and quantitative approaches are combined, a more complete knowledge about the phenomenon under consideration is achieved.

2 Phase 1: Qualitative Inquiry

Given the absence of a study on BCT adoption in Australia, we decided to use a qualitative approach in phase 1 to identify the BCT-specific factors that influence Australian organizations to adopt BCT. Eisenhardt (1989) recommends the use of a well-established theory as a starting point while investigating a phenomenon through qualitative methods. She states that the theory helps to shape the type of questions being asked, provides directions on how to collect and analyze the data, and gives information about the issues. Therefore, phase 1 of our study is based on the TOE framework, proposed by Tornatsky and Fleischer (1990). The TOE framework describes that the organization's intention to

adopt new technology is influenced by three different contexts, namely, technological, organizational, and environmental.

The **technology context** of the TOE framework refers to the factors related to the technology itself, it is BCT in our case, the **organizational context** comprises the factors related to the organization, and the **environmental context** states the factors related to the environment wherein an organization operates its business. Oliveira and Martins (2011) stated that the TOE framework is the most prominent framework that is used to examine the organizational adoption of various technologies including ERP systems, EDI, E-commerce, KMS, Internet, and many more. Further, they stated that the existing theories and models such as the Diffusion of Innovation (Rogers 2003) and Institutional Theory (DiMaggio and Powell 1983), which explains the technology adoption at an organizational level, are either the variation of the TOE framework or their parts are included in the TOE framework. This robustness and solid foundation of the TOE framework motivated us to use it as a theoretical lens for our study.

During phase 1, we conducted 23 semi-structured interviews with BCT experts and decision-makers working in different organizations in Australia. The data collection activity continued from Jan 2020 to April 2020. The interviewees were selected through purposive theoretical sampling and were based on the following predefined qualifying criteria: (1) they should have a minimum of three years of knowledge/experience with BCT, and (2) they should be working as decision-makers within an organization, which had adopted BCT or in the process of BCT adoption. We used LinkedIn, Google along our professional network to know the contact details of the interviewee and their organization status with BCT. Table 1 shows the details of the interviewees and their respective organizations.

Organization Type	**Interviewees**	**Interviews**
IT	CEOs, Founders, Software Engineer, System Analyst, CTO, Project Manager	8
Finance	CEO, Founder, CTO	3
Travel	CEO, Technical Analyst	2
Education	Director	1
Government	Senior Computer Forensics Officer	1
Consulting	CEOs, Project Manager, Solution Architect	4
Legal	CEOs, Director	4
	Total	**23**

Table 1. Summary of the interviewees and their respective organizations

All the interviews were transcribed and the data was analyzed using the QSR NVivo tool under the guidelines of Strauss and Corbin (1990). Multiple iterations of the data analysis were performed. Underlying concepts were drawn by examining the transcribed data line-by-line. Based on the similarities and differences, the identified concepts were grouped into factors. Finally, the factors were mapped with the contexts of the TOE framework. The qualitative analysis showed that the organization's intention to adopt BCT was influenced by the technological factors including perceived benefits, compatibility, complexity, information transparency, disintermediation, and perceived risks; organizational factors comprising organization innovativeness, organization learning capability, and top management support; environmental factors consisting competition intensity, government support, trading partner readiness, and standards uncertainty. Table 2 provides the frequency analysis of the responses received from the interviewees about the influence of every factor on BCT adoption, adapted from (Ali 2016).

Factors	**Frequency of Responses**		
	Positive	**Negative**	**Not Sure**
Perceived benefits	23	0	0
Perceived compatibility	20	0	3
Perceived complexity	0	19	4
Perceived information transparency	22	0	1
Perceived disintermediation	19	2	2

Perceived risks	0	21	2
Organization innovativeness	21	0	2
Organizational learning capability	20	0	3
Top management support	23	0	0
Competition intensity	19	0	4
Government support	20	0	3
Trading partner readiness	19	0	4
Standards uncertainty	0	19	4

Table 2. Frequency analysis of the responses received from the interviewees for every factor

3 Phase 2: Research Model and Hypotheses

Phase 2 involved a quantitative study that aims to examine the empirical and statistical relationships between the factors that emerged as relevant to BCT adoption in phase 1. Based on the findings of phase 1 and the prior literature on the adoption of BCT and inter-organization systems like EDI, which exhibit the characteristics like BCT, we propose the research model, theoretical linkages, and research hypotheses shown in Figure 1. The following sections explain hypotheses development.

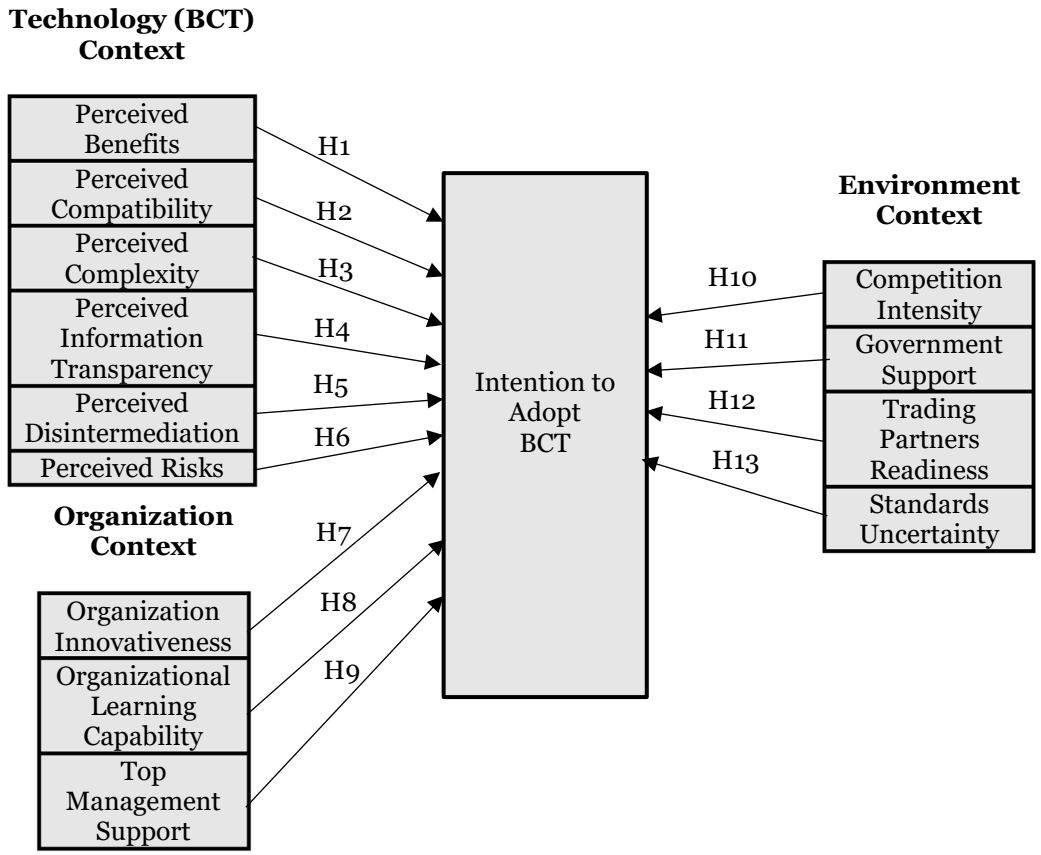

Figure 1: *Proposed theoretical model for the adoption of BCT*

3.1 Technology context

Perceived Benefits (PB). Perceived benefits refer to the positive consequences that an organization perceives from the use of technology. Many of the past studies consistently report the positive influence of perceived benefits on IT adoption. For example, Chwelos et al. (2001) studied the impact of perceived benefits on EDI. Barnes III and Xiao (2019) and Wong et al. (2019) stated that organizations adopt BCT when they expect BCT benefits in their business. Therefore, we propose that:

H1. *Perceived benefits of BCT positively influence the organization's intention to adopt BCT.*

Perceived Compatibility (PC). Perceived compatibility of technology describes the perception of an organization towards the suitability of that technology with its values and technological infrastructure.

Kühn et al. (2019) reported that if BCT is not compatible with the organization's existing IT infrastructure, there are fewer chances of its adoption. Sadhya and Sadhya (2018) stated that organizations are more likely to adopt BCT if it fits well with their existing business processes. Kalaitzi et al. (2019) reported similar effects of perceived compatibility. Therefore, we put forward the following:
H2. *Perceived compatibility of BCT positively influences the organization's intention to adopt BCT.*
Perceived Complexity (CMP). Perceived complexity is the degree to which organizations perceive technology is difficult in using and understanding. Huang et al. (2008) found that the complexity negatively influenced organizations' intention to adopt I-EDI technology. Wong et al. (2019) found that the technical complexity of BCT was a challenge to Malaysian organizations to understand, which adversely affected their decision to the adoption of BCT. Clohessy and Acton (2019) reported the perceived complexity of BCT as a barrier that negatively affects the organizational adoption of BCT. This leads us to proposing the following:
H3. *Perceived complexity of BCT negatively influences the organization's intention to adopt BCT.*
Perceived Information Transparency (PIT). Perceiving the transparency of information as a result of implementing technology is considered an important factor in the organizational intention to adopt that technology (Al-Jabri and Roztocki 2015). Francisco and Swanson (2018) said that BCT provides a transparent and trusted single source of distributed information, which motivates organizations towards its adoption. Wamba et al. (2020) reported the perceived transparency of information as the main determinant of organizational adoption of BCT in the USA. Sander et al. (2018) declared transparency and visibility of information as important determinants of BCT adoption. Therefore, it can be hypothesized that:
H4: *Perceived information transparency positively influences the organization's intention to adopt BCT.*
Perceived Disintermediation (PD). Disintermediation refers to the ability of BCT to manage peer-peer data transactions without the involvement of any third party (Larios-Hernández 2017). The disintermediation creates new types of BCT-based disintermediated services such as machine-to-machine (M2M) transactions, Blockchain as a Service (BaaS), which were unthinkable before the inception of BCT (Zamani and Giaglis 2018). The transaction cost can be reduced with the BCT-disintermediation because it establishes direct communication among businesses. O'Dair (2016) states that approximately 12.7% of royalties that goes to the third parties as operating cost could, through the BCT-disintermediation, be made available directly to artists in the music industry. Hence, it can be hypothesized that:
H5: *Perceived disintermediation positively influences the organization's intention to adopt BCT.*
Perceived Risks (PR). Perceived risks refer to the extent that organizations perceive the negative consequences of adopting BCT. There are many benefits of BCT reported, however, it is not without risks such as privacy, initial adoption costs, storage concerns, and 51% attack (Sadhya and Sadhya 2018). Erturk et al. (2019) mentioned that unscalability and slow speed of BCT hinder organizations to adopt BCT. Based on the this, it can be hypothesized that:
H6*: Perceived risks of BCT negatively influences the organization's intention to adopt BCT.*

3.2 Organization Context

Organizational Innovativeness (OI). Innovativeness is the willingness and ability of an organization to adopt new technology for the improvement of its services (Tajeddini et al. 2006). Thong and Yap (1995) related organizational innovativeness to the management's decision to adopt new technology. Newby et al. (2014) stated that the innovativeness of an organization plays a significant role in its decision to adopt an innovation. During the qualitative phase of our study, we observed that organizations, which adopted BCT, were more innovative as compared to the non-adopters. Venkatesh and Bala (2012) indicated that if there is a culture of innovativeness, an organization is more likely to adopt the inter-organizational system. Since the BCT is an inter-organizational system, we can hypothesize that:
H7. *Organizational innovativeness positively influences the organization's intention to adopt BCT.*
Organizational Learning Capability (OLC). Organizational Learning Capability (OLC) reflects an organization's ability to acquire new knowledge from its internal and external environment and then store, disseminate, and implement that knowledge into its business decisions (Jerez-Gómez et al. 2007).

Organizational learning provides an environment wherein organizations create new ideas, share and apply that knowledge, which consequently leads to the adoption of an innovation (Chadhar and Daneshgar 2018). Kulkarni and Patil (2020) stated that the learning culture of an organization significantly influences the adoption of BCT. Therefore, we propose that:

H8. *Organizational Learning Capability (OLC) positively influences the organization's intention to adopt BCT.*

Top Management Support (TMS). Top management is considered essential to the adoption of new technology. Koster and Borgman (2020) explained the positive influence of top management support on the adoption of BCT in the Netherland. Hughes et al. (2019) reported that if the top management is not supportive, BCT adoption within an organization is not possible. This is further supported by Clohessy and Acton (2019) regarding the BCT adoption in Ireland. Based on this, we propose that:

H9. *Top management support positively influences the organization's intention to adopt BCT.*

3.3 Environment Context

Competition Intensity (CI). Competition intensity (also called competitive or external pressure) refers to the degree that an organization feels from its competitors. Competition intensity has long been recognized as an important factor in the adoption of inter-organizational systems like EDI (Zhu and Kraemer 2005). Wong et al. (2019) showed that competitive pressure played an important role in the adoption of BCT. Barnes III and Xiao (2019) claimed that when an organization invests in BCT, competitors might follow suit and adopt BCT to maintain their competitive position. Therefore, it is reasonable to propose:

H10: *Competitive intensity positively influences the organization's intention to adopt BCT.*

Government Support (GS). Government support is considered a major driving force in the organizational adoption of new technology (Tan and Teo 2000). Koster and Borgman (2020) found that government support speeds up the adoption of BCT among organizations. Few other studies (Kulkarni and Patil 2020; Wong et al. 2019) also reported government support as a significant indicator of the successful adoption of BCT. This leads to proposing:

H11. *Government support positively influences the organization's intention to adopt BCT.*

Trading Partner Readiness (TPR). BCT, similar to any inter-organizational system like EDI requires strong collaboration and interaction among the trading partners (Werner et al. 2020). Chwelos et al. (2001) stated that an organization alone cannot decide the adoption of an inter-organizational system until its trading partners are financially and technologically ready for it. Kühn et al. (2019) state that an organization adopts BCT when its trading partners are ready to share their data over the BCT network. Therefore, we propose that:

H12. *Trading partner readiness positively influences the organization's intention to adopt BCT.*

Standards Uncertainty (SU). Organizations feel reluctant to adopt a technology for which there are no established standards in the market (Venkatesh and Bala 2012). Standards uncertainty creates fear of losing investments while adopting new technology. Kühn et al. (2019) found that there are no clear standards of BCT regarding data privacy, funds transfer, smart contracts that impede organizations to adopt BCT. Sadhya and Sadhya (2018) reported standards uncertainty as a barrier towards large-scale organizational adoption of BCT. These perspectives lead to the following hypothesis:

H13. *Standards uncertainty negatively influences the organization's intention to adopt BCT.*

4 Phase 2: Research Methodology

To test the model, a Qualtrics online survey was conducted with the help of a well-reputed data collection agency in Australia. The data were collected from June 2020 to August 2020. The survey was distributed to the decision-makers like the CEO, and the senior IT people like CTO, IT directors/Managers working with the organizations that had adopted or in the process of adopting BCT in Australia, and they had a minimum of three years of BCT-related knowledge and experience. We employed a 7-point Likert scale to measure the responses ranging from 1-Strongly Agree to 7-Strong Disagree. We received a total of 191 anonymous completed surveys with a response rate of 38.20%, based on 500 surveys distributed. The measuring scales of all the constructs, except perceived disintermediation, were adapted and modified

from the prior studies on IT adoption. The scale for the 'perceived disintermediation' was developed by following the guidelines of MacKenzie et al. (2011), see appendix.

5 Phase 2: Results

We used PLS-SEM path modeling with SmartPLS 3 software to test the proposed theoretical model.

5.1 Evaluation of the Measurement Model

The measurement model was assessed by determining the values of Cronbach's alpha, Composite Reliability (CR), Average Variance Extracted (AVE), square root of the AVE, and cross-loadings.

Internal Consistency and Reliability. The results of Cronbach's alpha, CR, and AVE for all variables were found greater than the acceptable values recommended by Hair Jr et al. (2016) i.e. Cronbach's alpha and CR should be > 0.7, and the AVE > 0.5. The results were found between the following ranges:

Cronbach's alpha	CR	AVE
0.764-0.884	0.864-0.928	0.628-0.811

Discriminant Validity. To measure the discriminant validity, we followed the Fornell and Larcker (1981) test, which requires that for each construct the square root of its AVE should exceed all correlations between that construct and any other construct value as shown bold in Table 3. In addition to that, we confirmed the discriminant validity through the cross-loadings procedure. Each indicator of every latent variable was loaded higher than indicators of any other off-diagonal variable, which implies that the loading separates each latent variable. The matrixes for the cross-loadings are not included in this paper because of the page space limitations.

Construct	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CI	**0.816**													
CMP	0.646	**0.857**												
GS	0.583	0.498	**0.853**											
INT	0.709	0.536	0.684	**0.830**										
OI	0.664	0.469	0.567	0.708	**0.828**									
OLC	0.548	0.382	0.657	0.639	0.658	**0.792**								
PB	0.332	0.493	0.573	0.738	0.675	0.623	**0.827**							
PC	0.653	0.489	0.664	0.674	0.718	0.635	0.710	**0.824**						
PD	0.625	0.426	0.611	0.648	0.647	0.631	0.668	0.644	**0.797**					
PIT	0.670	0.499	0.650	0.653	0.756	0.764	0.714	0.708	0.654	**0.841**				
PR	0.497	0.685	0.413	0.489	0.450	0.275	0.364	0.372	0.393	0.441	**0.900**			
SU	0.621	0.765	0.508	0.582	0.503	0.400	0.466	0.508	0.411	0.446	0.693	**0.825**		
TMS	0.561	0.482	0.587	0.646	0.650	0.691	0.645	0.542	0.682	0.640	0.382	0.529	**0.829**	
TPR	0.704	0.606	0.707	0.718	0.743	0.669	0.750	0.649	0.631	0.709	0.490	0.602	0.690	**0.835**

Perceived Benefits (PB), Perceived Compatibility (PC), Perceived Complexity (CMX), Perceived Information Transparency (PIT), Perceived Disintermediation (PD), Top Management Support (TMS), Organization Innovativeness (OI), Organization Learning Capability (OLC), Government Support (GS), Competitive Intensity (CI), Trading Partner Readiness (TPR), Standard Uncertainty (SU), Perceived Risk (PR), Intention to Adopt BCT (INT)

Table 3. Latent variable correlations and square roots of Average Variance Extracted (AVE)

5.2 Evaluation of the Structural Model

The evaluation of the structural model was performed through the assessment of the coefficients of determination (R^2), effect size (f^2), predictive relevance coefficient (Q^2), and the significance of path coefficients as suggested by Hair Jr et al. (2016).

The R^2 value suggests the extent to which the independent constructs could explain the variance in the dependent constructs. The R^2 of the dependent variable INT was found 0.806, which means that the

independent constructs PB, PC, CMP, PIT, PD, PR, TMS, OI, OLS, CI, GS, TPR, and SU together accounted for 80.6% variance in INT.

The strength of the effect (f^2) of independent variables on the dependent variable was found between f^2=0.127 and f^2=0.321 indicating the medium to large effect size (Hair Jr et al. 2016) of PB, PC, CMP, PIT, PD, PR, TMS, OI, OLS, CI, GS, and TPR on INT. However, the effect size of SU was found small.

The Q^2 value was found .526, which exceeds the minimum threshold of zero (Hair Jr et al. 2016) implying the model has predictive relevance for the constructs.

The results of the path coefficients and their level of significance are given in Table 4, which shows that OI, CI, and TPR are significant at p<0.01, and PB, PC, CMX, PIT, PD, PR, TMS, OLC, GS, PR are significant at p<0.05, which confirms the hypotheses H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, and H12. However, SU found insignificant. Consequently, hypotheses H13 is not supported.

Hypothesis	Relationship	Beta (β)	*t*- value	Outcome
H1	PB -→ INT	0.158	2.172*	Supported
H2	PC -→ INT	0.146	2.435*	Supported
H3	CMX -→ INT	-0.198	2.187*	Supported
H4	PIT -→ INT	0.155	1.997*	Supported
H5	PD -→ INT	0.110	2.441*	Supported
H6	PR -→ INT	-0.154	1.980*	Supported
H7	OI -→ INT	0.178	2.211*	Supported
H8	OLC -→ INT	0.136	2.005*	Supported
H9	TMS -→ INT	0.110	2.431*	Supported
H10	CI -→ INT	0.450	6.636**	Supported
H11	GS -→ INT	0.138	2.042*	Supported
H12	TPR -→ INT	0.250	2.351**	Supported
H13	SU -→ INT	-0.065	0.670	Not Supported

*p < 0.05, **p<0.01

Table 4. Path Coefficient Test

6 Discussion

Based on the mix-methods approach, qualitative-interviews and quantitative-online survey, the present study is an early attempt to investigate the factors influencing organizations to adopt BCT in Australia. The results reveal that the factors belong to technological context (perceived benefits, perceived compatibility, perceived information transparency, perceived disintermediation), organizational context (organization innovativeness, organization learning capability, top management support), and environmental context (competitive intensity, government support, trading partner readiness) significant positive influence organization's intention to adopt BCT. Moreover, the results show that perceived complexity and perceived risks have a negative influence, whereas, the standards uncertainty has no significant effect on the BCT adoption.

The results show that organizations adopt BCT when they perceive that BCT would bring benefits, for instance, reduction in transaction cost, improved security, and is compatible with their business needs and legacy systems. The perceived complexity negatively influences BCT adoption. These results of our study are consistent with Wong et al. (2019) and Gunasekera and Valenzuela (2020). Perceived transparency of information has been found positively significant in the previous studies (Al-Jabri and Roztocki 2015), which is consistent with our study. Our study statistically proves the significant positive influence of perceived disintermediation on BCT adoption. The quick and speedy data management/business operations without the involvement of any third party motivate organizations to adopt BCT. The perceived risks are reported as a negative factor in the adoption of BCT. The results show that the organizations, which perceive their information will be misused or their security will be at risk, are reluctant to adopt the BCT. This finding is consistent with the previous studies of Yoo et al. (2019). The top management support that is consistently found significant in previous studies, is also found significant in our study. Without the support, active involvement, and provision of the resources by the top management, the BCT adoption is not possible. This result is consistent with Clohessy and Acton (2019). However, it is inconsistent with Wong et al. (2019) that reported top management support

insignificant on BCT adoption in Malaysia. Organizational learning capability and organization innovativeness are found significant. The organizations, which are capable to acquire, store, apply new knowledge and learn; open to new ideas, and ready to take risks are more likely to adopt BCT. The competitive intensity is reported as the most influential factor to adopt BCT. This implies that when the organizations see their competitors had adopted the BCT and getting benefits, they feel the fear of losing control over the market. Consequently, they are compelled to adopt BCT. The finding agrees with the previous studies of Wong et al. (2019), Kulkarni and Patil (2020). Government support is found significant, which is aligned with the findings of (Koster and Borgman 2020; Kulkarni and Patil 2020; Wong et al. 2019). The results for the trading partner readiness suggest that the organizations adopt BCT when their trading partners are also willing and ready, technologically and financially, to adopt the BCT. Kulkarni and Patil (2020), Kühn et al. (2019), and Chwelos et al. (2001) reported the similar effect of trading partners readiness on the adoption of BCT and inter-organizational systems. Surprisingly, the standards uncertainty is found insignificant in this study, which is contrary to the findings of the previous studies (Kühn et al. 2019; Sadhya and Sadhya 2018; Venkatesh and Bala 2012). Since the Australian government took initiatives e.g. blockchain roadmap to promote the adoption of BCT, it could have resulted in the decrease of the uncertainty of BCT standards among organizations.
It is clear in the above discussions that the results of the current study are aligned with the previous studies and consistent across the qualitative and quantitative phase of the study.

6.1 Implications

Theoretical. First, our study contributes to the theory by developing and empirically validating a theory-driven and data-grounded model of BCT adoption among Australian organizations. The model highlights factors such as perceived information transparency, perceived disintermediation, organization innovativeness, organizational learning capability, which are important to consider but were ignored in the prior research on BCT adoption. It is also important to note that the literature on BCT acknowledges the importance of disintermediation, declares it as the main feature of BCT, and a driving factor of BCT adoption, but its impact has not been tested for BCT adoption. We not only develop the measuring scale of the perceived disintermediation but also measure its influence on BCT adoption. Second, our study extends the TOE framework by incorporating the BCT specific factors which were not available in the original TOE framework. The extended model provides a richer and more comprehensive explanation of the BCT adoption in Australia. The model is drawn from the results of the mix-methods approach, which enhances its validity.
Practical. The results of our study can inform policymakers of the Australian government and private organizations working to promote the adoption of BCT among organizations in Australia. The results show government support as an important factor in the adoption of BCT. Therefore, the Australian government could develop more refined policies and strategies to enhance the BCT adoption. The perceived disintermediation of BCT motivates the organization towards its adoption. Therefore, the organizations running their business as an intermediary need to redesign their business models to sustain in the market. The consulting and marketing companies could also use our results to develop their informed decisions and campaigns.

7 Conclusion

Based on the TOE framework, the study investigates the factors affecting the adoption of BCT among Australian organizations using a mix-methods approach. The study derived a 13-factors theoretical model from the findings of the interview data of BCT experts and decision-makers; then developed the hypotheses from the extant literature and confirmed the model through collecting data with an online survey. Among the 13 hypotheses, 12 were found supported and one was rejected. The results showed that:

- Technological factors including perceived benefits, perceived compatibility, perceived information transparency, and perceived disinformation have a positive influence on the organization's intention to adopt BCT, whereas, the perceived complexity and perceived risks have a negative influence.
- Organizational factors comprising organizational innovativeness, organizational learning capability, and top management support are the driver of BCT adoption.

- Environmental factors encompassing competitive intensity, government support, trading partner readiness encourages organizations to adopt BCT. However, standards uncertainty has no major influence.

The study has both theoretical and practical contributions, which are useful both for theory development and making decisions for the adoption of BCT. Besides the implications, the results of the study must be interpreted with the considerations of some limitations. First, the study investigates the adoption of BCT among Australian organizations. Second, the study uses the TOE framework as a theoretical lens. Last, the study considers the direct relationship between the dependent and independent variables. Therefore, we aim to conduct future research in a broad range of countries, integration of more theoretical lenses, and inclusion of the moderating variables to examine BCT adoption.

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Appendix

Perceived disintermediation

Definition: Refers to the degree to which organizations perceive that blockchain enables organizations to run their data transactions without the involvement of any intermediary.
Measuring items:
Organizations adopt blockchain when they perceive that it will enable them to:

1) store their data without the involvement of any intermediary
2) access their data without the involvement of any intermediary
3) share their data without the involvement of any intermediary
4) audit their data without the involvement of any intermediary