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The Behavioral Intention of Blockchain Adoption

Ambara Purusottama✉[1], Yos Sunitiyoso[2], Togar Mangihut Simatupang[3], Puteri Annisa Tsamrotul Fuadah[4]

School of Business and Economics, Universitas Prasetiya Mulya, Tangerang, Indonesia[1]
School of Business and Management, Institut Teknologi Bandung, Bandung, Indonesia[2,3,4]

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Abstract

Despite the growing urgency, discussions about the diffusion of this technology are still challenging to identify and understand. Hence, it is essential to distinguish the diffusion of blockchain technology in society. This study developed the model and used a survey as a research strategy. Data were analysed using structural equation modelling. Furthermore, this study collected 96 respondents using a snowball sampling technique. The findings show that certain hypotheses resulted in diverging from the developed model. Blockchain adoption is suitable for today's problems and has a relative advantage over other technologies in influencing individual perceptions. However, the limited knowledge of society makes blockchain adoption only focused on a particular context. The role of the social environment is more visible in its significance on the intention to adopt blockchain technology along with individual perceptions. The research model attempted to extend the existing technology adoption behaviour theory widely used to understand technological adoption.

Intensi Perilaku Adopsi Blockchain

Abstrak

Meskipun kebutuhan teknologi blockchain semakin mendesak, diskusi tentang difusi adopsi teknologi tersebut masih sulit untuk dipahami. Karenanya, penting untuk mengidentifikasi sejauh mana difusi teknologi blockchain yang terjadi di masyarakat. Penelitian ini mengembangkan model perilaku adopsi blockchain dan menggunakan survei sebagai strategi penelitian. Data kemudian dianalisis menggunakan model persamaan struktural. Selanjutnya penelitian ini berhasil mengumpulkan 96 responden dengan menggunakan teknik sampling snowball. Temuan menunjukkan bahwa beberapa hipotesis tidak selaras dengan model yang dikembangkan. Adopsi teknologi blockchain dianggap cocok untuk masalah saat ini dan memiliki keunggulan relatif dibandingkan teknologi lain dalam mempengaruhi persepsi individu. Namun, keterbatasan pengetahuan masyarakat membuat adopsi blockchain hanya terfokus pada konteks tertentu. Peran lingkungan sosial lebih terlihat signifikansinya pada intensi untuk mengadopsi teknologi blockchain bersama dengan persepsi individu. Model penelitian berusaha untuk memperluas teori perilaku adopsi teknologi yang banyak digunakan untuk memahami adopsi suatu teknologi.

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✉Correspondence Address
Institutional address : Jl. Ganesha No.10, Lb. Siliwangi, Bandung, Jawa Barat
Email: yos.sunitiyoso@sbm-itb.ac.id

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INTRODUCTION

The growing adoption of blockchain technology is a sign of alignment with the needs of society (Rassanjani et al., 2021). This technological strength relies more on its paradigm than the available technology Instead of Its technological sophistication. Some people think a blockchain is a form of resistance to today's technology. Blockchain initiators develop a system that aims for data/information transactions to be carried out peer-to-peer due to the potential moral hazard from intermediaries (Chen, 2018). Nakamoto (2008) defined it as an antithesis of a centralised system since the system is difficult to control and risks a systemic "zero-sum game". Many data/information misuse issues further reinforce the notions of the need for a different approach controlled by a network in an ecosystem. Blockchain adoption has a higher level of urgency and is slowly transforming into an issue for corporate strategic decision-making (Deloitte, 2019).

Angelis & Ribeiro (2019) described the transformation of blockchain utilisation that started when Bitcoin, the initial blockchain product in the form of crypto assets, was discovered and became a new instrument for transactions. Blockchain technology plays a role in controlling the exchange of information by including entities involved in a network. The high adaptability of a blockchain drives the technology to evolve into smart contracts (Christidis & Devetsikiotis, 2016). Smart contract penetration has succeeded in getting a place because it makes it easier for people to conduct transactions without worrying about trust, known as digital trust (Nelms et al., 2018). The system is an agreement between nodes attached via code and can run automatically in the network. Nowadays, blockchains are being used more widely through decentralised applications (Dapps) in several previously difficult areas to administer using the currently available technology. Solid blockchain transformation is an issue that attracts researchers to understand blockchains further (Ruggieri et al., 2018; Savastano et al., 2018).

An academic study of blockchain expands to technological development and its adoption in social systems. Furthermore, academic findings can improve ecosystem governance, both intra- and inter-organisational (Brilliantova & Thurner, 2019; Pereira et al., 2019). Furthermore, several researchers have predicted the potential for blockchain adoption if applied to many sectors, especially in the public sector. This far, the public sector is considered a priority for developing this technology because of asymmetric information and the potential for misuse of data/information (Mettler, 2016; Klarin, 2020). Although the growth of blockchain discussions has shown a significant increase over the last few years (Purusottama et al., 2023), these studies emphasize the merit of blockchain adoption for society neglecting the adoption behavior. Stakeholders need this situation to indicate the current understanding of blockchain adoption. Moreover, this information can be used as a reference for making deployment initiatives of blockchain adoption more effective. This study contributes to the technology adoption behavior through model modification.

This study aims to comprehend the diffusion of technological innovation, such as blockchain technology, in society (Hossain, 2021). Moreover, blockchain penetration is still in its early stages, and it is essential to know the extent of public understanding and response to blockchains. The user perception and intention in adopting technology are investigated to understand blockchain adoption. The basic assumption in this study refers to the dissemination of information as a process influenced by social mechanisms, not only referring to the needs of an organisation or individual in utilising a technological innovation (Rogers, 2003). This research strengthens the theory of information diffusion towards a technological breakthrough, blockchain usage in particular, and the process of social behaviour. For practitioners, the results of this study can be used as a basis for developing an understanding of blockchain.

Hypothesis Development

The study literature raises a few hypotheses, as shown in Figure 1. Perception is a response to recognizing and interpreting sensory information to provide a picture and understanding of something (Xu et al., 2007; Lin et al., 2020). Individuals' perception of blockchains can occur because of particular conditioning in society. They will recognise the technology, interpret it, and discover how it can aid human work. Therefore, to create a positive perception, the technology should meet specific requirements, such as the technology should align with and be able to solve the existing problems (Mottaleb, 2018). To measure the relevance of blockchain adoption, this study exerts a few indicators: topicality, credibility, understandability, and interest. Rajnak & Puschmann (2020) emphasised using blockchains according to the problem of asset exchange because it can store data securely with decentralised principles. From these notions, it can be concluded that the relevance of blockchain in solving social problems can shape individual perceptions of this technology. Therefore, the hypothesis that can be proposed is:

H1: The relevance of blockchain technology in solving societal problems affects individual perceptions of the technology

Blockchain can be implemented in vast areas due to its capabilities, a system involving multiple entities. It requires technology to accommodate the system to provide particular values, such as transparency and traceability (Queiroz & Wamba, 2019). The supply chain is an area that is considered compatible with blockchain capabilities. Hackius & Petersen (2017) argue supply chain requires blockchain that can facilitate real-world systems involving multiple-entity. This notion shows that blockchain compatibility with an ongoing system can create a positive individual perception. The compatibility measurement can be identified from a few dimensions: experience, value perspective, and needs. Therefore, the presumption that can be proposed is:

H2: The compatibility of blockchain technology to work with the real system positively affects people's initial perceptions

The relative advantage of blockchain technology against the available technology or its competitors will be the key to creating individual perceptions (Song & Wang, 2018). The blockchain performs entirely differently instead of emphasizing its sophistication. It employs an opposite mental model that potentially disrupts the current technology adoption. The relative advantages are based on a few dimensions: effectiveness, convenience, timeliness, and accuracy. These advantages can be a stimulus to create an individual response to the blockchain. Friedlmaier et al. (2017) assert since the problems experienced by the community are the implications of adopting the available technologies, the blockchain has a relative advantage compared to its competitors. Blockchains may decisively contribute to asset exchange and supply chains (Schmidt & Wagner, 2019). In this area, blockchains can show advantages relative to the current technology. Based on these arguments, the following hypotheses can be proposed:

H3: The relative advantages of blockchain technology compared to other technologies create positive implications on individual perceptions of the technology

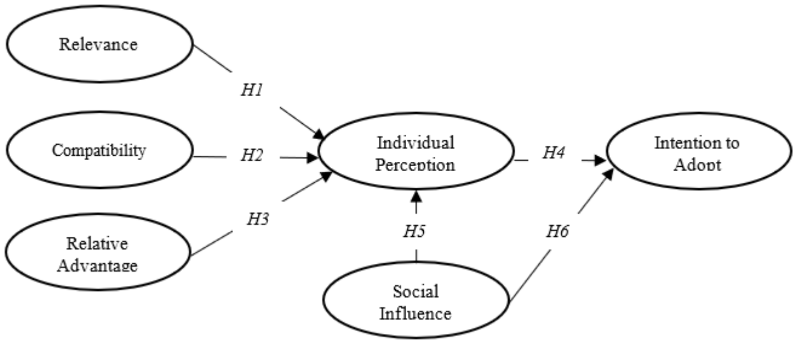
Perception work involves the human senses when assessing something. The reaction has gone through a thought process in justifying what was experienced, clashing with one's beliefs (Xu et al., 2007; Jusuf & Munandar, 2021). Individuals' perceptions may vary, and dynamics refer to their current beliefs. Belief may change because of a new understanding that shifts the prior understanding due to the accumulation of knowledge. If individuals experienced by others do not conflict with one's beliefs, the perception generated will be positive. Then, if individuals' experience contradicts their belief, the perception will be negative. Some researchers consider perception as an opinion in assessing something experienced by individuals. Interest in technology adoption is a notion that represents behaviour in adopting technology. Ajzen (1985) and Ajzen & Sheikh (2013) explained that an opinion considered goodwill stimulates intention behaviour that is measured by the worthiness of the technology adoption, continuance, and recommendation to their society. Therefore, a positive perception can influence individuals to adopt or be interested in blockchain technology (Schmidt & Wagner, 2019). Caiazza & Volpe (2017) stated that the technology adoption process is fundamentally a process of opinion construction on technological innovation. From these notions, the following hypothesis can be proposed:

H4: Individuals' perceptions of blockchain technology encourage intention to adopt blockchain in their daily activities

Social influences affect individual thinking as part of the social system (Duffett, 2015; Djafarova & Rushworth, 2017). Individual beliefs come not only from the accumulation of knowledge internally but also from the social environment. Ajzen & Sheikh (2013) defined intention as consisting of two perspectives: internal and external. Internal is the accumulation of knowledge gained from education and experience. On the other hand, external influences are the social environment in which individuals often interact, such as close family, coworkers, or admired figures – depending on how much they influence the individual. However, social influence does not always influence individuals to act. The dimensions of measuring social influence are appropriateness or conformity to the applicable norms and motivation to comply (Ajzen, 1985; Ajzen & Sheikh, 2013). Individuals will assess what is said or taught by other individuals. If the individual feels that the notion or appeal of another individual is following the prevailing norms, the individual can accept the notion. Those notions indicate that social influences will shape individual perceptions. The hypothesis that can be put forward is:

H5: The power of social influence towards blockchain technology affects individual perceptions.

The clash of beliefs with society's opinions is a process that individuals must undergo when adopting such technology (Koenig-Lewis et al., 2015). If the external opinions align with the individual's beliefs, those opinions will further strengthen the individual's opinion on blockchain usage and encourage the person to adopt blockchain technology immediately. The relationship between social influence is directly proportional to individual perceptions and interest in adopting technology. In the discussion on innovation diffusion, such as blockchain or other innovative technologies, the role of other individuals will be significant in adopting these technologies (Eckhardt et al., 2009). Individuals will respond positively if the social environment of their notions adopts blockchain technology following applicable norms. The contribution of



Source: Authors' Compilation

Figure 1. Research Model and Hypothesis Development

the social environment plays an essential role in the diffusion of technological innovations such as blockchains to increase their adoption rate. Therefore, the following hypothesis is:

H6: The power of social influence towards the benefits of blockchain technology drives individual intention to adopt the technology

METHOD

This study used a deductive approach to develop and test the model. The respondents of this study were individuals exposed to blockchain adoption daily in a different spectrum. As a new technology, the penetration of technology adoption was still classified in stages. The level of blockchain diffusion was dispersed into (i) hearing about blockchain technology, (ii) understanding blockchain technology, (ii) blockchain active users, and (iv) leveraging blockchain technology to support their businesses.

This study was aware that the number of samples depended on heterogeneity in a population to the exposure of a technology (blockchain adoption). However, since this technology was classified as new, another justification was needed to determine the samples. Therefore, this study used an unknown population size to determine the number of samples required. Lameshaw's calculations assumed the proportion of the number of adopters at the early adopter stage, to be exact, was 2.5% of the total population. This study got 72.99 or rounded up to 73 samples from these calculations. Thus, the sample of this study used 73 samples as the lower limit. This study adopted a snowball sampling of the respondents who had exposure to blockchain technology. This technique aimed to increase the efficiency of the data collection time and research bias, which was the most considerable risk of this study. Data was collected from the defined population, shared work with the members of the blockchain association and their acquittances to complete research questionnaires. This study selects a few samples according to the established criteria and then asks these samples to find the following sample. The process draws up when the following samples do not meet the criteria.

Surveys were adopted as a research strategy to elicit responses from the instrument development, as shown in Table 1. To mitigate the risk of research scattering, the protocols in this study required initial instrument testing before execution. The protocols were developed to

Table 1. Research Instrument

Construct	Code	Dimension	Code
Relevance	REL	Topicality, interest, credibility	REL_1, REL_2, REL_3, REL_4, REL_5, REL_6, REL_7,
Compatibility	COM	Experience, value perspective, needs	COM_1, COM_2, COM_3, COM_4, COM_5, COM_6, COM_7
Relative Advantages	RAD	Effectiveness, convenience, accuracy	RAD_1, RAD_2, RAD_3, RAD_4, RAD_5, RAD_6, RAD_7
Individual Perceptions	IPV	Familiarity, novelty, comfort, pleasantness	IPV_1, IPV_2, IPV_3, IPV_4, IPV_5, IPV_6, IPV_7
Social Influence	SOI	Normative belief, motivation to comply	SOI_1, SOI_2, SOI_3, SOI_4, SOI_5, SOI_6, SOI_7
Intention to Adopt	ITA	Worthiness, continuance, recommendation	ITA_1, ITA_2, ITA_3, ITA_4, ITA_5, ITA_6, ITA_7

justify and reduce inappropriate instruments. In implementing the protocols, this study involved 30 respondents – who were no longer used in the data analysis. The respondents were asked to complete the questionnaires, which consisted of 42 statements with seven observational variables representing each construct. The questionnaires were distributed online.

The questionnaires in this study were measured using a 5-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". The scale selection was based on the literature recommending a measurement scale of 5 or more to get better results (Weijters et al., 2010). Then the completed questionnaires were then analysed using a statistical approach, the structural equation model (Hair et al., 2019), to determine the relationship between the stratified constructs. This study used PLS-SEM since this application was more effective with fewer than 100 samples.

RESULTS AND DISCUSION

Profile of the Respondents

The survey collected 96 respondents, exceeding the minimum required number. The respondent data can be classified into blockchain utilization (Table 2) and respondent profile (Table 3). For the first group, this study identified few levels in adopting blockchain technology, including (level 1) awareness of blockchain technology, (level 2) understanding how blockchain technology works, (level 3) blockchain users, and (level 4) utilizing blockchain technology to support their businesses. The descriptive statistic shows that the level of blockchain adoption in society institutes adoption spectrum from the low level (aware of blockchain technology) to high (adopt blockchain for business). In addition, the dominance of blockchain adoption diffusion is at the lowest level, as indicated by more than 50% of respondents. Adoption at the advanced level has the lowest proportion, only 5%. Blockchain diffusion is necessary to derive stakeholders' attention to encourage its adoption intensity.

In the demographic and geographic classifications, six main groups were identified. In the gender group, there were more male respondents than female respondents. In comparing the number of male and female respondents, there were 62 male respondents (64.58%) and 34 female respondents (35.42%). Then, the age group categories identified an even distribution of respondents. There were 23 respondents (23.96%) under 20 years old, 33 respondents (34.48%) from 20-29 years old, 26 respondents (27.08%) from 30-39 years old, and 14 respondents (14.58%) from 40 years old and above. From this classification, blockchain technology is mainly used in the 20–29-year age group.

From the monthly expenses group, the group with an income of more than Rp4,000,000.00 was the group with the highest number of respondents, 33 (34.38%). On the other hand, the income group of Rp3,000,001.00 - Rp4,000,000.00 only consisted of 9 respondents (9.38%). Based on educational background, respondents with a high school/ vocational high school education level were 39 (40.63%), followed by Bachelor's and Master's degrees with 27 and 24 respondents,

Table 2. Profile of the Respondents by the Blockchain Adoption Rate

Level	Adoption Description	Freq.	Percentage	Acc. Percentage
1	Aware of blockchain technology	50	52.08%	
2	Understand blockchain technology	23	23.96%	76.04%
3	Blockchain users	18	18.75%	94.79%
4	Adopt blockchain for business	5	5.21%	100.00%

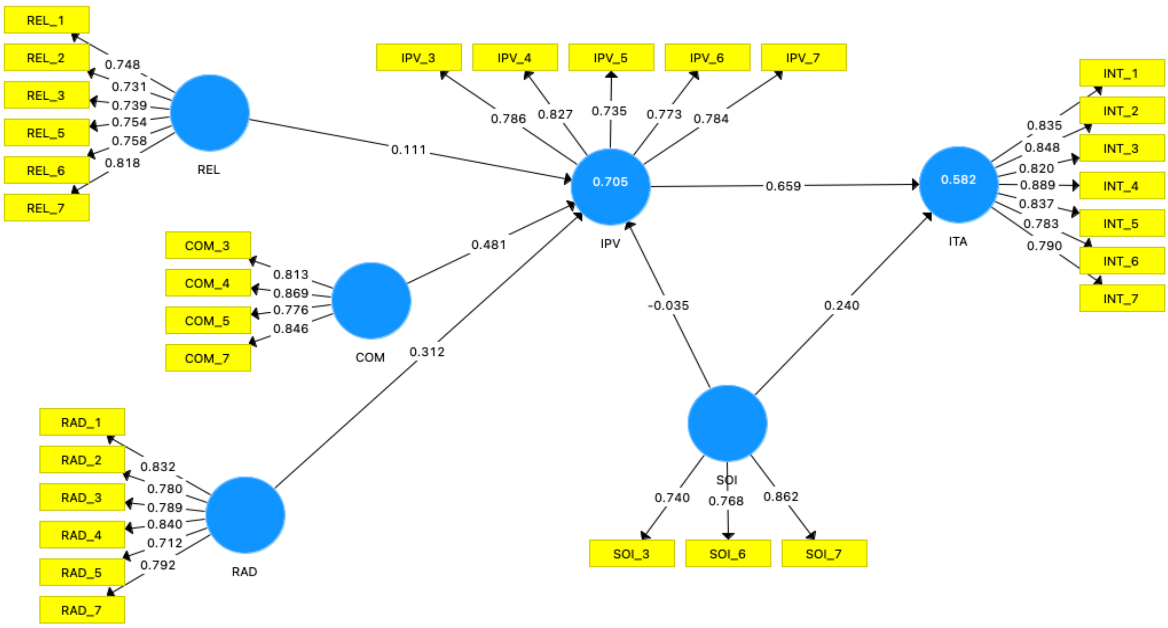
respectively. Based on location, 82 (85.42%) of the respondents came from the Java, and the rest were distributed throughout Sumatra, Kalimantan, and Sulawesi, respectively. Finally, education emerged as the most significant aspect in the occupational area group, with 27 respondents or 28.13%, followed by retail, finance, and consumable goods. Meanwhile, the other areas were evenly distributed, including automotive, technology, mining, business, and agriculture.

Model Testing

The model produced six variable relationships or hypotheses, as visualised in Figure 2. The model testing process reduced several observation variables. Previously, there were seven research instruments developed for each construct. The instruments were derived from the dimensions developed by previous discussions on the constructs. Instrument reduction in the developed model was made differently between constructs.

Table 3. Profile of the Respondents

Item(s)	Frequency	Percentage	Accumulation Percentage
Gender			
Male	62	64.58%	
Female	34	35.42%	100,00%
Age			
Below 20 years	23	23.96%	
20-29	33	34.38%	58.33%
30-39	26	27.08%	85.42%
40 years old and over	14	14.58%	100.00%
Monthly Expenses			
Less than Rp1,000,000	17	17.71%	
Rp1,000,001 - Rp1,500,000	13	13.54%	31.25%
Rp1,500,001 - Rp3,000,000	24	25.00%	56.25%
More than Rp3,000,001 - Rp4,000,000	42	43.76%	100.00%
Educational Background			
High School/Diploma	43	44.80%	
Bachelor's Degree	27	28.12%	72.92%
Master's/ Doctorate Degree	26	27.08%	100.00%
Geographical Location			
Java	82	85.42%	
Others (Sumatera, Kalimantan, Sulawesi)	14	14.58%	100.00%
Working Area			
Consumable goods	12	12.50%	
Education	27	28.13%	40.63%
Finance	12	12.50%	53.13%
Retail	17	17.71%	70.83%
Others (Dispersed to Automotive, Agriculture, Entrepreneur, Technology, and Mining)	28	29.17%	100.00%



*) **: 99% LoC (P<0.001), *: 95% LoC (P<0.05)

Figure 2. Model Visualization of PLS-SEM

Almost all observation variables in the constructs used were reduced except for ITA. These variables can explain the interest in blockchain utilisation. The SOI construct had the most reductions among other constructs, namely SOI_1, SOI_2, SOI_4, and SOI_5. Then, the following reduced construct was compatibility with three instruments, namely COM_1, COM_2, and COM_5. Furthermore, the IPV construct was reduced by two instruments, IPV_1 and IPV_2. The RAD and REL constructs were reduced by one instrument each, namely RAD_5 and REL_4. This test needed to be done to justify the feasibility of the developed model.

Outer and Inner Model

An outer model test was conducted to determine the relationship between the constructed and observed variables. The observations in Figure 1 can explain the variable construct with a more measurable instrument. In the reflective indicators, the feasibility of the model shows several items, including composite validity, composite reliability, Average Variance Extracted (AVE), and Cronbach's alpha. Furthermore, the results of model testing must meet the required standards, including composite validity >0.7, composite reliability >0.8, AVE >0.5, and Cronbach's alpha >0.6 (Hair et al., 2019).

Table 4. Outer Model Testing

Variable(s)	CA	rho_A	CR	AVE
COM	.846	.856	.896	.683
IPV	.842	.858	.887	.611
ITA	.925	.932	.939	.688
RAD	.881	.882	.910	.627
REL	.852	.857	.890	.575
SOI	.706	.733	.834	.627

*) CA: Cronbach's Alpha, CR: Composite Reliability, AVE: Average Variance Extracted

Table 4 explains that the constructs used in this study were feasible to use. The observational variables developed from the construct play a significant role in measuring the construct. In the CA indicator, all constructs have values above the required standard (>0.7). The highest CA indicator is ITA, with 0.925, while the lowest is SOI, with 0.706. Outer Models. This position also occurs on other indicators, such as rho_A and CR. In the rho_A indicator, the ITA construct is 0.932, and the SOI construct is 0.733. While for the CR indicator, the ITA construct is 0.939, and the SOI construct is 0.834. However, in the AVE, the position experienced a slight change – the highest value in the ITA construct is 0.688. The lowest value in the model is REL, with an AVE value of 0.575.

The objective of the inner model testing was to ensure the relationship's feasibility between constructs, including the R-square, Q-square, RMSEA, and path coefficient. The R-square test resulted in an IPV construct with 0.692 and an ITA construct with 0.573. This value indicates the coefficient of determination in the intense endogenous construct – the spectrum of R-square values from 0.67 (strong) to 0.19 (weak), as shown in Table 5. The next test was Q-square to determine the predictive ability of a model. The test produced a value of 0.229, where the value range is 0.02, which has a low predictive ability, 0.15 with moderate predictive ability, and 0.35 with high predictive ability. Another indicator stated that if Q-square is more than 0.05, the constructed model is relevant where the exogenous variables used to predict endogenous variables are correct. This model is declared suitable for predicting blockchain utilisation behaviour with the resulting value.

Another test indicator was SRMR (Square Root Mean Residual) which revealed the quality of the model in which the value was required to be close to 0. Differences of opinion raised the optimal indicator of less than 0.10 compared to 0.08, which is more conservative. This study resulted in a value of 0.086, which means the model can predict reality appropriately. VIF can justify the model, which states no strong correlation between variables. A value of 5 indicates that there is a correlation between variables. Table 6 shows that all values in the model meet the required values.

Since this model is layered, two levels of relationships between variables can be identified, direct and indirect (Table 7). The direct effects include: (i) the direct effect of COM on IPV is 0.481 and is positive; (ii) IPV to ITA is 0.659 and is positive; (iii) RAD to IPV is 0.312 and is positive; (iv) REL to IPV is 0.111 and is positive; (v) SOI to IPV is 0.035 and is negative, and (vi) SOI to ITA is 0.240 and is positive. Meanwhile, the indirect effects include: (i) COM to ITA is positive 0.317; (ii) RAD to ITA is 0.206 and is positive; (iii) REL to ITA is 0.073 and is positive, and (iv) SOI to ITA is 0.023 and is negative. Several constructs in this model have a positive relationship; only SOI->IPV and SOI->IPV->ITA constructs have a negative relationship.

Table 5. R-square Testing

Variable(s)	R-square	R-square Adjusted
IPV	.705	.692
ITA	.582	.573

Table 6. VIF Inner Model Testing

Variable(s)	IPV	ITA
COM	4.308	-
IPV	-	1.088
ITA	-	-
RAD	3.406	-
REL	2.931	-
SOI	1.204	1.088

Table 7. Coefficient Test Analysis

Variable(s)	IPV	ITA
COM	.481	.317
IPV	-	.659
ITA	-	-
RAD	.312	.206
REL	.111	.073
SOI	.035	.217

Hypothesis Testing

The testing produced different results from the developed hypotheses. In detail, four hypotheses were accepted, while the other two were rejected, as shown in Table 8. The accepted hypotheses included H2 (COM->IPV), H3 (RAD->IPV), H4 (IPV->ITA), and H6 (SOI->ITA). The lowest required values for a hypothesis to be accepted were >1.96 for T-statistics and <0.05 for P-value, with a 95% confidence level. H2 has T-statistics of 3.523 (P-value of 0.000), so it is classified as accepted by the hypothesis with a confidence level of 99%. A similar situation occurred in H3 with a T-statistics value of 2.897 (P-value of 0.004), H4 with 11.368 (P-value of 0.000), and H6 with 3.011 (P-value of 0.003). All four constructs are classified in the 99% confidence level. Whilst, the rejected hypotheses are H1 (REL->IPV) and H5 (SOI->IPV) because the calculation is not able to reach the capacity at the lowest level of the confidence set, the lower limit of 95%.

Table 8. Hypothesis Testing

Hypothesis	Relationship	T-*statistics*	P-value	Decision
H1	REL → IPV	1.227	.220	Not Accepted
H2	COM → IPV	3.664	.000	**Accepted
H3	RAD → IPV	2.897	.004	**Accepted
H4	IPV → ITA	11.368	.000	**Accepted
H5	SOI → IPV	.597	.551	Not Accepted
H6	SOI → ITA	3.011	.003	**Accepted

*) **: 99% LoC (P<0.001), *: 95% LoC (P<0.05)

Discussion

This study explained the behaviour of blockchain adoption, represented by a few constructs through the research model. The model involved the constructs of relevance (REL), relative advantage (RAD), compatibility (COM), social influence (SOI), individual perception (IPV), and intention to adopt (ITA). Since this model is stratified, three out of four exogenous variables can influence individual intention in adopting blockchain technology, namely (i) compatibility (COM), relative advantage (RAD), and (iii) social influence (SOI). The COM and RAD variables affect ITA positively through IPV. Although the REL construct has a positive impression on its endogenous variable (IPV), it has poor impression. The staggering finding is that SOI has a different effect on its endogenous variables, poor impression toward IPV and significance toward ITA. The detailed findings will be described in the following paragraph.

In specific findings, COM and RAD produce a more significant relationship towards IPV and ITA indirectly. In the COM and IPV relationship, blockchain technology can coexist with current systems, such as in the supply chain area that requires transparency and traceability, which are value perspectives from the supply chain ecosystem and asset transactions (Queiroz & Wamba, 2019)blockchain is a cutting-edge technology that is already transforming and remodeling the relationships between all members of logistics and supply chain systems. Yet, while studies on blockchain have gained a relative pace over the recent years, the literature on this topic does not report sufficient research cases on blockchain adoption behavior at the individual level. The present study, therefore, aims to bridge this gap, notably by helping understand the individual blockchain adoption behavior in the logistics and supply chain field in India and the USA. Drawing on the emerging literature on blockchain, supply chain and network theory, as well as on technology acceptance models (TAMs. The importance arose because, based on experience, the conventional paradigm has driven inequality since data/information in the supply chain area is concentrated on a particular entity (Hackius & Petersen, 2017). This situation encourages moral hazard where the system allows attempts to abuse the power of the data/information that is owned. Adopting blockchain is more effective, accurate, and convenient in the relationship between RAD and IPV than conventional technology. Blockchain transactions can occur more effectively and accurately since this technology involves an ecosystem to verify data/information before transactions occur (Friedlmaier et al., 2017). Protocols in technology have a design where data/information first passes through multilevel checks so that errors can be suppressed. Then, this system encourages users to be more comfortable since this technology has unique features, such as allowing users to view transactions made, and the system can record every transaction (Schmidt & Wagner, 2019). Both constructs provide positive perceptions of individuals through familiarity, novelty, comfort and pleasantness. On the following path, IPV has a significant effect on ITA. A positive perception of blockchain will encourage individual interest to adopt it because it is considered feasible, can be used for a more extended period (continuance), and is recommended to others (Caiazza & Volpe, 2017; Schmidt & Wagner, 2019).

This study identified a poor relationship between REL toward IPV and ITA indirectly. Even though blockchain technology has the unique ability to solve today's problems, its presence is often overlooked since it is new, and only limited people comprehend its capabilities (Mottaleb, 2018). The adoption of blockchain is found constantly discussed in the supply chain area and limited outside this area. Therefore, utilising blockchain on other topics will relieve the topicality of blockchain adoption, such as the work by Rajnak & Puschmann (2020). Blockchain, as a new technology, has many obstacles in its diffusion. Therefore, individual interest in adopting them is currently at a lower level. This technology is also experiencing problems in its perfection, such as data breaches that repeatedly generate tremendous losses. Blockchain should continuously improve to increase trust in this technology and derive higher credibility in society. Blockchain adoption discussions need to be expanded to other areas to provide an understanding of the importance of blockchain technology for society. Furthermore, this study found that since the relevance of blockchain in society is problematic, the intention to adopt this technology is challenging to promote.

In the other path, SOI influences its endogenous variables differently. It influences significantly on ITA but insignificant on IPV. On SOI and ITA, the intention of adopting blockchain is influenced by individual perceptions (internal) and their social reach (external). The social system in Indonesia that prioritizes relationships between individuals, as well as groups, can influence individuals to increase their interest in adopting blockchain or normative beliefs (Djafarova & Rushworth, 2017; Duffett, 2015). The pressure comes from the immediate community, such as family and friends, and specific figures that individuals admire. Individuals will try to follow the recommendations of these figures (motivation to comply) (Ajzen, 1985; Ajzen & Sheikh, 2013). The study found that individuals listen more to admired figures about blockchain adoption because they are perceived to have expertise on the topic than their immediate social environments, such as family or friends. Individuals already recognized the group has little knowledge and experience of blockchain technology.

Meanwhile, this study also found that SOI has a poor significance toward IPV. The poor position is employed since individuals depend more on internal understanding than the influence of their social reach (external). Individuals find it difficult to accept the impression within their social reach that contradicts Koenig-Lewis et al. (2015). Furthermore, individuals may appraise the current normative beliefs align with their thinking, but it is less necessary to follow them. Poor normative belief in individuals indicates that certain people considered influential by them have a knowledge gap or lack understanding of blockchain technology. They feel their social outreach understanding of blockchain is lower than their internal understanding, which contradicts Eckhardt et al. (2009). From this situation, the individual motivation to adhere to these beliefs' has poor motivation to comply. Intensive education is a pertinent approach to promote the position of normative belief toward individuals regarding blockchain adoption.

The research model that explains the intention behavior of blockchain adoption is carried out simultaneously through internal and external approaches. However, a few problems arose against blockchain adoption. First, the relevance of this technology needs to be increased since it is still limited in its discussion. Stakeholders must encourage the adoption of this technology in other overlooked areas or expand the discussion area. Second, normative belief is challenging to intensify individual perceptions. Individuals recognize that although this belief is decent, the capacity of its social reach is insufficient to persuade them. Technological literacy is plausibly the forward action to urge normative beliefs about blockchain adoption.

CONCLUSION AND RECOMMENDATION

This study portrayed the behaviour of blockchain adoption through a model modification. The survey in this study involved 96 respondents exposed to different levels of blockchain understanding: being aware of blockchain technology, understanding blockchain technology, blockchain users, and adopting blockchain technology for businesses. Four of the six hypotheses of the developed model were accepted, while the leftovers were rejected. Since the relationships in this model are multilevel, there are direct and indirect paths that this model can explain. This study pointed out that few constructs have poor significance toward their endogenous variables. Persistent discussion of blockchain adoption and intensive technological literacy is the leading approach to leverage public understanding of blockchain technology as well as promote more intensive blockchain diffusion. This study presents a behavioural intention model on blockchain adoption since the generic models are considered inappropriate to explain technology adoption still at an early stage. This model can contribute to the behavioural intention literature in technology diffusion at certain stages. Limitations of this study are: (i) the scope of behavioural adoption is limited to the literature, which allows some facts to be missed in the existing model, and (ii) the generalisation ability can miss in-depth insights from the studied problem. Then, different methods are recommended to support this study.

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