

Employee intentions to adopt blockchain technology in accounting information systems in Local government: Testing the Unified Theory of Acceptance and Use of Technology (UTAUT)

Hafiez Sofyani^{1*}, Alek Murtin¹, Juanda¹, Tiyas Puji Utami², and Adli Zuliansyah Putra²

¹Department of Accounting, Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Special Region of Yogyakarta, Indonesia.

²Master of Accounting, Universitas Muhammadiyah Yogyakarta, Special Region of Yogyakarta, Indonesia.

Abstract. This study investigates the intention to adopt blockchain technology (BT) in accounting information systems (AIS) within Indonesian local governments, utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT). The research focuses on four key UTAUT determinants: facilitating conditions, performance expectancy, social influence, and trust. Using a survey of 295 local government employees involved in financial management, the study applied Structural Equation Modelling (SEM-PLS) to test the hypotheses. The findings reveal that facilitating conditions and trust drive the intention to adopt BT in AIS. At the same time, performance expectancy and social influence have no significant impact. These findings emphasize the critical role of establishing adequate infrastructure and enhancing employee trust to ensure successful BT adoption in AIS within Indonesian local governments.

1 Introduction

Blockchain technology (BT) has emerged as a new phenomenon, attracting attention from various groups. Despite its emergence as a medium for developing cryptocurrency, there has been much discussion about Bitcoin adoption in the accounting world. BT provides an innovative method to record, process, and store transactions in the accounting field, which could affect all accounting processes, including transactions initiated, processed, authorized, recorded, and reported [1]. Also, there is a possibility for increased standardization and transparency in financial reporting, allowing data analysis and audits to be carried out more efficiently [2, 3]. These benefits have piqued the interest of the public sector in some countries in incorporating BT into their e-government systems, such as the Accounting Information System.

* Corresponding author: hafiez.sofyani@umy.ac.id

In terms of sustainability, the adoption of BT has a significant role. BT allows for a transparent and permanent record of transactions. This capability can track and verify environmental data such as carbon emissions, resource consumption, and supply chain transparency. This helps to ensure that reported sustainability metrics are accurate and reliable. Implementing BT can also streamline data collection, verification, and auditing processes for sustainable accounting. This can result in cost savings and operational efficiencies by reducing manual processes and improving data reliability.

In 2019, the Indonesian government announced that it was preparing BT for e-government, which included financial management and governance. BT adoption also consists of the Accounting Information System (AIS). Adopting BT in AIS is expected to improve government transparency, accountability and performance [1-5]. However, related BT research in the AIS, particularly in the public sector, is still lacking. Many associated studies discuss the potential benefits and challenges of BT adoption in AIS in general [1, 4, 6-8]. Additionally, there is still a lack of studies examining individual intention to adopt it, particularly in developing countries' public sectors. Research regarding adoption intentions is crucial to obtain valuable insights as input for the successful adoption of BT on AIS in government institutions.

Therefore, this study examines the determinants of employees' intention to adopt BT in AIS in local governments (LGs). This study adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. Therefore, this study contributes to increasing the relevance of UTAUT as a new technology acceptance framework in the context of BT in AIS, especially in the public sector, where related literature is still scarce. This study provides input to relevant authorities, such as LGs, the Ministry of Home Affairs, and the Ministry of Finance, in formulating policies for adopting BT on AIS in government institutions. Even further, BT in AIS enables real-time, auditable and immutable recording of transactions, which is critical in enhancing transparency and accountability in public financial management and curbing corruption.

2 Theoretical framework and hypotheses

The UTAUT is one of the prominent theories explaining technology adoption. Venkatesh, Morris [9] developed this theory by integrating eight frameworks to identify similarities and differences, yielding four constructs: facilitating conditions, social influence, effort, and performance expectancy. However, in this case, the framework was slightly modified by replacing the effort variable with trust. Singh and Sinha [10] argued that individuals are unwilling to adopt or use new technologies due to their lack of trust. Before the intention to use or adopt emerges, the latest technology promoted should be able to create trust in users or potential users [10-12]. Thus, trust is a significant aspect to consider when developing a conceptual framework for technology adoption. However, related empirical research is challenging to find in this context. Based on the justifications above, the conceptual framework of this study is illustrated in Figure 1.

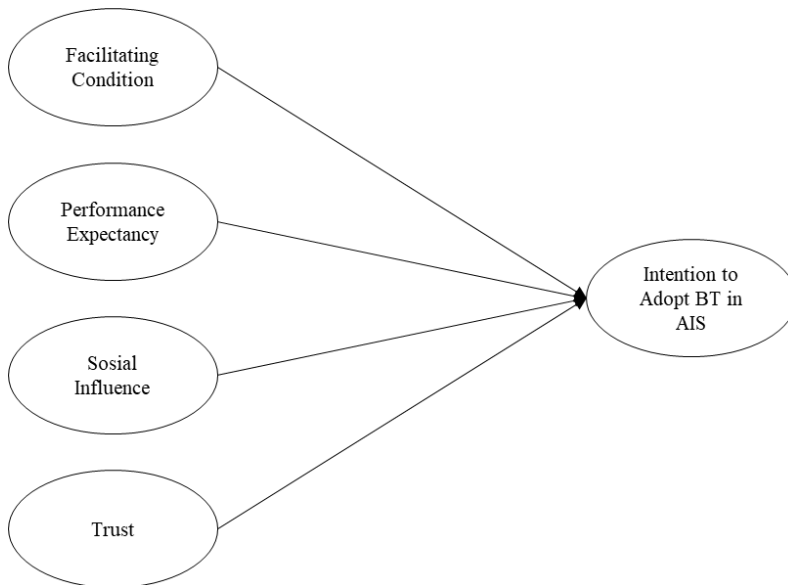


Fig. 1. Conceptual framework of the research

3 Result and discussion

This research uses survey data, so common method bias can occur. Therefore, the Harman single-factor test was before testing the hypothesis [13]. He continued that this challenge becomes problematic when one latent component accounts for most of the variance explained, which is greater than 50%. From the bias test results, only 47% of the variation is obtained based on the CMV test results. It can be concluded that CMV is not a severe concern to the research results.

Table 1. Demographics of the Respondents

Criteria	Description	Total	%
Age	20-35 years	126	42,71
	36-50 years	93	31,52
	>50 years	31	10,50
	Not mentioned	45	15,25
Educational Background	Accounting	132	44,74
	Management	41	13,89
	Economy	21	7,11
	Others	68	23,05
	Not mentioned	33	11,18
Gender	Male	88	29,83
	Female	164	55,59
	Not mentioned	43	14,57
Number of Respondent		295	100

The population in this study consisted of all employees of the Regional Apparatus Organization (RAO) of the Special Region of Yogyakarta Province. The sample determination was carried out by purposive sampling with the criteria of employees in the Special Region of Yogyakarta Province RAO who operate applications related to financial administration. Table 1 presents the demographics of the respondents. It can be seen that

most respondents are young employees aged 20-35 years. Regarding gender, the majority are men, and in terms of educational background, the majority are from the accounting field.

3.1 Measurement model assessment

Before the questionnaire was distributed, a trial was conducted on five experts in accounting information systems and public sector accounting to test the accuracy of the question items with the research variables. Various suggestions were followed when developing the research questionnaire [14]. Aspects (indicators) of the variables are elaborated to ensure that the instrument can capture the research objectives. All variables in the questionnaire are scaled using Likert 1 to 5, where 1 = strongly disagree and 5 = strongly agree. This range was used because it is often used in survey research conducted in Indonesia. In compiling the questionnaire, the researcher adopted it from previous research and modified it according to the research context without changing the meaning. Table 2 presents the operational variables and sources used in compiling the questionnaire.

Table 2. Operational Definition of Variables

Variables	Operational Variables	Sources of questionnaire
Facilitating Conditions	The extent to which a person believes that the existing organizational and technical infrastructure supports the use of a system or technology [15].	Mukherjee, Baral [16]
Performance Expectancy	The extent to which an individual believes that using the system will help him or her achieve gains in job performance [9].	Ferri, Spanò [17]
Social Influence	The extent to which a person believes that other people or social support is important for them to use the technology [15].	Ferri, Spanò [17]
Trust	Trust indicates how willing individuals are to take risks to meet their needs [16].	Mukherjee, Baral [16]
Intention to Adopt	The level of willingness or desire to use technology in this context is BT in AIS [18].	Srivastava, Mohta [19]

Before structural testing is carried out, it must ensure that the use of measures reflects the specified theory, so it is necessary to test the validity of the construct [20]. Validity measures the level of understanding of several items to measure the same concept and the extent to which items distinguish between constructions or measure different concepts [21]. To get the same understanding, it is measured by convergent validity by looking at the outer loading and average variance extract (AVE) values. They agreed that the rule of thumb is more than 0.5 [21]. Table 3 shows that the results are in accordance with Hair, Risher [21] suggestion. In addition, discriminant validity is also considered by looking at the Fornell-Lacker Criteria; the Fornell-Lacker Criteria is the square root of the AVE of each construct must be greater than the correlation with other latent constructs [22]. Table 4 shows that the criteria have met the rule of thumb suggested [21].

Table 3. Loading and AVE

Construct	Indicator	Loading	AVE
Facilitating Conditions	FC1	0.830	0.687
	FC2	0.835	
	FC3	0.801	
	FC4	0.849	
Performance Expectancy	PE1	0.898	0.823
	PE2	0.926	
	PE3	0.898	
Social Influence	SI1	0.716	0.560
	SI2	0.746	
	SI3	0.782	
Trust	T1	0.873	0.736
	T2	0.906	
	T3	0.792	
Intention to Adopt	ITA1	0.800	0.731
	ITA2	0.844	
	ITA3	0.891	
	ITA4	0.883	

Note: AVE: Average Variance Extracted

Table 4 also highlights the reliability test results from Cronbach alpha and composite reliability [21]. The reliability test determines the stability and consistency of the measuring instrument used to provide relatively consistent results when measurements are repeated. The agreed value is more than 0.6, indicating reliable data [21].

Table 4. Reliability and discriminant validity test results

Construct	Cronbach's alpha	Composite reliability	FC	ITA	PE	SI	T
Facilitating Conditions	0.849	0.855	0.829				
Intention to Adopt	0.877	0.881	0.608	0.855			
Performance Expectancy	0.893	0.894	0.534	0.521	0.907		
Social Influence	0.634	0.651	0.577	0.482	0.504	0.748	
Trust	0.819	0.826	0.574	0.620	0.622	0.555	0.858

Note: FC = Facilitating Condition; ITU = Intention to Adopt; PE = Performance Expectancy; SI = Social Influence; T = Trust.

3.2 Structural model assessment

Table 5 presents the results of the structural model test to show the relationship between variables. According to [21], checking the results of multicollinearity, relationships between variables, and predictive power such as R^2 is necessary to get an excellent structural model. First, the results of multicollinearity can be seen from the variance inflation factor (VIF) [21]. Before hypothesis testing, the VIF test results confirmed no multicollinearity issue between constructs because the VIF value was less than 3. Furthermore, the Adjusted R^2 of the research model is at a moderate level, which shows the ability of exogenous variables to explain endogenous variables by 48.7%. Other variables outside the model explain the rest [23]. In addition, the results of the model fit test are presented, where the model can be said to be fit because the standardized root mean square residual (SRMR) value is carried 0.10 [24]. Table 5 also presents the relationship between constructs. It is found that facilitating conditions and trust can increase the intention to

adopt BT in LGs' AIS. At the same time, the variables of performance expectancy and social influence do not have a significant relationship.

Table 5. Hypothesis testing results

Association	Coefficient	T statistics	P values	VIF	Conclusions
FC → ITA	0.327	4.746	0.000	1.819	Significant
PE → ITA	0.111	1.530	0.063	1.811	Insignificant
SI → ITA	0.051	0.711	0.239	1.730	Insignificant
T → ITA	0.335	4.445	0.000	1.999	Significant
Adjusted R ² = 0.487; SRMR = 0.079					

Note: FC = Facilitating Condition; ITA = Intention to Adopt; PE = Performance Expectancy; SI = Social Influence; T = Trust.

3.3 Robustness check

Another way to assess the predictive accuracy of the PLS path model is to calculate the Q² value [21]. As a guideline, the Q² value should be more excellent than zero for a particular endogenous construct to indicate the prediction accuracy of the structural model for that construct. The model is more accurate when the Q² value is close to 1 [25]. The RMSE and MAE values of PLS-SEM, which are lower than those of linear regression models, also indicate superior predictive power. Table 6 presents additional tests to measure Q² and PLSpredict. Of the two rules, this study fulfils the condition that the Q² value is more than zero and close to 1. In contrast, the PLSpredict value of the RMSE and MAE values of PLS-SEM have strong predictive power.

Table 6. PLS predict test result

	Q ² predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
ITU1	0.248	0.320	0.138*	0.327	0.137
ITU2	0.358	0.305	0.125*	0.305	0.122
ITU3	0.354	0.307	0.130	0.319	0.132
ITU4	0.366	0.294	0.124	0.301	0.124

Note: *PLS-SEM > LM

In addition, the results of Confirmatory Tetrad Analysis (CTA) are recommended to empirically validate the measurement model specifications, both reflective and formative. In this study, the test results offered empirical support for the reflective mode of the construct measurement model [21]. Furthermore, the CTA results showed that the zero was included in the confidence intervals. Finally, Sarstedt, Ringle [26] recommended that research consider nonlinear effects and endogeneity related to structural models.

The nonlinearity test was conducted using the quadratic analysis method. The results showed that all exogenous variables had insignificant p-values. The results can be seen in Table 7, so it can be concluded that the relationship between exogenous and endogenous variables is linear, and the model can be considered strong [21].

Table 7. Nonlinear assessment

Association	Coefficient	SD	T values	P values
QE (PE) → ITA	0.019	0.031	0.611	0.271
QE (SI) → ITA	0.004	0.029	0.147	0.441
QE (FC) → ITA	-0.017	0.026	0.674	0.250
QE (T) → ITA	0.021	0.029	0.728	0.233

Note: FC = Facilitating Condition; ITA = Intention to Adopt; PE = Performance Expectancy; SI = Social Influence; T = Trust.

3.4 Discussion

This study confirms that facilitating conditions and trust enhance employees' intention to adopt BT in AIS in Indonesian LGs. As such, this study partially accepts the UTAUT perspective. In detail, facilitating conditions such as resource availability, technical infrastructure, regulatory support, industry standards, knowledge, awareness, and strategic alignment collectively enhance the intention to adopt BT in AIS. These conditions reduce barriers, mitigate risks, and support organizations to embrace BT as a transformative tool for improving their AIS capabilities. This finding is in line with Patil and Undale [27], Chu, Chao [28], and Wang, Ozden [29], who found that facilitating conditions are a pivotal factor for new technology adoption.

In addition, trust in BT is pivotal in enhancing the intention to adopt it in AIS. The immutable ledger, enhanced data security, automation through smart contracts, interoperability with existing systems, decentralized governance, and cost efficiency contribute to building trust among stakeholders. As organizations recognize the benefits of BT in improving transparency, security, efficiency, and compliance in AIS, they are more inclined to adopt BT as a foundational tool for transforming financial management and reporting processes. This finding supports Yermack [30], Wong, Tan [31], and Afifa, Van [32], who found that trust is a pivotal factor in the adoption of new technology.

From the above findings, several important implications can be outlined. *First*, LGs should allocate sufficient financial resources and invest in upgrading technical infrastructure to support BT adoption in AIS. This includes funding for BT pilot projects, training programs for staff, and upgrading IT systems to ensure compatibility with BT. *Second*, policymakers and regulatory bodies should develop guidelines and frameworks supporting BT implementation in LGs' AIS. This includes addressing legal concerns, ensuring compliance with data protection regulations, and providing incentives for early adopters to mitigate risks associated with regulatory uncertainty. *Third*, LGs should prioritize capacity-building initiatives to enhance knowledge and awareness about BT among critical stakeholders, including government officials, IT personnel, auditors, and citizens. Workshops, seminars, and collaboration with academia and industry experts can facilitate understanding and foster a supportive environment for BT adoption in AIS. *Fourth*, collaboration between LGs, technology providers, research institutions, and industry associations can facilitate knowledge exchange and best practice sharing in BT adoption for AIS. Partnerships can help LGs leverage expertise, share resources, and co-develop solutions that meet specific AIS requirements and local regulatory contexts. *Fifth*, the LGs should prioritize pilot projects and case studies demonstrating successful use cases of BT in AIS. These initiatives are tangible examples of how BT improves transparency, efficiency, and accountability in government operations, building trust and confidence among decision-makers and stakeholders. *Sixth*, LGs should engage stakeholders, including citizens, businesses, and community organizations, in the adoption process of BT in AIS. Transparent communication about the benefits, risks, and implications of BT adoption

fosters trust and promotes broader acceptance and support for initiatives. Finally, LGs should establish mechanisms for evaluating the impact and effectiveness of BT adoption in AIS. Continuous monitoring and feedback loops allow for adjustments and improvements based on real-world outcomes, ensuring that BT initiatives align with organizational goals and deliver expected benefits over time.

4 Conclusion

This study aims to test Indonesian LGs' intention to adopt BT in AIS from a UTAUT perspective. According to the results of the PLS analysis, LG employees' intention to adopt BT in AIS is determined by facilitating conditions and trust. This insight makes ensuring adequate infrastructure and superstructure establishment crucial before launching BT adoption. Furthermore, BT and its benefits must be promoted to increase employee trust. These two factors will help Indonesian LGs ensure the successful adoption of BT in AIS.

This study has limitation, namely that it only included one city and four regencies from the Yogyakarta particular region province, namely Yogyakarta city, Bantul, Sleman, Gunung Kidul, and Kulon Progo regencies. As a result, the study's external validity is insufficient, particularly in representing Indonesia as a whole. Hence, additional research in other regions is required to expand upon the findings of this study.

References

1. Yu T, Lin Z, Tang Q. Blockchain: The introduction and its application in financial accounting. *Journal of Corporate Accounting & Finance*. **29(4)**, 37-47 (2018). <https://doi.org/10.1002/jcaf.22365>
2. Kwilinski A. Implementation of blockchain technology in accounting sphere. *Academy of Accounting and Financial Studies Journal*. **23**, 1-6 (2019).
3. Zhang Y, Pourroostaei Ardakani S, Han W. Smart ledger: The blockchain-based accounting information recording protocol. *Journal of Corporate Accounting & Finance*. **32(4)**, 147-57 (2021). <https://doi.org/10.1002/jcaf.22515>
4. ALSaqa ZH, Hussein AI, Mahmood SM. The impact of blockchain on accounting information systems. *Journal of Information Technology Management*. **11(3)**, 62-80 (2019).
5. Liu M, Robin A, Wu K, Xu J. Blockchain's impact on accounting and auditing: a use case on supply chain traceability. *Journal of Emerging Technologies in Accounting*. **19(2)**, 105-19 (2022). <https://doi.org/10.2308/JETA-2021-002>
6. Falwadiya H, Dhingra S. Blockchain technology adoption in government organizations: a systematic literature review. *Journal of Global Operations and Strategic Sourcing*. **15(3)**, 473-501 (2022). <https://doi.org/10.1108/JGOSS-09-2021-0079>
7. Fang B, Liu X, Ma C, Zhuo Y. Blockchain technology adoption and accounting information quality. *Accounting & Finance*. **63(4)**, 4125-56 (2023). <https://doi.org/10.1111/acfi.13088>
8. Verma S, Sheel A. Blockchain for government organizations: Past, present and future. *Journal of Global Operations and Strategic Sourcing*. **15(3)**, 406-30 (2022). <https://doi.org/10.1108/JGOSS-08-2021-0063>
9. Venkatesh V, Morris MG, Davis GB, Davis FD. User acceptance of information technology: Toward a unified view. *MIS quarterly*. 425-78 (2003). <https://doi.org/10.2307/30036540>

10. Singh N, Sinha N. How perceived trust mediates merchant's intention to use a mobile wallet technology. *Journal of retailing and consumer services*. **52**, 101894 (2020). <https://doi.org/10.1016/j.jretconser.2019.101894>
11. Chan WM, Lee JWC. 5G connected autonomous vehicle acceptance: The mediating effect of trust in the technology acceptance model. *Asian Journal of Business Research*. **11(1)**, 40-60 (2021). <https://doi.org/10.14707/ajbr.210098>
12. Shrestha AK, Vassileva J, Joshi S, Just J. Augmenting the technology acceptance model with trust model for the initial adoption of a blockchain-based system. *PeerJ Computer Science*. **7**, e502 (2021). <https://doi.org/10.7717/peerj-cs.502>
13. Podsakoff PM, MacKenzie SB. Impact of organizational citizenship behavior on organizational performance: A review and suggestions for future research. *Organizational Citizenship Behavior and Contextual Performance*. 133-51 (2014). https://doi.org/10.1207/s15327043hup1002_5
14. Blumberg B, Cooper D, Schindler P. EBOOK: Business research methods: McGraw Hill; 2014.
15. Afifa MMA, Van HV, Van TLH. Blockchain adoption in accounting by an extended UTAUT model: empirical evidence from an emerging economy. *Journal of Financial Reporting and Accounting*. (2022).
16. Mukherjee S, Baral MM, Lavanya BL, Nagariya R, Singh Patel B, Chittipaka V. Intentions to adopt the blockchain: investigation of the retail supply chain. *Management Decision*. **61(5)**, 1320-51 (2023). <https://doi.org/10.1108/MD-03-2022-0369>
17. Ferri L, Spanò R, Ginesti G, Theodosopoulos G. Ascertaining auditors' intentions to use blockchain technology: evidence from the Big 4 accountancy firms in Italy. *Meditari Accountancy Research*. **29(5)**, 1063-87 (2021). <https://doi.org/10.1108/MEDAR-03-2020-0829>
18. Davis FD. User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International journal of man-machine studies*. **38(3)**, 475-87 (1993). <https://doi.org/10.1006/imms.1993.1022>
19. Srivastava S, Mohta A, Shunmugasundaram V. Adoption of digital payment FinTech service by Gen Y and Gen Z users: evidence from India. *Digital Policy, Regulation and Governance*. **26(1)**, 95-117 (2024). <https://doi.org/10.1108/DPRG-07-2023-0110>
20. Sofyani H, Darma ES. Effect of architecture and efficiency of mobile banking application on the intention to continue using Islamic bank: does data security matter? *Journal of Islamic Marketing*. **15(6)**, 1479-97 (2024). <https://doi.org/10.1108/JIMA-07-2023-0220>
21. Hair JF, Risher JJ, Sarstedt M, Ringle CM. When to use and how to report the results of PLS-SEM. *European business review*. **31(1)**, 2-24 (2019). <https://doi.org/10.1108/EBR-11-2018-0203>
22. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*. **18(1)**, 39-50 (1981). <https://doi.org/10.1177/002224378101800104>
23. Sekaran U. *Research methods for business: A skill building approach*. John Wiley & Sons; 2016.
24. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*. **43**, 115-35 (2015). <https://doi.org/10.1007/s11747-014-0403-8>
25. Chin WW. *The partial least squares approach to structural equation modeling*. Modern methods for business research/Lawrence Erlbaum Associates. (1998).

26. Sarstedt M, Ringle CM, Cheah J-H, Ting H, Moisescu OI, Radomir L. Structural model robustness checks in PLS-SEM. *Tourism Economics*. **26(4)**, 531-54 (2020). <https://doi.org/10.1177/1354816618823921>
27. Patil H, Undale S. Willingness of university students to continue using e-Learning platforms after compelled adoption of technology: Test of an extended UTAUT model. *Education and Information Technologies*. **28(11)**, 14943-65 (2023). <https://doi.org/10.1007/s10639-023-11778-6>
28. Chu T-H, Chao C-M, Liu H-H, Chen D-F. Developing an extended theory of UTAUT 2 model to explore factors influencing Taiwanese consumer adoption of intelligent elevators. *Sage Open*. **12(4)**, 21582440221142209 (2022). <https://doi.org/10.1177/21582440221142209>
29. Wang D, Ozden M, Tsang YP. The impact of facilitating conditions on electric vehicle adoption intention in China: An integrated unified theory of acceptance and use of technology model. *International Journal of Engineering Business Management*. **15**, 18479790231224715 (2023). <https://doi.org/10.1177/18479790231224715>
30. Yermack D. Corporate governance and blockchains. *Review of finance*. **21(1)**, 7-31 (2017). <https://doi.org/10.1093/rof/rfw074>
31. Wong L-W, Tan GW-H, Lee V-H, Ooi K-B, Sohal A. Unearthing the determinants of Blockchain adoption in supply chain management. *International Journal of Production Research*. **58(7)**, 2100-23 (2020). <https://doi.org/10.1080/00207543.2020.1730463>
32. Afifa MMA, Van HV, Van TLH. Blockchain adoption in accounting by an extended UTAUT model: empirical evidence from an emerging economy. *Journal of Financial Reporting and Accounting*. **21(1)**, 5-44 (2022). <https://doi.org/10.1108/JFRA-12-2021-0434>