

A Test of the Theory of Planned Behavior: Influencing Behavioral in Implementation Central Bank Digital Currency in Indonesia

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Abstract

The aim of this research is to test the Theory of Planned Behavior and its influence on behavior in the implementation of Central Bank Digital Currency (CBDC) in Indonesia. CBDC refers to a digital currency issued by the central bank that can be used as a legal tender, similar to physical cash. The purpose of CBDC as an alternative legal tender is to coexist with physical cash, providing the option of CBDC as a legal tender for individuals who prefer to use digital currencies. Given the increasing reliance on technology in our lives, it is important for society to embrace digital currencies to facilitate transactions. Therefore, it is crucial to understand the factors that influence an individual's intention to use electronic money.

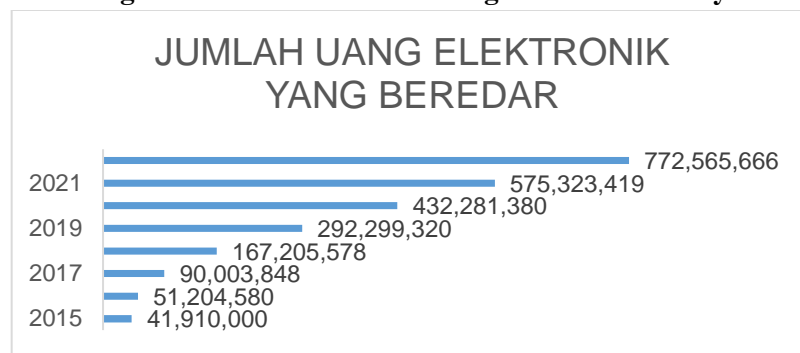
The research design used in this study is quantitative research with a descriptive approach. The research location to gather data is in Makassar City, South Sulawesi, Indonesia. The sample size in this study was determined using the Slovin's formula, with a 10% margin of error, resulting in a sample size of 99.9 samples. However, due to fractional subject numbers, it was rounded up to 100 samples. The data analysis technique used is multiple regression.

The research results indicate that: 1) Attitude has a positive and significant influence on the implementation of Central Bank Digital Currency. 2) Subjective Norm has a significant negative influence on the implementation of Central Bank Digital Currency. 3) Perceived Behavioral Control has a significant influence on the implementation of Central Bank Digital Currency.

A. Introduction

Money is an essential economic instrument. Almost all economic activities heavily rely on money. It serves as a legitimate means of payment within a specific region and functions as a medium of exchange for necessary goods and services. With the advancement of technology, money has also transformed into more efficient forms and functions. In the current digital era, numerous emerging fintech companies offer digital financial products such as e-money, enabling individuals to conduct financial transactions without the need for cash.

Figure 1: Amount of Circulating Electronic Money.



Source: Bank Indonesia, 2022

The challenges faced by the banking sector in the future are increasing, diverse, and dynamic. Recognizing these challenges, the Financial Services Authority (OJK) deems it necessary to formulate the future direction of banking that aligns with the dynamics of the national economy and banking sector, as outlined in the Indonesian Banking Development Roadmap 2020-2025 (OJK, 2021). One alternative that can be pursued by the central bank is to promote the reform of financial transactions in Indonesia by implementing Central Bank Digital Currency (CBDC) (OJK, 2021).

Central Bank Digital Currency (CBDC) is a digital currency issued by the central bank to serve as a legitimate alternative payment instrument, similar to physical cash (Kochergin et al., 2019). The purpose of CBDC as an alternative legal tender is for it to coexist with the existence and use of physical cash, making CBDC a legal tender option for individuals who require its use. Considering the increasing dependence on technology in our lives, it is important for society to be able to use digital currency to facilitate transactions (Bank of England, 2020).

Considering this phenomenon, it is important to understand the factors that influence an individual's intention to use electronic money. This research utilizes the Theory of Planned Behavior (TPB) model, which explains the most dominant factors that influence the intention to use electronic money.

The Theory of Planned Behavior (TPB) consists of three main determinants: attitude, subjective norm, and perceived behavioral control. According to the TPB theory,

an individual's behavior can be predicted from their intention, where intention can be predicted from attitude towards the behavior, subjective norm, and perceived behavioral control (Ajzen, 1991). This provides insights into the reasons behind the behavior of individuals using electronic money, enabling policymakers, electronic money issuers, and merchants to develop strategies to enhance the usage of electronic money. This theory is applied to study the behavior of using electronic money by individuals, also referred to as electronic money consumers. The theory has been widely used to predict consumer behavior in various contexts, such as credit card usage (Rutherford & Devaney, 2009), internet banking (Adityasto & Baridwan, 2012), mobile banking (Luarn & Lin, 2005), investment (Warsame & Ileri, 2016), online shopping (Lin, 2007), and many others.

The aim of this research is to test the Theory of Planned Behavior (TPB) that influences behavior in the implementation of Central Bank Digital Currency (CBDC) in Indonesia.

B. *Theory of Planned Behavior (TPB)*

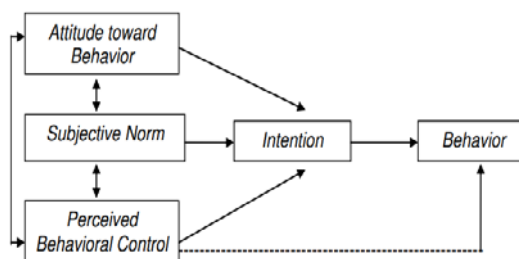
This theory was initially called the Theory of Reasoned Action (TRA) and was developed in 1967. It has since been revised and expanded by Icek Ajzen and Martin Fishbein. From the 1980s, the theory was used to study human behavior and develop more effective interventions. In 1988, additional elements were added to the existing Theory of Reasoned Action, resulting in the Theory of Planned Behavior (TPB), to address limitations identified by Ajzen and Fishbein through their research using TRA.

The Theory of Reasoned Action was developed to examine the relationship between attitudes and behavior (Fishbein, Ajzen, 1975; Ajzen, 1988; Werner, 2004). The main concepts in the Theory of Reasoned Action (TRA) are "compatibility principles" and the concept of "behavioral intention" (Fishbein, Ajzen, 1975; Ajzen, 1988). Compatibility principles state that to predict a specific behavior directed toward a specific target in a specific context and time, specific attitudes relevant to the time, target, and context need to be assessed (Fishbein, Ajzen, 1975; Ajzen, 1988). The concept of behavioral intention suggests that the motivational desire to engage in a behavior, as defined by attitudes, influences behavior (Fishbein, Ajzen, 1975). Behavioral intention indicates how much effort an individual is willing to commit to performing a behavior, with higher commitment indicating a greater likelihood of the behavior being performed. Behavioral intention is determined by attitudes and subjective norms (Fishbein, Ajzen, 1975; Ajzen, 1988). Attitude refers to an individual's perception of a specific behavior as favorable or unfavorable (Werner, 2004). Subjective norm refers to an individual's subjective judgment of the preferences and support of others regarding the behavior (Werner, 2004).

The Theory of Reasoned Action has been criticized for neglecting the importance of social factors that can be influential determinants of individual behavior in real life (Werner, 2004). Social factors encompass all environmental influences (such as individual norms) that can affect individual behavior (Ajzen, 1991). To address this limitation, Ajzen (1991) proposed an addition to the determination of individual behavior in the Theory of Planned Behavior, which is perceived behavioral control. Perceived behavioral control refers to an individual's perception of how easy or difficult it is to perform a particular behavior (Ajzen, 1991). Perceived behavioral control indirectly influences behavior. A brief

explanation of the Theory of Planned Behavior can be used to predict whether an individual will engage in a behavior or not.

Figure 2 *Theory of Planned Behavior (TPB) Framework*



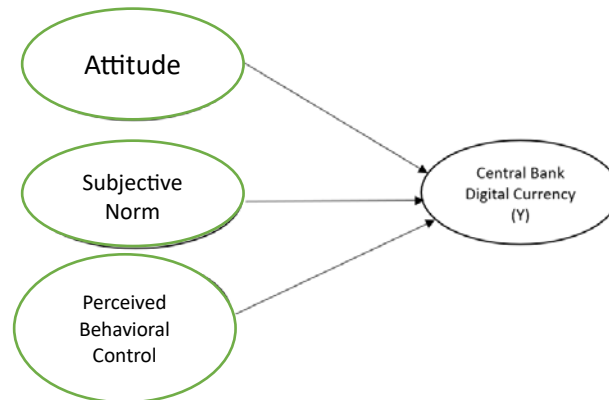
C. *Central Bank Digital Currency (CBDC)*

Central Bank Digital Currency (CBDC) is a form of electronic currency issued by a central bank that can be used by the public for digital payments and storing value. The three main elements of CBDC are that it is a digital currency, issued by a central bank, and universally accessible. The emergence of CBDC may be in response to the high popularity of cryptocurrencies, where many people around the world see crypto as the currency of the future. However, the main issue with cryptocurrencies is their highly volatile or unstable value. This is a problem that CBDC aims to address.

Essentially, cryptocurrencies are not supported by any central authority, as they are not controllable and are decentralized. Cryptocurrencies serve as a benchmark for finance without relying on third parties, with authority residing in the cryptocurrency holders. On the other hand, governments still want to maintain their role as controllers, leading them to compete with cryptocurrencies by launching CBDC. Similar to crypto, CBDC also utilizes distributed ledger technology (DLT). While cryptocurrencies are not recognized as legal tender, governments acknowledge CBDC as legal payment instruments within the jurisdiction of the central bank. However, the question then arises: why should governments issue CBDC when fiat currency still exists?

If a country issues or creates CBDC, the government will consider the electronic currency as legal tender, just like fiat currency. In other words, CBDC and cash (fiat) are legally recognized as methods of payment and can be claimed at the central bank or government (Invesnesia.com, 2021).

Figure 3. Framework



D. Hypothesis:

- H1: Attitude, as one of the determinants of TPB, has a positive influence on the adoption of Central Bank Digital Currency.
- H2: Subjective norm, as one of the determinants of TPB, has a positive influence on the adoption of Central Bank Digital Currency.
- H3: Perceived behavioral control, as one of the determinants of TPB, has a positive influence on the adoption of Central Bank Digital Currency.

E. RESEARCH METHODS

The type of research used in this study is quantitative research with a descriptive approach. The research location to obtain data is in Makassar City, South Sulawesi. The sample in this study consists of the productive-age population (15-60 years old) in Makassar City. The sample size was determined using the Slovin's formula, resulting in a sample size of 100.

The data collection technique used in the study is through a questionnaire. Hypothesis testing in this study is conducted using multiple linear regression. The equation for multiple linear regression is as follows:

$$\text{Model } Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e$$

Dimana:

Y = Central Bank Digital Currency (CBDC)

X_1 = Attitude

X_2 = Subjective Norm

X_3 = Perceived Behavioral Control

a = Konstanta

e = error (5%)

F. RESULTS

Figure 4. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Gender (X ₁)	100	4	10	8.58	1.565
Subjective Norm (X ₂)	100	4	10	8.00	1.583
Perceived Behavioral Control (X ₃)	100	4	10	7.94	1.953
Central Bank Digital Currency (CBDC) (Y)	100	4	10	8.44	1.702
Valid N (listwise)	100				

Source: Data Processing SPSS Versi 29.0.1.0

Respondent classification

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Men	40	40.0	40.0	40.0
	Woman	60	60.0	60.0	100.0
	Total	100	100.0	100.0	

Source: Data Processing SPSS Versi 29.0.1.0

		Education Level			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SMP/Sederajat	1	1.0	1.0	1.0
	SMA/Sederajat	50	50.0	50.0	51.0
	Strata 1 (S1)	40	40.0	40.0	91.0
	Magister (S2)	9	9.0	9.0	100.0
	Total	100	100.0	100.0	

Source: Data Processing SPSS Versi 29.0.1.0

		Age		Valid	Cumulative
		Frequency	Percent	Percent	Percent
Valid	15-20 Years	41	41.0	41.0	41.0
	21-30 Years	31	31.0	31.0	72.0
	31-40 Years	20	20.0	20.0	92.0
	41-50 Years	7	7.0	7.0	99.0
	51-60 Years	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

Source: Data Processing SPSS Versi 29.0.1.0

		Profesi		Valid	Cumulative
		Frequency	Percent	Percent	Percent
Valid	Staff	9	9.0	9.0	9.0
	Teacher/Lecturer	29	29.0	29.0	38.0
	Bussinesman	4	4.0	4.0	42.0
	Other	58	58.0	58.0	100.0
	Total	100	100.0	100.0	

Source: Data Processing SPSS Versi 29.0.1.0

2. Research Instrument Test

Validitas Test

Variabel	Question Item	r_{hitung}	r_{tabel}	Description
Attitude (X.1)	X1.1	1	0,163	VALID
	X1.2	0,589	0,163	VALID
Subjective Norm (X.2)	X2.1	0,511	0,163	VALID
	X2.2	0,427	0,163	VALID
Perceived Behavioral Control (X.3)	X3.1	0,312	0,163	VALID
	X3.2	0,282	0,163	VALID

Central Bank Digital Currency (CBDC) (Y)	Y.1	0,431	0,163	VALID
	Y.2	0,460	0,163	VALID

Source: Data Processing SPSS Versi 29.0.1.0

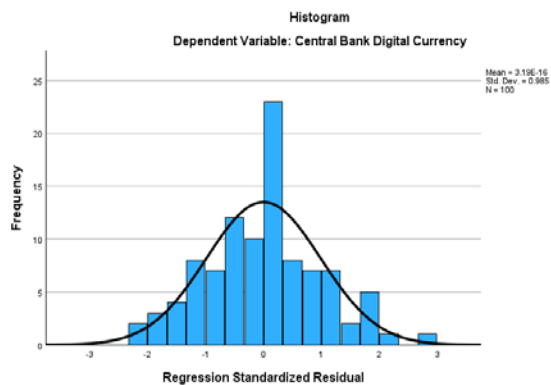
Reability Test

Reliability Statistics

Cronbach's Alpha	N of Items
.852	8

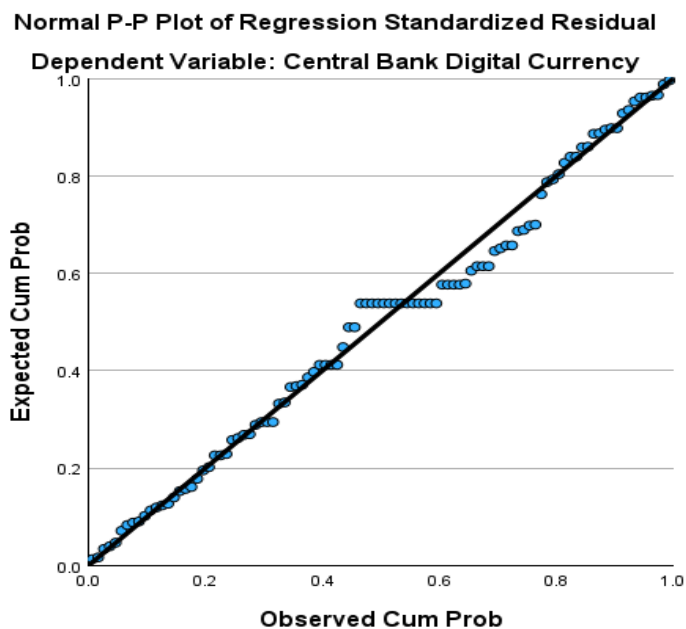
Source: Data Processing SPSS Versi 29.0.1.0

Histogram Grafic



Source: Data Processing SPSS Versi 29.0.1.0

P-P Plot Grafic



One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual	
N		100	
Normal Parameters ^{a,b}	Mean	.0000000	
	Std. Deviation	1.31898979	
Most Extreme Differences	Absolute	.079	
	Positive	.074	
	Negative	-.079	
Test Statistic		.079	
Asymp. Sig. (2-tailed) ^c		.130	
Monte Carlo Sig. (2-tailed) ^d	Sig.	.129	
	99% Confidence Interval	Lower Bound	.120
		Upper Bound	.138

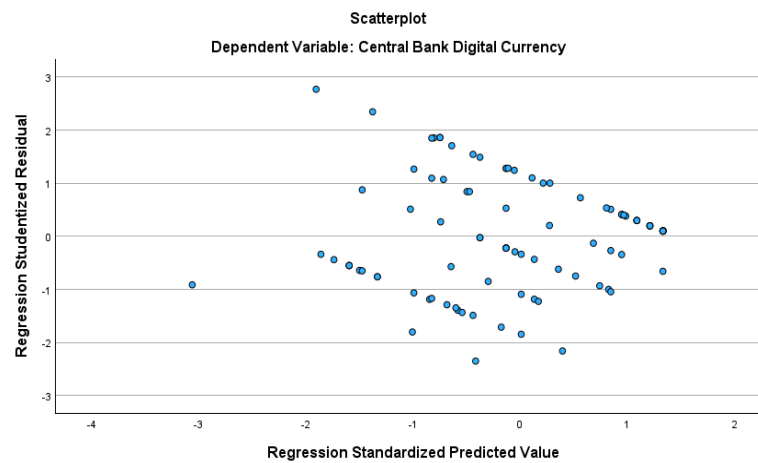
a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

Source: Data Processing SPSS Versi 29.0.1.0



Source: Data Processing SPSS Versi 29.0.1.0

Model		Coefficients ^a				Collinearity Statistics		
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF
		B	Std. Error	Beta				
1	(Constant)	2.004	.873		2.294	.024		
	Attitude	.283	.102	.261	2.788	.006	.717	1.395
	Subjective Norm	.131	.101	.122	1.297	.198	.711	1.406
	Perceived Behavioral Control	.373	.074	.428	5.048	<.001	.871	1.147

a. Dependent Variable: Central Bank Digital Currency

Source: Data Processing SPSS Versi 29.0.1.0

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.406	3	38.135	21.256	<.001 ^b
	Residual	172.234	96	1.794		
	Total	286.640	99			

Source: Data Processing SPSS Versi 29.0.1.0

Model		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.004	.873		2.294	.024
	Attitude (X1)	.283	.102	.261	2.788	.006
	Subjective Norm (X2)	.131	.101	.122	1.297	.198
	Perceived Behavioral Control (X3)	.373	.074	.428	5.048	<.001

a. Dependent Variable: Central Bank Digital Currency (CBDC) (Y)

Source: Data Processing SPSS Versi 29.0.1.0

Hypothesis Testing

a. First Hypothesis Testing

Given the Sig value for the influence of X1 on Y is $0.006 < 0.05$ and the calculated t value of $2.788 >$ the tabled t value of 1.984, it can be concluded that H1 Attitude (X1) has a significant influence on the adoption of Central Bank Digital Currency (Y).

b. Second Hypothesis Testing

Given the Sig value for the influence of X2 on Y is $0.198 > 0.05$ and the calculated t value of $1.297 <$ the tabled t value of 1.984, it can be concluded that H2 Subjective Norm (X2) does not have a significant influence on the adoption of Central Bank Digital Currency (Y).

c. Third Hypothesis Testing

The Sig value for the influence of X3 on Y is $0.001 < 0.05$, and the calculated t value is $5.048 >$ the tabulated t value of 1.984. Therefore, it can be concluded that H3 Perceived Behavioral Control (X3) has a significant influence on the implementation of Central Bank Digital Currency (Y).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.632 ^a	.399	.380	1.33944

a. Predictors: (Constant), Perceived Behavioral Control (X3), Subjective Norm (X2), Attitude(X1)

Source: Data Processing SPSS Versi 29.0.1.0

In the table above, the obtained value of R² is 0.399, which means that Attitude, Subjective Norm, and Perceived Behavioral Control collectively account for 39.9% of the variance in user attitudes, while the remaining 60.1% is influenced by other unexamined factors in this study.

G. DISCUSSION

In this research, hypothesis testing was conducted using SPSS version 29.0.1.0. The testing aimed to examine whether the three main determinants of the Theory of Planned Behavior have an influence on the implementation of Central Bank Digital Currency. Based on the results of the hypothesis testing, it can be concluded that, in terms of partial testing, the independent variables Attitude (X1), Subjective Norm (X2), and Perceived Behavioral Control (X3) have an impact on the dependent variable, the implementation of Central Bank Digital Currency (Y), as follows:

1. Attitude, as one of the determinants of the Theory of Planned Behavior (TPB), has a positive influence on the implementation of Central Bank Digital Currency (CBDC).

Based on the analysis conducted, it was found that Attitude variable has a significant and positive partial effect on the implementation of Central Bank Digital Currency (CBDC) because its significance value is smaller than the t-value, which is $0.006 < 0.05$, and the t-value is $2.788 >$ the critical t-value of 1.984. This indicates that the better the individual's attitude towards CBDC implementation, the higher the likelihood of them adopting it.

In recent years, the global financial landscape has witnessed significant advancements and developments in CBDC initiatives by various countries. Several central banks have launched pilot projects or conducted extensive research on CBDC implementation. These ongoing efforts have resulted in new insights, regulatory changes, and technological advancements that could influence the relationship between attitude and CBDC adoption.

This is consistent with a study conducted by Annisa Hakim Zamzami (2020), which found that attitude has a positive influence on the intention to adopt cryptocurrency.

2. Subjective norm, as one of the determinants of the Theory of Planned Behavior (TPB), has a positive influence on the implementation of Central Bank Digital Currency (CBDC).

Based on the analysis conducted, it was found that the subjective norm variable does not have a partial and significant influence on the implementation of Central Bank Digital Currency (CBDC) as the significance value is larger than the t-value, which is $0.198 > 0.05$, and the t-value is $1.297 <$ t-table 1.984. This indicates that the opinions and views of important individuals around the respondents, referred to as social pressure regarding the use of digital currency, do not significantly influence individuals to adopt it.

In this study, subjective norm was measured as the opinions and views of important individuals surrounding the respondents, which can be considered as social pressure influencing individuals' decisions regarding the use of digital currency. However, the analysis results indicate that the influence of subjective norm is not significant in driving CBDC adoption in the current conditions.

The lack of significance can be attributed to several factors. First, in the rapidly evolving context, society may have varied perceptions regarding the use of digital currency. Subjective norm only reflects the views of a limited number of important individuals around the respondents, and these views may not represent the opinions of the majority of the overall society.

Second, other factors such as government regulations, security and privacy concerns, and the level of technological skills in society can also play a role in CBDC adoption. Uncertainties or concerns related to these factors may diminish the influence of subjective norm in individuals' decision-making regarding CBDC.

In this context, it is important to conduct further research to gain a deeper understanding of the factors influencing subjective norm regarding CBDC usage in the

current conditions. This research could involve broader studies, including variations in geographical, demographic, and socio-economic characteristics of the respondents, to obtain a more comprehensive understanding of the factors influencing CBDC adoption. This finding is consistent with the research conducted by Tanzila Arifa Putri, Nurbaiti, and Juliana Nasution (2023), which found that subjective norm does not have a significant influence on the intensity of using Fintech Payment among students of FEB UNISMUH.

3. Perceived Behavioral Control, as one of the determinants of the Theory of Planned Behavior (TPB), has a positive influence on the implementation of Central Bank Digital Currency (CBDC).

Based on the analysis conducted, it was found that the variable of perceived behavioral control has a partial and significant influence on the implementation of Central Bank Digital Currency (CBDC) as the significance value is smaller than the t-value, which is $0.001 < 0.05$. This indicates that in predicting behavioral intention, perceived control over behavior has a high level of accuracy.

The significant influence of Perceived Behavioral Control on the adoption of Central Bank Digital Currency (CBDC) suggests that individuals' perception of their control over using electronic money plays a crucial role in their intention to adopt CBDC. When individuals perceive a higher level of control over their behavior related to electronic money usage, such as ease of use, security, and familiarity with the digital payment system, they are more likely to embrace CBDC.

This finding aligns with previous research on the Theory of Planned Behavior (TPB) and the adoption of digital financial technologies. Studies have consistently shown that individuals' perceived control over their behavior strongly affects their intention to adopt new technologies. In the context of CBDC, individuals who believe they have control over their use of electronic money are more inclined to embrace CBDC as a trusted and efficient means of payment.

Furthermore, this finding emphasizes the importance of providing a user-friendly and secure environment for the adoption of CBDC. Policymakers and central banks need to focus on enhancing individuals' perceived control by addressing concerns related to privacy, security, and technical infrastructure. By addressing these factors, they can increase individuals' confidence and willingness to adopt CBDC, leading to its successful implementation.

In conclusion, this study highlights the significant influence of Perceived Behavioral Control on the adoption of Central Bank Digital Currency. It emphasizes the need to focus on individuals' perceived control and address related concerns to facilitate the successful implementation of CBDC as a digital payment solution.

This finding is consistent with the research conducted by Yulfan Arif Norahman and Rina Sari Qurniawati (2021), who found that perceived behavioral control has a positive influence on the intention of Halal Food MSMEs to use E-Money.

H. CONCLUSION

Based on the research findings and data analysis discussed regarding the influence of Attitude, Subjective Norm, and Perceived Behavioral Control on the adoption of Central Bank Digital Currency (CBDC), the following conclusions can be drawn:

1. The variable of attitude has a significant and positive impact on the adoption of CBDC. Individuals who hold positive attitudes towards CBDC are more likely to embrace and utilize it as a digital currency. This finding aligns with previous studies that have highlighted the role of attitude in shaping individuals' intention to adopt new technologies or currencies.
2. The research findings indicate that Subjective Norm has a significant negative impact on the adoption of Central Bank Digital Currency (CBDC). This implies that the opinions and perspectives of influential individuals surrounding the respondents, which can be considered as social pressure, do not exert a significant influence on an individual's decision to use electronic money. In other words, the attitudes and behaviors of others in their social circle do not play a significant role in shaping an individual's acceptance and adoption of CBDC. This finding suggests that factors other than subjective norm, such as personal beliefs and perceptions, may have a stronger influence on individuals' decisions regarding the use of CBDC.
3. Perceived Behavioral Control has a significant influence on the adoption of Central Bank Digital Currency (CBDC). This can be associated with the fact that the higher the perceived control over behavioral aspects related to the use of electronic money, the greater the intention to use electronic money as a means of implementing Central Bank Digital Currency.

I. RECOMENDATION

1. Therefore, it is recommended for future researchers and policymakers to stay updated with the latest developments and trends in CBDC implementation. This includes considering additional factors such as regulatory frameworks, user behaviors, technological advancements, and market dynamics, which may impact the relationship between attitude and CBDC adoption.
2. Furthermore, conducting further research and expanding the scope of the study to include diverse geographical locations and respondent groups can provide a more comprehensive understanding of the influence of attitude on CBDC adoption. This can help capture diverse perspectives and identify potential variations in the impact of attitude within different contexts..
3. The government is encouraged to make breakthroughs in providing social assistance and other funds in non-cash forms. This is expected to serve as a means of introducing electronic money to the community, especially those who are economically disadvantaged and unbanked. By leveraging digital financial technology, the government can facilitate financial inclusion and expand the use of CBDC as a more efficient and inclusive payment instrument.

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