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TRAM-Based Analysis of SAPAWARGA Adoption for Digital Tax Services Among Generation X and Millennials in West Bandung Regency

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Abstrak

This study examines the technological readiness and acceptance of Generation X and Millennials in adopting the SAPAWARGA application as a means of paying Motor Vehicle Tax (PKB) in West Bandung Regency. The approach used is the Technology Readiness and Acceptance Model (TRAM), which combines the constructs of the Technology Readiness Index (optimism, innovativeness, discomfort, and insecurity) and the Technology Acceptance Model (perceived usefulness, perceived ease of use, and intention to use). The research method used was quantitative by distributing questionnaires to 110 respondents who were selected purposively. The data was analysed using Structural Equation Modelling with the Partial Least Squares (SEM-PLS) approach. The results of the study show that optimism and innovative attitudes have a positive and significant effect on the perception of usability and ease of use of applications. The perception of convenience is the most dominant factor in influencing users' intention to continue using the application. Conversely, inconvenience and insecurity did not have a significant effect, likely due to the high digital literacy of respondents. These findings emphasize the importance of developing easy-to-use features and improving system security to drive long-term user engagement. This study contributes to understanding the generational differences in the adoption of digital public services and their implications for the development of e-government platforms.

Kata Kunci: SAPAWARGA, TRAM, PKB, Digital Public Services.

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1. Pendahuluan

Technological developments in the Industry 4.0 era have brought challenges as well as great opportunities in the transformation of public services in Indonesia. Classic problems, such as complex bureaucracy, low community participation, and limited infrastructure and digital literacy, are still obstacles in the implementation of technology-based public services. Advances in information technology that integrate aspects of computing, information processing, and communication require every individual to be able to adapt to the changes that occur (Ariyanto et al., 2021). In response to these challenges, the government implements the e-government policy as stated in Presidential Decree No. 20 of 2006 in order to increase the efficiency, transparency, and accountability of public services and facilitate interaction between the government and the public. In this context, the adoption of digital technology depends not only on the readiness of infrastructure, but also on psychological and behavioural factors of users. In line with this, previous research shows that in the context of digital application adoption, internal motivation and user experience have been proven to strengthen the perception of usability and convenience, thus having a significant impact on the intention of sustainable use (Zulvia & Shinta Yerina, 2023).

One of the tangible forms of e-government is the One-Stop Mangunggal Administration System (SAMSAT), which provides vehicle administration services and Motor Vehicle Tax (PKB) payments. As a tool to support the ease of PKB payments, the West Java Regional Revenue and Assets Agency (BAPENDA) launched the West Java SAMSAT Mobile (SAMBARA) application which was created in 2018. Then, the SAMBARA application will be integrated into the SAPAWARGA application in 2022 with the aim that services can be faster, more practical, and more transparent.

The SAPAWARGA application was carried out by the West Java Communication and Information Office (DISKOMINFO) in 2019. This application provides complete features ranging from tax payments to citizen aspiration channels. This is a manifestation of supporting the vision of West Java as a digital province. However, in areas with limited networks, geography, and low digital literacy such as in West Bandung Regency are obstacles in the use of this application, so the use of the SAPAWARGA application is not optimal and is still far proportional to the number of taxpayers.

Generation X was born in the 1965–1980 period and Millennials in the 1981–1996 period. Generation X is a generation that tends to be careful in adopting new technologies, they focus more on security, ease of use and reliability (Rahmayanti, Assyifa Putri Kencana, 2025). Meanwhile, Generation Y was born at the beginning of technological development so that it is easy to adapt and more easily influenced by technological developments (Kurniawan & Woro Damayanti, 2019). Both are the most active productive working age groups as users of public services, including as motor vehicle taxpayers. In addition, both also have direct involvement in the tax payment system. By examining two different generations, the research can improve the generalizability of the study results and provide policy recommendations that are more inclusive and responsive to different user characteristics. Comparing the two allows for a deeper understanding of the influence of psychological readiness and digital literacy on public technology adoption.

This study uses the Technology Readiness and Acceptance Model (TRAM) which is a combination of the TRI and TAM models. This model consists of the variables intention to use, perceived usefulness and perceived ease of use derived from the TAM model. Meanwhile, the variables of optimism, innovativeness, discomfort and insecurity come from the TRI model. This model is used to assess the psychological readiness and acceptance of the community, especially generation X and Millennials in using the SAPAWARGA application as a means of payment of Motor Vehicle Tax (PKB) in West Bandung Regency.

2. Metode

This study uses a quantitative approach with the aim of determining the level of readiness and acceptance of the SAPAWARGA application in Generation X and Millennials (Y) in the payment of Motor Vehicle Tax (PKB) in West Bandung Regency. The population in this study is all taxpayers in West Bandung Regency. Meanwhile, the sample is a productive age group that is active as a public service user and is included as a taxpayer in West Bandung Regency during the research period. Data was collected through surveys using questionnaires that were distributed offline through barcodes directed to respondents. Using the purposive sampling technique.

Data was collected through several techniques, namely closed questionnaires, documentation, and short interviews with officers at the West Bandung Regency SAMSAT Office to obtain additional information to deepen understanding related to the application user experience.

3. Hasil dan Pembahasan

This study obtained 110 respondents who are generation X and millennials (Y) aged 24-55 years, adjusted to a predetermined sample. The characteristics of the respondents can be seen in the following table:

Table 1. Respondent Characteristics

Characteristics	Category	Sum	Percentace (%)
Gender	Man	70	63,64%
	Woman	40	36,36%
Age	24-39 years old	106	96,36%
	40-55 years old	4	3,64%
Work	Entrepreneur	33	30,00%
	Private Employees	53	47,27%
	TNI/POLRI/PNS	11	10,00%
	Other	14	12,73%

Source: Research Results (2025)

The characteristics of the respondents in this study show a demographic profile that is very relevant to the context of digital-based public service adoption. Most of the respondents are millennials aged 24–39 years (96.36%), who are known as digital natives and have a high level of digital literacy. This confirms that users' perceptions and behaviors towards the SAPAWARGA application are greatly influenced by age groups who are used to using technology in their daily lives. Meanwhile, the number of respondents from Generation X (40–55 years old) is still very limited (3.64%), indicating that this group is not yet fully engaged in the use of digital

applications for public services, which opens up opportunities for local governments to improve digital literacy across generations.

In terms of gender, the majority of respondents were male (63.64%), which reflects the tendency that affairs related to vehicles and their tax payments are still more handled by men. However, the proportion of women reaching 36.36% also shows the potential for active participation of women's groups in the transformation of digital public services. As for the type of work, respondents were dominated by private employees (47.27%) and self-employed (30.00%). These two groups generally have a high awareness of the importance of time efficiency and ease of access to services, which is the main attraction of using the SAPAWARGA application. In addition, respondents from state apparatus (10.00%) and other work groups (12.73%) showed a diversity of user backgrounds, which can be the basis for improving the features and flexibility of applications to be more inclusive.

3.1 Validity and Reliability Tests

a. Validity Test

The results of the validity test show that all instruments in this model are declared valid by looking at the value of R calculated, and R of the table, the value of R of the table is obtained by looking at the formula df= n-2. If the calculated R value is greater than the R value of the table (0.1874), then the indicator can be further analyzed.

Table 2. Validity Test

Variabel	Code	R count	R table	Information
Optimism (OPT)	OPT 1	0,559	0,1874	
	OPT 2	0,529	0,1874	
	OPT 3	0,542	0,1874	
Innovativism (INV)	INV 1	0,567	0,1874	
	INV 2	0,593	0,1874	
	INV 3	0,558	0,1874	
Insecurity (INS)	INS 1	0,594	0,1874	
	INS 2	0,513	0,1874	
	INS 3	0,523	0,1874	
Discomfort (DCF)	DCF 1	0,567	0,1874	
	DCF 2	0,438	0,1874	
	DCF 3	0,591	0,1874	Saw
	DCF 4	0,629	0,1874	
Perceived Usefulness (PU)	PU 1	0,580	0,1874	
	PU 2	0,555	0,1874	
	PU 3	0,575	0,1874	
Perceived Ease of Use (PEOU)	PEOU 1	0,511	0,1874	
	PEOU 2	0,597	0,1874	
	PEOU 3	0,494	0,1874	
	PEOU 4	0,588	0,1874	
Intention to Use (ITU)	ITU 1	0,561	0,1874	
	ITU 2	0,435	0,1874	
	ITU 3	0,481	0,1874	

Source: Processed Data (2025)

Based on these results, all items have calculated R values that exceed the R of the table, so all instruments meet the validity requirements through the Pearson correlation test.

b. Reliability Test

The results of the reliability test showed that Cronbach's Alpha value exceeded the threshold of >0.6. This indicates that the instrument has a high level of reliability.

Table 3. Reliability Test

Number of Indicators	Cronbach's Alpha	Reiliability Coefficient	Information
23	0,857	>0,6	Reliabel

Source: Processed Data (2025)

3.2 Analysis Using SEM-PLS

a. Measurement Model (Outer Model)

The measurement model is a calculation that is carried out to measure the relationship between latent variables and their indicators. This research was carried out through several stages of testing, including checking the reliability of individual items using standardized loading factors, internal consistency testing with composite reliability, and measuring convergent validity through average variance extracted. As well as the measurement of Discriminant Validity using Fornell Larcker, the value exceeds 0.7 is said to be valid. The results of the outer model are said to be valid and reliable in measuring latent variables if they have a Loading Factor of <0.7, Average Variance Extruded (AVE) <0.5 and Composite Reliability <0.7.

After testing, it can be found that there is still an outer loading value of <0.7, which indicates that the indicator is not able to be used to measure latent variables properly. Therefore, retesting was carried out by eliminating invalid indicators. The indicators that were omitted from the model in this study were DCF 2 and INS 1, DCF 3 was not excluded because when DCF 2 was lost, the DCF 3 indicator value increased so that it showed valid data. The results of this research measurement model can be seen in the following table.

Table 4. Result Outer Model

Variable Leave		Validity Evaluation			Reliability Evaluation		
Variable	**Code**	**LF**	**FL**	**Ket.**	**AVE**	**CR**	**Ket**
Optimism (OPT)	OPT 1	0,812	0,802	Valid	0,643	0,884	Reliable
	OPT 2	0,801					
	OPT 3	0,793					
Innovative (INV)	INV 1	0,797	0,814	Valid	0,663	0,855	Reliable
	INV2	0,820					
	INV 3	0,825					
Insecurity (INS)	INS 2	0,901	0,833	Valid	0,693	0,818	Reliable
	INS 3	0,758					
Discomfort (DCF)	DCF 1	0,845	0,818	Valid	0,669	0,858	Reliable
	DCF 3	0,724					
	DCF 4	0,878					
Perceived Usefulness (PU)	PU 1	0,809	0,813	Valid	0,661	0,854	Reliable
	PU 2	0,791					
	PU 3	0,838					
Perceived Ease of Use (PEOU)	PEOU 1	0,737	0,758	Valid	0,574	0,843	Reliable
	PEOU 2	0,804					
	PEOU 3	0,705					
	PEOU 4	0,781					
Intention to Use (ITU)	ITU 1	0,815	0,780	Valid	0,609	0,832	Reliable
	ITU 2	0,718					
	ITU 3	0,803					

Source: Processed Data (2025)

The results of the above test show that all latent variables have an Average Variance Extracted (AVE) value >0.5, meaning that all variables are valid and each latent variable can explain each variant of the indicator. The discriminant validity value is also good because the FL value has exceeded the minimum limit of >0.7. Then, the Composite Reliability (CR) value is at >0.7 which means that the modified indicator is said to be reliable so that it is able to measure each latent variable well.

b. Model Structural (Inner Model)

Internal model testing was carried out to test the hypothesis describing the correlation between the construct values of exogenous variables and endogenous variables. The results of the hypothesis test are declared acceptable if the t-statistic value has a value of >1.96. This test goes through four stages, namely Path Coefficient (β), Coefficient of Determination (R2), Effect Size (f2), and Predictive Relevance (Q2).

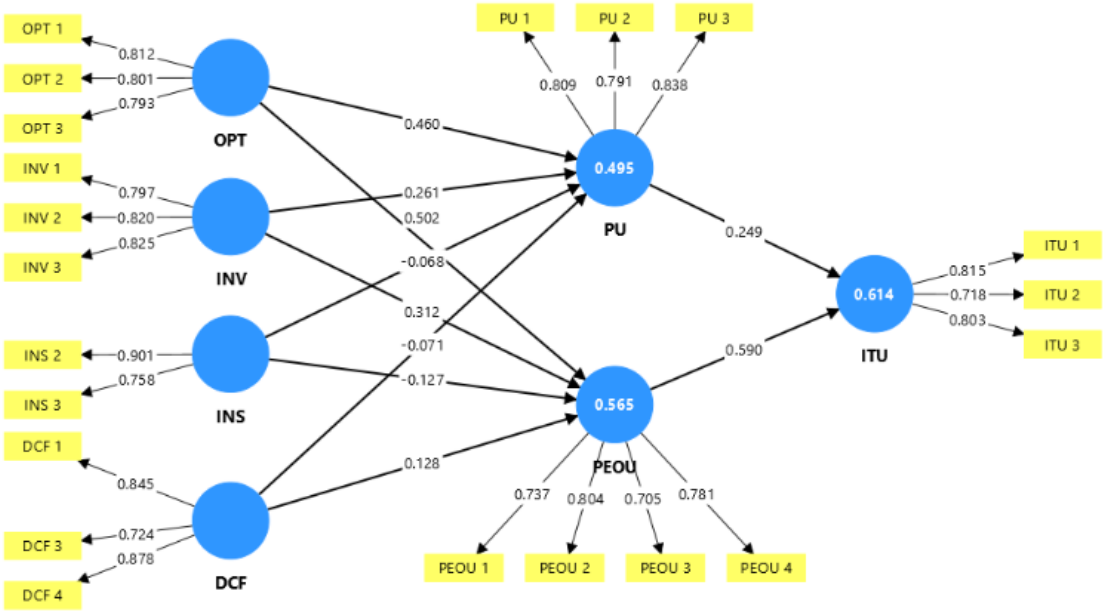
1. Path Coefficient (β)

This test was carried out to determine the magnitude of the influence between variables in the model. In this test, if the value is close to 1, it is considered to have a strong positive relationship. Meanwhile, a value close to -1 indicates a negative relationship.

Table 5. Water Path Coefficient (b)

Variable	OPT	INV	INTO	DCF	PU	PEOU	ITU
Optimism (OPT)					0,460	0,502	
Innovative (INV)					0,261	0,312	
Insecurity (INS)					-0,068	-0,127	
Discomfort (DCF)					0,128	-0,071	
Perceived Usefulness (PU)							0,249
Perceived Ease of Use (PEOU)							0,590
Intention to Use (ITU)							

Source: Processed Data (2025)



Picture 1. Results of the Research Path Coefficient Test

Based on the test results, it can be seen that the OPT and INV variables have a positive and significant influence with PU and PEOU, meaning that the optimism and innovation of users contribute to shaping user perception of the usability and convenience of the system. The INS and DCF variables have a negative influence on PU. This shows that feelings of insecurity and inconvenience have no influence in shaping the perception of usability or convenience of the system. Meanwhile, the PU and PEOU variables have the highest variables against the ITU. This means that the perception of convenience and use of the system is the main thing that can be a driver for users to use the system.

Coefficient of Determination (R^2)

R-Square (R2) is a test that is carried out to measure the strength of the relationship between several variables and the intended variable. In accordance with the standards that have been set, if the R-Square value is >0.75, it is said to have a strong influence. Meanwhile, 0.50-0.75 is said to be moderate, and <0.25 is said to be weak.

Table 6. Hasil Uji Coefficient of Determination (R2)

Variable	R-Square	Information
ITU	0,614	Moderate
PEOU	0,565	Moderate
PU	0,495	Weak

Source: Processed Data (2025)

This model belongs to the moderate and weak category because of the value of R2 >0.5. Users believe that the usability of this application can improve the performance described in the model. The values of the PEOU and ITU variables are greater than the values of the PU variables. This shows that the system can help with work, so that users have the intention to use the application continuously.

Effect Size (f2)

This test is carried out to see how much one variable affects other variables. The value of f2 is said to have a small influence if the value is less than 0.02, if the value is more than 0.15 it is said to have a moderate influence, while if it is more than 0.35 it is said to have a large influence. In this study, the test results had varying influences ranging from small to large.

Table 7. Effect Size (f2)

Research Path	F-Square	Analysis
DCF-PU	0,006	Small
DCF-PEOU	0,024	Keep
INS-PU	0,006	Small
INS-PEOU	0,025	Keep
INV-PU	0,067	Small
INV-PEOU	0,110	Keep
OPT-PU	0,202	Big
OPT-PEOU	0,279	Big
PEOU-ITU	0,468	Big
PU-ITU	0,084	Keep

Source: Processed Data (2025)

The path from the OPT variable to PU and PEOU has a large f2 value, indicating that this variable has a strong f2 value in shaping the perception of usability and ease of use of the system. The same is true of the PEOU to ITU pathway, which shows that the perception of ease of use is the main factor that can affect users' intention to continue using the SAPAWARGA application. Meanwhile, other paths such as INV to PEOU, INS to PEOU, and PU to ITU show a moderate f2 which indicates that the contribution of these variables can be said to be quite measurable. Meanwhile, the path from DCF to PU, INS to PU, and INV to PU has a small f2, so it can be interpreted that these variables do not have a significant contribution. Overall, the results of this f2 test emphasize the importance of usability and the perception of ease of use as a key factor in shaping user intentions. Meanwhile, the variables of insecurity and discomfort had no effect in this study.

Uji Predictive Relevancy (Q2)

This test is performed using the PLS predict/CVAT method to measure the extent to which variables can affect other variables. A value of Q2 is said to be predictive if it is >0.

Table 8. Predictive Relevance (Q2)

Variable	Predictive Relevance	Information
ITU	0,445	Predictive
PEOU	0,524	Predictive
PU	0,442	Predictive

Source: Processed Data (2025)

The results of the Q2 test in this study showed that all variables had a good predictive relationship. A positive Q2 value shows that the model has good quality and relevance so that it can be used to predict good data variability related to the readiness and acceptance of the community, especially the Millennial generation, in using the SAPAWARGA application.

Hypothesis Test Result

Hypothesis testing is carried out to determine the extent of the relationship between constructs. This test is carried out through PLS/CVAT. In general, the relationship is said to be significant if the value is >1.96 at a significance level of 0.05.

Table 9. Hypothesis Test Results

Hypothesis	Relationships between Variables	Original Sample	T Statistics	p-value	Conclusion
H1	DCF-PU	-0,071	1,411	0,161	Rejected
H2	DCF-PEOU	0,128	0,898	0,371	Rejected
H3	INS-PU	-0,068	1,085	0,280	Rejected
H4	INS-PEOU	-0,127	0,795	0,428	Rejected
H5	INV-PU	0,261	4,250	0,000	Accepted
H6	INV-PEOU	0,321	2,253	0,026	Accepted
H7	OPT-PU	0,460	7,118	0,000	Accepted
H8	OPT-PEOU	0,502	4,307	0,000	Accepted
H9	PEOU-ITU	0,590	7,600	0,000	Accepted
H10	PU-ITU	0,249	2,939	0,004	Accepted

Source: Processed Data (2025)

Based on the results of hypothesis testing, there were six hypotheses that were accepted while others were rejected, because the t-test score showed a number of <1.96. The following are the conclusions of the hypothesis testing of this study:

Hypothesis 1: The Effect of Discomfort (DCF) on Perceived Usefulness (PU)

The results indicate a negative relationship between Discomfort (DCF) and Perceived Usefulness (PU). However, the discomfort experienced by users primarily from Generations X and Y does not significantly diminish their perception of the application's usefulness. This may be attributed to the fact that millennials tend to be more adaptive to new technologies and are more tolerant of minor inconveniences when using digital applications. Therefore, even slight discomfort does not reduce their perception of the benefits offered by the SAPAWARGA application. The results of this hypothesis are in line with the research (Priambodo et al., 2024) which revealed that the discomfort variable to perceived usefulness showed a negative influence.

Hypothesis 2: The Effect of Discomfort (DCF) on Perceived Ease of Use (PEOU)

The analysis shows that Discomfort (DCF) does not significantly influence Perceived Ease of Use (PEOU). Users reported that feelings of discomfort did not lower their perception of ease of use, especially among millennial users who generally have high confidence in using technology. Furthermore, the SAPAWARGA application was designed to minimize user discomfort and enhance usability. The results of this study are in line with the research (Priambodo et al., 2024) which revealed that the discomfort variable on perceived ease of use showed a negative influence.

Hypothesis 3: The Effect of Insecurity (INS) on Perceived Usefulness (PU)

Insecurity (INS) was found to have a negative but non-significant influence on Perceived Usefulness (PU). Users, predominantly from Generations X and Y, expressed confidence in using the SAPAWARGA application, likely due to their digital familiarity and the application's government-backed credibility. Consequently, the sense of insecurity was insufficient to alter their perception of usefulness. The results of this study are in line with the research conducted (Priambodo et al., 2024) which revealed that the insecurity variable on perceived usefulness showed a negative influence.

Hypothesis 4: The Effect of Insecurity (INS) on Perceived Ease of Use (PEOU)

The results indicate a negative but non-significant effect of Insecurity (INS) on Perceived Ease of Use (PEOU). The perceived ease of using the application remained high despite feelings of insecurity, especially among Generations X and Y. This can be attributed to the transparent and secure system design of SAPAWARGA, which does not hinder user interaction. This finding is supported by (Priambodo et al., 2024).

Hypothesis 5: The Effect of Innovativeness (INV) on Perceived Usefulness (PU)

The hypothesis results show a positive and significant influence between innovative (INV) on Perceived Usefulness (PU). In this case, generations X and Y have an innovative sense so that by using the SAPAWARGA application, PKB payments will become easier. In addition, the many features in this application can be used by users to be able to explore the SAPAWARGA application independently, so that they feel that this application can be used without the help of others. The results of this hypothesis are in line with research conducted by (Priambodo et al., 2024) which reveals that the variable of innovative on perceived usefulness shows a positive influence.

Hypothesis 6: The Effect of Innovativeness (INV) on Perceived Ease of Use (PEOU)

The hypothesis results show a positive and significant influence between innovative (INV) on Perceived Ease of Use (PEOU). In this context, users' innovative attitudes can significantly increase the perception of ease of using the SAPAWARGA application, which is dominated by the X day Y generation. The results of this study are in line with those carried out by (Priambodo et al., 2024) which reveals that the variable of innovative on perceived usefulness shows a positive influence.

Hypothesis 7: The Effect of Optimism (OPT) on Perceived Usefulness (PU)

The results of the study show that Optimism (OPT) has a positive and significant influence on Perceived Usefulness (PU), Users feel that the SAPAWARGA application has benefits and is useful for daily activities, because they believe that this application can provide services that can help in carrying out activities, especially to pay PKB. The results of this study are in line with the research (Priambodo et al., 2024) which reveals that the variable of innovative on perceived usefulness shows a positive influence.

Hypothesis 8: The Effect of Optimism (OPT) on Perceived Ease of Use (PEOU)

The hypothesis results show that Optimism (OPT) has a positive and significant influence on Perceived Ease of Use (PEOU). Users already have a sense of optimism in using the SAPAWARGA application, and feel confident that this application can provide convenience and comfort in making PKB payments. So it can be concluded that the higher the user's sense of optimism, the higher the benefits will be felt. The results of this study are in line with the research (Priambodo et al., 2024) which reveals that the variable of innovative on perceived usefulness shows a positive influence.

Hypothesis 9: The Effect of Perceived Ease of Use (PEOU) on Intention to Use (ITU)

The hypothesis results show that Perceived Ease of Use (PEOU) has a positive and significant influence on Intention to Use (ITU). The results of this test show that the perception of ease of using the SAPAWARGA application will increase user interest in using the application. Generations X and Y in this study are users of the SAPAWARGA application and are likely to be familiar with the use of technology, so they are used to and can easily operate this application. The results of this study are in line with the study (Priambodo et al., 2024) which revealed that the variable of innovative on perceived usefulness shows a positive influence.

Hypothesis 10: The Effect of Perceived Usefulness (PU) on Intention to Use (ITU)

The results of this study show that Perceived Ease of Use has a positive influence on intention to use. This result proves that the more positive the user's view of the benefits of technology, the greater the user's interest in continuing to use or receive the technology. Users are interested in using the SAPAWARGA application, especially to make PKB payments because it is considered more useful. The results of this study are in line with the research (Priambodo et al., 2024) which reveals that the variable of innovative on perceived usefulness shows a positive influence.

4. Kesimpulan

This study aims to analyse the psychological readiness and technology acceptance of Generation X and Millennials towards the use of the SAPAWARGA application as a means of payment of Motor Vehicle Tax (PKB) in West Bandung Regency, using the Technology Readiness and Acceptance Model (TRAM) approach. Based on the results of testing ten hypotheses, it was found that six hypotheses (H5–H10) were accepted and four hypotheses (H1–H4) were rejected. The factors of optimism and innovative have been proven to have a positive and significant influence on the perception of usability and ease of use of applications. On the other hand, discomfort and insecurity did not have a significant effect, indicating that users tend to be adaptive and have trust in the government's digital system. These findings also confirm that perceived ease of use is the strongest determinant in forming intention to use, followed by perceived usefulness. Thus, the development of digital public services needs to prioritize aspects of ease of access, efficiency, and user-friendly and trusted features. Strategies to improve the quality of the user interface, security assurance, and technology education can be priorities in encouraging the sustainability of the use of the SAPAWARGA application. This study has limitations in the geographical scope and characteristics of the respondents who are mostly from the productive age group. Therefore, further research is suggested to expand population and regional coverage, as well as integrate qualitative approaches to explore contextual factors such as social barriers, digital culture, and local policy dynamics. In addition, the development of an integrative model that combines TRAM with aspects of trust, user experience, or digital literacy can be a promising theoretical exploration direction in the study of public technology adoption.

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