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Factors Influencing the Diffusion of Blockchain Technology in the Indonesian Goverment

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Abstract

Background: Blockchain can improve the security and efficiency of government information systems. However, the adoption of this technology in Indonesia is still limited, especially in the government sector. Previous studies have emphasized the importance of regulatory and legal aspects in blockchain implementation. This condition is a challenge and an opportunity to examine the factors that influence the diffusion of blockchain innovation in the Indonesian government.
Objective: This study aims to identify and analyze the factors that influence the diffusion of blockchain technology in the Indonesian government through hypothesis testing and conceptual model development, as well as to determine the current stage of blockchain technology diffusion in the Indonesian government.
Methods: This study uses data from a questionnaire survey of 24 government agencies in Indonesia, representing various levels of central, provincial, district, and city, and focusing on the technology sector. A total of 192 responses were successfully collected. The collected data were analyzed using SmartPLS software to test the validity and reliability of the instrument, research hypothesis, and proposed conceptual model, and the results of the hypothesis test were used to determine the current stage of blockchain technology diffusion in the Indonesian government.
Results: The study's results indicate that the research instruments used are valid and reliable and meet the requirements for use in this study. Of the eight hypotheses proposed, three were accepted, and five were rejected. The tested conceptual model showed good agreement with the empirical data.
Conclusion: This study concludes that relative advantage and stakeholder roles are key factors significantly influencing the Indonesian government's intention to adopt blockchain technology. In contrast, complexity, regulation, top management support, and competence do not significantly influence adoption intentions. The diffusion of blockchain technology in the Indonesian government is still in the knowledge stage, so the decision to adopt it has not been reached. The implication is that the government needs to prioritize blockchain advantages and actively involve stakeholders, such as experts and developers, in efforts to adopt this technology.

Keywords: Diffusion of Innovation, Blockchain, Information Systems, E-Government, Information Technology Management

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I. INTRODUCTION

Blockchain technology has promising application prospects in various fields [1] because it provides several advantages to information systems: decentralization for higher security, transparency, Audibility, resilience, scalability, and better data privacy [2]. Blockchain technology also allows widespread adaptation and development due to the modern or cloud computing model, where services and resources, including computing, storage, databases, and networks, are provided via the Internet so that users can access blockchain services from any device with an internet connection [3].

The application of blockchain technology is proven to provide benefits, security and efficiency, such as blockchain-based smart home systems as a solution to the limitations of traditional network authentication based on a single server [4], increasing transparency and accountability of the halal food supply chain in the livestock industry tracking process, making it difficult to falsify information due to record keeping. Data cannot be permanently changed in the blockchain network [5]. Blockchain technology also provides benefits for organizations in the form of improving collaboration, governance, decision making, gaining competitive advantage and increasing competitiveness [6],

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including the potential to revolutionize various areas of e-government such as identity and access management, procurement of goods and services, asset recording, taxation, distribution of social assistance, health services and general elections [7], [8].

In the context of the spread of blockchain technology in Indonesia, it can be found in several previous studies, such as developing a blockchain-based data storage model to improve the performance of government organizations [9], building a blockchain-based traceability system model to support the halal supply chain ecosystem [10], and analyzing the level of intention to use blockchain currency due to the increasing popularity of blockchain technology and its potential for various applications [11].

Some studies examine factors and models for the deployment of blockchain technology related to government institutions related to public services [12], [13], [14], maximizing government performance [15], state sovereignty [16], supply chain security regulations [17], government-supported blockchain distribution systems [18], partners' perspectives on government regulatory blockchain frameworks and models [19], [20], internal and external factors [21] and cooperation [22].

Diffusion aims to understand the spread of new ideas or technology through various media to groups of people and organizations or regions [23] so that it can be widely applied [24] by determining the barriers and drivers of blockchain technology, analyzing these factors over time of diffusion, and measuring the level of diffusion of blockchain technology in a community group or region [25], resulting in a comprehensive understanding and acceptance model regarding the diffusion and adoption of blockchain technology services [26].

There are several weaknesses in previous research related to the diffusion of blockchain technology in Indonesia, such as having to consider regulatory and compliance aspects in implementing blockchain in government as one of the diffusion factors [27], investigating moderating variables related to the diffusion of blockchain technology [28], and the need for in-depth research and discussion about legal aspects as one of the factors in the diffusion of blockchain technology through the Indonesian government [29].

However, until now, the formal implementation of blockchain technology in government administration in Indonesia has not been widely realized. This condition presents both challenges and opportunities. On the one hand, the absence of concrete implementation opens up space for this study to provide constructive input for the government regarding factors that can potentially influence the diffusion of blockchain innovation in Indonesia. On the other hand, this condition requires an in-depth and comprehensive study of the factors that can facilitate the adoption of blockchain technology effectively and efficiently in the context of the Indonesian government. This study aims to analyze the factors that influence the diffusion of blockchain technology in the Indonesian government and provide an understanding of the stages of blockchain technology diffusion in the current Indonesian government.

II. Literature Review

A. Government Information System

The author will do a major proofread through Jisebi services to improve the quality of writing and readability. Components that interact with each other to achieve specific goals [30] consist of hardware, software, data, processes, and humans, as well as organizations [31] that are useful for users [32]. Government e-government provides potential benefits for organizations, businesses, and citizens, such as cost savings, improved communication and coordination between organizations, expanded citizen participation and increased government accountability [33] through digital governance and public services [34]. E-government is also part of a smart city [35] covering various criteria such as public services, education, environment, health, housing, social, economic, cultural, sports, traffic, finance, democracy, population, and licensing [36] to produce a basis and control of policies for public welfare [37].

B. Blockchain Technology In Government

Blockchain technology has the desired features of decentralization, autonomy, integrity, immutability, verifiability, fault tolerance, anonymity, auditability and transparency [38]. The types of blockchain systems and data structures use distributed ledger technology to maintain consensus status [39]. Blockchain is divided into three categories: public, consortium, and private [30]. Distributed ledger is a framework for building and running blockchain applications [31]. Public sector reform is also influenced by the trend of blockchain technology in e-government to provide more transparent public digital information management solutions [7]. Security and privacy are enhanced with encryption and data distribution across blockchain-based peer-to-peer (P2P) networks e-Government in the Government to Citizen (G2C), Government to Government (G2G) and Government to Business (G2B) schemes [42].

C. Diffusion of Innovation

Diffusion of Innovation is a process where an innovation, idea or new technology is communicated through specific channels over time among members of a social system to influence the decision to adopt the innovation through identifiable factors such as relative advantage, compatibility, complexity, trialability and observability by interactions between individuals and environmental factors [33], providing an understanding of the process that is passed from initial knowledge about an innovation, the formation of attitudes towards the innovation, the decision to adopt or reject, to the decision to implement the new idea and confirmation of the innovation-decision by the decision maker (individual, group or organization) [34].

D. Development of Proposed Hypotheses and Conceptual Models

This study uses the diffusion of innovation (DOI) theory as the primary model to understand the important factors related to the diffusion of blockchain technology in Indonesia's Government. However, the Indonesian Government has not used blockchain technology, and there are no blockchain technology developers who provide blockchain applications or systems to be tested, so Trialability and Observability cannot be used as the factors for the diffusion of blockchain technology in this study. The research model is modified based on research [35] blockchain adoption factors in using the DOI context only use Relative Advantage (RA) and Complexity (CPX), Organizational Context uses Top Management Support (TMS) and Competency (CMP), Other Environmental Context uses Competitive Pressure which influences Intention to Adopt (IA) and Adoption. Based on research [36], Other Environmental contexts influence e-government transformation with Stakeholders' Pressure, Laws and Regulations, and Directives factors, so researchers modify Other Environmental Contexts by adding Stakeholders (SH) and Laws and Regulations (LR) factors as the model proposed in this study. Figure 1 shows the conceptual model in the current study.

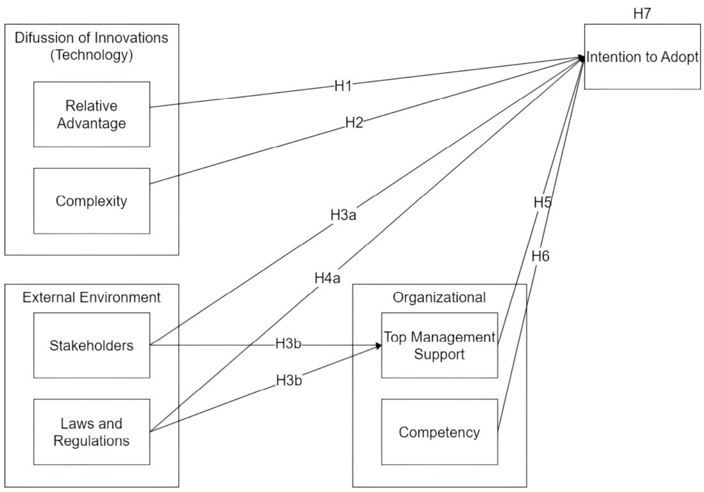

Fig. 1 Conceptual Model

1) Relative Advantage (RA)

The greater the perceived benefits of an innovation compared to the old method, the faster the innovation will be adopted [30]. Blockchain technology offers various advantages for its users and is a promising solution, especially for developed countries [31]. It is believed that the advantages and benefits of blockchain will increase interest in adopting this technology and ultimately encourage widespread adoption [32]. Consequently, the hypotheses are formulated:

H1: Relative Advantage (RA) has a positive influence on Intention to Adopt (IA)

2) Complexity (CPX)

Innovations that are easy to understand and use tend to be adopted more quickly than innovations that require new understanding and skills [30]. New technologies require new skills, making it difficult for people to understand how they work and the benefits they offer, generally stemming from the complexity of the technology's technical or conceptual structure [32] Large organizations are reluctant to adopt blockchain technology due to the complexity of the large-scale digital transformation required, including migration from traditional centralized to decentralized systems [31]. Consequently, the hypotheses are formulated:

H2: Complexity (CPX) has a positive influence on Intention to Adopt (IA)

3) Stakeholders (SH)

Non-governmental software developers and providers play an important role in influencing government e-service implementation decisions [33]. Blockchain innovators, consisting of blockchain technology experts, consultants and developers, play an important role as stakeholders and partners of governments and businesses in driving blockchain development in various countries [35]. Experts are key stakeholders in formulating and implementing blockchain technology in government environments [34]. Consequently, the hypotheses are formulated:

H3a: Stakeholders (SH) has a positive influence on Intention to Adopt (IA)

H3b: Stakeholders (SH) has a positive influence on Top Management Support (TMS)

4) Laws and Regulations (LR)

Laws and regulations become the basis and reference for stakeholders and organizations in implementing electronic services [33]. Regulations, norms and institutional rules significantly influence individuals or organizations' adoption or rejection of innovations [35]. Legislative and executive support can encourage the creation of a comprehensive blockchain ecosystem, including legal frameworks, private capital, and entrepreneurial participation in the development of blockchain infrastructure for implementing blockchain technology [34]. Consequently, the hypotheses are formulated:

H4a: Laws and Regulations (LR) has a positive influence on Intention to Adopt (IA)

H4b: Laws and Regulations (LR) has a positive influence on Top Management Support (TMS)

5) Top Management Support (TMS)

Top management has full rights and responsibilities and is tasked with determining organizational goals, strategies and policies to achieve beneficial goals [36]. As leaders in the context of innovation, top management plays an important role as innovators or main agents in introducing and adopting innovations in organizations [30]. Organizations need top management support for innovation implementation related to resource allocation and service integration [32]. Consequently, the hypotheses are formulated:

H5: Top Management Support (TMS) has a positive influence on Intention to Adopt (IA)

6) Competency (CMP)

Competency is a combination of knowledge, skills and abilities individuals possess to demonstrate their professionalism in certain organizational fields [36]. One factor in an organization's readiness to adopt blockchain technology is having competent employees in this field [31]. An organization's level of competence and knowledge about blockchain can influence its intention to adopt the technology [32]. Consequently, the hypotheses are formulated:

H6: Competency (CMP) has a positive influence on Intention to Adopt (IA)

7) Intention to Adopt (IA)

Intention, an individual's tendency to behave in a certain way, is influenced by attitudes, norms, behavioural control, and important predictors of expected behaviour [37]. The more users switch and adapt to new technology, the higher the individual's intention to use the technology [38]. The high intention to adopt new technology in an organization strongly correlates with its successful implementation [32].

III. METHODS

A. Data Collection

The study took place from January to March 2024, involving the distribution of questionnaires both online Google Form and offline using paper to respondents in the central government, namely the Office of the Presidential Staff of the Republic of Indonesia, the Ministry of Politics, Law and Human Rights of the Republic of Indonesia, the Ministry of Home Affairs of the Republic of Indonesia, the Ministry of Communication and Information of the Republic of Indonesia, the Ministry of Defense of the Republic of Indonesia, the National Cyber and Crypto Agency of the Republic of Indonesia, the distribution of questionnaires also to government respondents at the provincial level, namely the Communication and Information Office of DKI Jakarta, DI Yogyakarta, Central Java, East Java, West Java, North Sumatra, Central Kalimantan, East Nusa Tenggara, Papua, as well as the distribution of questionnaires to government respondents at the city and district levels, namely the Communication and Information Office of Surabaya, Yogyakarta, Solo, Sleman, Kupang, Bandung, Bogor, Makasar, Ambon.

All respondents have been permitted to participate in this study after being informed of all relevant aspects necessary for their decision to participate. The relevant institution appointed the respondents to fill out the questionnaires directly. They were tasked with and knowledgeable in information and communication technology, electronic data processing, and IT staff. The sample size refers to [37] as representative of the research population based on the number of variables. It is determined using a ratio of 20:1 so that with 7 variables, the recommended sample size is 140. At the end of March 2024, feedback from the questionnaire was Government institutions at the central level, namely the Office of the Presidential Staff of the Republic of Indonesia, the National Cyber and Crypto Agency of the Republic of Indonesia, while government institutions at the provincial level are the Communication and Information Services of DKI Jakarta, West Java, Central Java, DI Yogyakarta, East Nusa Tenggara, and government institutions at the city and district levels are the Communication and Information Services of Yogyakarta, Sleman, Solo, Surabaya, Kupang.

B. Instrument Development

The research uses quantitative methods and survey techniques to collect primary data through questionnaires with Likert scale answers of 1 to 5 (strongly disagree, disagree, neutral, agree, strongly agree) [30]. Table 1 shows the context, variables, indicators, and references of the research instruments.

TABLE 1
RESEARCH INSTRUMENT

Context	Initials		Questions	Source
Diffusion of Innovation	RA	RA1	The use of blockchain improves the quality of decision-making	[32]
		RA2	Blockchain makes organizations more flexible	
		RA3	Blockchain improves public services and government relations with citizens	
		RA4	Blockchain increases the productivity of government employees	
	CPX	CPX1	The concept of blockchain is difficult to understand in a business context	[32]
		CPX2	Implementation of blockchain technology is complex	
Organizational	TMS	TMS1	Top management is very concerned about protecting sensitive data	[32]
		TMS2	Top management understands the benefits of blockchain in protecting sensitive data	
	CMP	CMP1	Level of understanding of blockchain technology	[32]
		CMP2	Frequently use or work with blockchain technology	
External Environment	SH	SH1	Blockchain developers have personal motivations to develop this technology	[25]
		SH2	Entrepreneurs see great business potential in blockchain	
		SH3	Cost efficiency is the main reason for blockchain adoption	
		SH4	Blockchain helps reduce corruption and protect sensitive data in developing countries	
	LR	LR1	Public pressure drives attention to data protection	[25]
		LR2	Government regulations support the implementation of blockchain technology	
	IA	IA1	Adopting blockchain is the right decision	[32]
		IA2	The government has done quite a lot of research on data security in blockchain	

IV. RESULTS

After distributing the questionnaire offline and online, the researchers collected 192 responses from 12 government institutions at the central, provincial, city, and district levels. Table 2 displays the profile of respondents based on gender, status, field of work, and job duties, and Table 3 displays the profile of government institutions.

TABLE 2
RESPONDENT PROFILE

Information		Frequency	Percentage
Gender	Man	119	62%
	Woman	73	38%
		192	100%
Status	Government employees	129	67,2%
	Non Government employees	63	32,8%
		192	100%
Field of Work	IT Staff	126	65,6%
	Non IT Staff	66	34,4%
		192	100%
Work Assignments	Electronic Data Officer	146	76%
	Non Electronic Data Officer	46	24%
		192	100%

TABLE 3
PROFILE OF GOVERNMENT INSTITUTIONS

Institutions	Frequency	Percentage
National Cyber and Crypto Agency of the Republic of Indonesia	2	1,1%
Staff Office of the President of the Republic of Indonesia	6	3,1%
East Nusa Tenggara Province Communication and Information Department	25	13,0%
Central Java Province Communication and Information Department	18	9,4%
Yogyakarta Special Region Province Communication and Information Department	4	2,1%
Special Capital Region of Jakarta Province Communication and Information Technology Department	34	17,7%
West Java Province Communication and Information Department	4	2,1%
Yogyakarta City Communication and Information Department	15	7,8%
Surakarta City Communication and Information Department	26	13,5%
Surabaya City Communication and Information Department	21	10,9%
Kupang City Communication and Information Department	24	12,5%
Sleman Regency Communication and Information Department	13	6,8%
	192	100%

A. Model Validity and Reliability Test (Outer Model)

Validity and reliability testing use SmartPLS software to ensure the quality and reliability of research data, resulting in strong and credible conclusions [31], [32], respectively shown in Tables 4 and 5. Validity tests include convergent validity with loading factor values ranging from 0.764 to 0.966, which indicates a value exceeding the threshold of 0.70; the AVE value ranges from 0.689 to 0.924, which indicates a value exceeding the threshold of 0.50.

Reliability tests include Cronbach's alpha, with values ranging from 0.584 to 0.918, which indicates values less than the threshold and exceeding the limit of 0.70, and composite reliability values ranging from 0.824 to 0.961, which indicates values exceeding the threshold of 0.70.

TABLE 4
OUTER MODEL

Construct	Items	Loading	Cronbach's Alpha	Composite Reliability	AVE
RA	RA1	0.872	0.910	0.937	0.788
	RA2	0.914			
	RA3	0.889			
	RA4	0.875			
CPX	CPX1	0.915	0.740	0.884	0.792
	CPX2	0.864			
SH	SH1	0.847	0.849	0.899	0.689
	SH2	0.878			
	SH3	0.820			
	SH4	0.772			
LR	LR1	0.764	0.609	0.829	0.710
	LR2	0.914			
TMS	TMS1	0.778	0.584	0.824	0.702
	TMS2	0.893			
CMP	CMP1	0.956	0.918	0.960	0.924
	CMP2	0.966			
IA	IA1	0.962	0.918	0.961	0.924
	IA2	0.960			

TABLE 5
THE DISCRIMINANT VALIDITY CHECK

	CMP	CPX	IA	LR	RA	SH	TMS
CMP	0.961						
CPX	0.021	0.890					
IA	0.303	0.326	0.961				
LR	0.252	0.475	0.653	0.843			
RA	0.272	0.331	0.726	0.582	0.888		
SH	0.437	0.428	0.806	0.728	0.699	0.830	
TMS	0.569	0.227	0.417	0.331	0.452	0.544	0.838

B. Test-Path, Hypothesis and Model (Inner Model)

Testing uses SmartPLS software which aims to test the hypotheses built and the conceptual model proposed in the research, explaining the causal relationship between variables [31], [32], respectively shown in Tables 6 and 7. Model testing includes R square with values of 0.305 and 0.711, F square with values ranging from 0.002 to 0.332, and goodness of fit with an SMR value of 0.090. Hypothesis testing includes direct effects with P values ranging from 0.000 to 0.540 and indirect effects with P values of 0.551 and 0.636.

TABLE 6
MODEL TESTING

Construct			R Square		F Square		Godness of Fit	
			Value	Description	Value	Description	SMR	Description
RA	RA → IA				0.161	Medium Effect		
CPX	CPX → IA				0.010	Small Effect		
SH	SH → IA				0.332	Medium Effect		
	SH → TMS				0.281	Medium Effect		
LR	LR → IA				0.016	Small Effect	0.090	Model Fit
	LR → TMS				0.013	Small Effect		
TMS	TMS → IA	Independent → Intervening	0.305	Weak Model	0.002	Small Effect		
CMP	CMP → IA				0.003	Small Effect		
IA		Independent → Dependent	0.711	Medium Model				

TABLE 7
HYPOTHESIS TESTING

Construct		Direct Effect		Indirect Effect	
		P Values	Description	P Values	Description
RA	RA → IA	0.000	Significant Effects		
CPX	CPX → IA	0.201	No Significant Effect		
SH	SH → IA	0.000	Significant Effects		
	SH → TMS	0.000	Significant Effects		
	SH → TMS → IA			0.551	Not Mediating
LR	LR → IA	0.124	No Significant Effect		
	LR → TMS	0.147	No Significant Effect		
	LR → TMS → IA			0.636	Not Mediating
TMS	TMS → IA	0.540	No Significant Effect		
CMP	CMP → IA	0.444	No Significant Effect		
IA					

C. Stages of Blockchain Technology Diffusion in the Indonesian Government

Based on the results of testing the direct effect hypothesis on the intention to adopt is dominated by 7 constructs with "no significant effect", while those with "significant effects" are in 3 constructs, and for the indirect effect on the intention to adopt, each construct is "not mediating", as shown in Table 6. Furthermore, the R-squared description model test results show a "weak model" for TMS → IA and a "medium model" for IA. For the F square description it is dominated by 5 constructs with "small effects", while those with "medium effects" are in 3 constructs, as shown in Table 7 because this can provide insight into Communication Channels and provide stages of blockchain technology diffusion in the Indonesian government as shown in Figures 2 and 3.

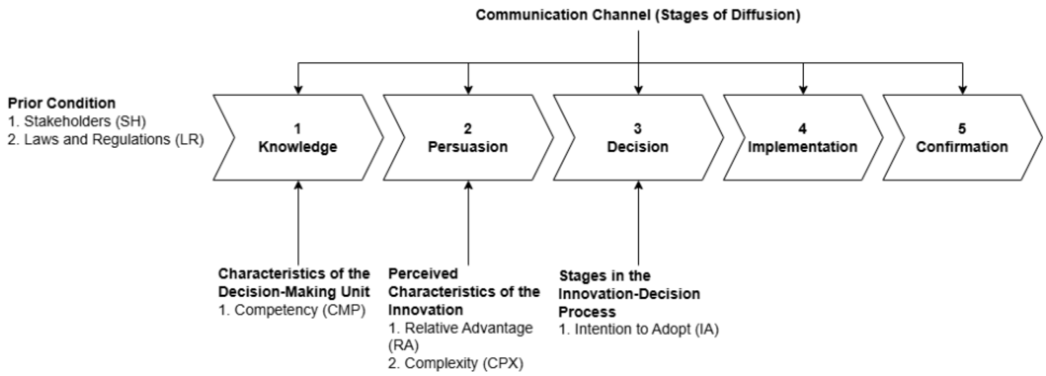

Fig. 2 Communication Channel

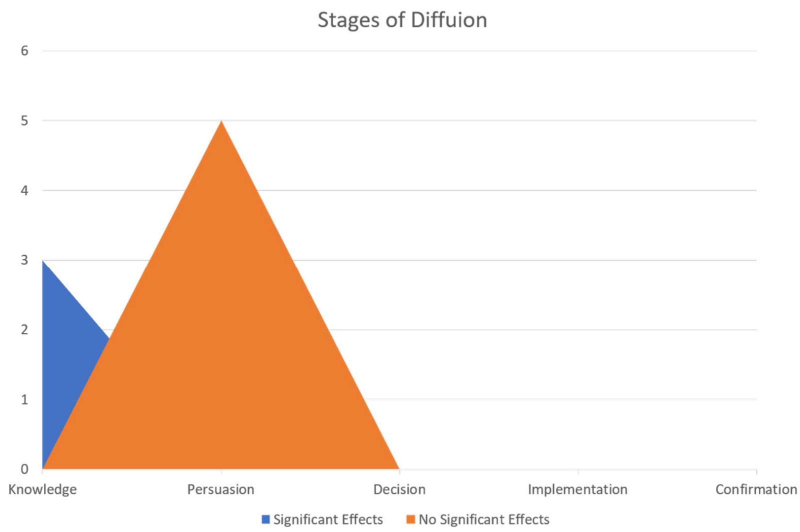

Fig. 2 Stages of Diffusion

V. DISCUSSION

A. *Test Results*

The results of the validity and reliability testing of the research instrument indicate that the questionnaire used has good quality and meets the standards. Table 5 shows that each indicator measures the intended concept or construct significantly, with a factor loading value above 0.70 and an Average Variance Extracted (AVE) above 0.50. These results indicate good convergent validity. In addition, the Cronbach's alpha and Composite Reliability (CR) values for each construct are also above 0.70, indicating adequate reliability. Table 6 shows good discriminant validity, where the correlation between constructs is lower than the AVE value of each construct. Thus, it can be concluded that this research instrument is valid and reliable for measuring constructs relevant to this study.

The results of the inner model test in Table 7 show that the proposed conceptual model has moderate explanatory power. These results can be seen from the R-square value for the Intention to Adopt (IA) construct of 0.711, which means that the model can explain 71.1% of the variation in adoption intention. Meanwhile, the R-square value for the Top Management Support (TMS) construct is 0.305, indicating that the model explains 30.5% of the variation in top management support. The F Square value shows that most constructs have little influence on other constructs, ranging from 0.002 to 0.332. However, the influence of Stakeholders (SH) on IA and TMS is moderate, with values of 0.332 and 0.281, respectively. The Goodness of Fit value with an SMR of 0.090 indicates that the model fits well with the empirical data.

Hypothesis testing shown in Table 8 yields the following findings: H1, which states that Relative Advantage (RA) has a positive and significant effect on IA (p=0.000), so this hypothesis is accepted and supports the innovation diffusion theory, which states that the greater the perceived benefits of innovation, the faster the innovation is adopted, in this context, a strong perception of blockchain's superiority over other technologies drives blockchain adoption intentions in government [30], [31], [32]. H3a and H3b state that Stakeholder (SH) has a positive and significant effect on IA (p=0.000) and TMS (p=0.000), so this hypothesis is accepted and supported by data that the role of stakeholders, such as experts, consultants, and blockchain developers is significant in driving adoption intentions and influencing top management support for blockchain adoption in government [33], [34], [35]. However, H2, H4a, H4b, H5, and H6 hypotheses are not accepted. Complexity (CPX) has no significant effect on IA (p=0.201), as well as Legislation (LR) on IA (p=0.124) and TMS (p=0.147). Top Management Support (TMS) also has no significant effect on IA (p=0.540), and Competence (CMP) has no significant effect on IA (p=0.444). These findings indicate that relative advantage (RA) and stakeholders (SH) are important factors in blockchain adoption intention, while other factors do not show significant effects.

Stages of diffusion are seen in Figure 2 according to [33], [34] Prior Conditions include factors that exist before individuals or organizations are exposed to innovation such as, Stakeholders (SH): Representing Previous Practice, Felt Needs/Problems, and Innovativeness and Stakeholders (SH): Representing Previous Practice, Felt Needs/Problems, and Innovativeness Laws and Regulations (LR): Representing Norms of The Social Systems. After that, Characteristics of the Decision-Making Unit includes the characteristics of individuals or organizations that make decisions to adopt or reject innovations such as, Competency (CMP): The level of understanding and mastery of blockchain technology by organizational personnel can be associated with the characteristics of the decision-making unit, especially in terms of Knowledge and abilities that influence the evaluation and adoption process. After that, perceived characteristics of innovation are directly related to how individuals or organizations perceive innovations, such as relative advantage (RA), which measures perceptions of the advantages of blockchain compared to existing alternatives. By the definition of RA in the innovation diffusion and Complexity (CPX) model: Measuring perceptions of the difficulty level in understanding and using blockchain. By the definition of CPX as one of the characteristics of perceived innovation, after that, for the Stages in the Innovation-Decision Process. After that, the Stages in the Innovation-Decision Process for Intention to Adopt (IA) are directly related to the Decision stage. The variables RA, CPX, TMS, and CMP become Persuasion, and SH and LR become Knowledge, which can influence the stages that then form the intention to adopt blockchain technology in government in Indonesia [35], [36], [37]. Because of this, Figure 3 shows that the Indonesian government is currently still in the knowledge stage with point 3 based on the hypothesis test "significant effects" and Persuasion with point 5 based on the hypothesis test "no significant effects", so there has been no decision to adopt blockchain technology in the Indonesian government [38], [39].

B. Contributions and Implications

This study contributes to the development of innovation diffusion theory by identifying contextual factors relevant to blockchain adoption in the public sector. The study's findings enrich the understanding of how factors such as relative advantage, stakeholder roles, complexity, regulation, top management support, and competence influence blockchain adoption intentions in government. Practically, the findings of this study can be used as a basis for the government to formulate effective strategies and policies to encourage blockchain adoption in various government sectors. The government needs to improve the perception of blockchain's advantages, actively engage stakeholders, and overcome challenges related to complexity, regulation, top management support, and competence.

C. Limitations and Future Research

This study has several limitations, including a relatively small sample size, a focus on respondent perceptions, and a research context limited to the Indonesian government. In addition, this study also has limitations in the latest academic references, especially in calculating the stages of innovation diffusion, so researchers calculate the stages of diffusion based on articles that are more than five years old. Further research can be conducted with a larger and more representative sample size, using various data collection methods (e.g., interviews, case studies), comparing research contexts across countries or sectors, and examining other factors that have the potential to influence blockchain adoption, such as organizational culture, leadership, and incentives. In addition, further research can also examine how to calculate the stages of innovation diffusion in more detail and depth.

VI. CONCLUSIONS

This study analyzes the factors that influence the intention of the Indonesian government to adopt blockchain. The results show that relative advantage (RA) and stakeholder role (SH) are significant factors that drive the intention to adopt blockchain. However, complexity (CPX), laws and regulations (LR), top management support (TMS), and competence (CMP) are not proven to influence the intention to adopt significantly. The stage of blockchain technology diffusion in the Indonesian government is only at the knowledge stage, so there has been no decision to adopt blockchain technology in the Indonesian government. These findings underline the importance of the perception of blockchain benefits and stakeholder involvement in applying technology in the public sector. This study contributes to developing innovation diffusion theory and provides practical implications for the government in formulating effective blockchain implementation strategies.

Author Contributions: *Eltyasar Putrajati Noman*: Conceptualization, Methodology, Software, Investigation, Validation, Data Curation, Writing - Original Draft, Writing - Review & Editing. *Anderson Kevin Gwenhure*: Supervision, Writing - Review & Editing.

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Informed Consent: Informed Consent was obtained, and a detailed explanation was presented in the Methods section.

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