An Empirical Study to Validate The Technology Acceptance Model (TAM) In Evaluating “Desa Digital” Applications

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Abstract. The sustainability of Industry 4.0 has now entered into the tourism sector or Tourism 4.0. Where tourism in Indonesia is a potential thing but still not as expected. Previous research shows that the applied model has not yielded optimal results in predicting platform use, so one of the steps to further study the Desa Digital mobile application research is done with the variables used in this study: Perceived Ease of Use, Perceived Usefulness, Attitude Toward Use, Intention to Use, and Actual System Usage. The aim of this research is to know the technology acceptance variable using the Technology Acceptance Model (TAM) and evaluate it. The method used in this research is to use the Partial Least Square (PLS) method. The results showed that: (1) variables influencing the acceptance of the Technology Acceptance Model, namely: Perceived Ease of Use, Perceived Usefulness, Attitude Toward Use, Intention to Use and Actual System Usage, (2) constructs that affect the model namely Perceived Ease of Use Use and Perceived Usefulness for Attitude Toward Use, Attitude Toward Use for Intention to Use and Intention to Use for Actual System Usage.

Keyword: Technology Acceptance Model (TAM), Prediction Model, Perceived Ease of Use, Perceived Usefulness, Attitude Toward Use, Intention to Use dan Actual System Usage.

1. Introduction

Continuation of the Tourism era 4.0, is an adjustment pattern of the 4.0 industry revolution through the tourism sector through technological convergence termed as the period of the internet of things (IoT), cloud computing, big data analytics and so on. As the era progressed visitor behavior was able to be collected via apps and sensors which were then processed to create a seamless and personalized traveling experience (kemenpar.go.id).

Based on previous literature studies [14] shows that the model in previous studies has not been optimal in predicting factors related to platform acceptance for tourist destinations, which is expected in the model created can indicate the actual use of the platform is applied. Therefore used a digital platform with the Technology Acceptance Model (TAM) as a benchmark for evaluating technology acceptance. This research focuses on the acceptance of technology in the form of a digital platform which is later expected to be accepted and applied to the Kadubungbang Village in the Pulosari Mountains area of Pandeglang Regency. Based on the information that has been obtained, the researchers propose the application of the use of technology in the form of a Digital Village application at the Kadubungbang village tourist location using the Technology Acceptance Model (TAM). In this study data analysis using the Partial Least Square (PLS) approach. PLS is an alternative approach that shifts from a covariant-based SEM approach to variant-based.
2. **Literature Study**

2.1 Technology Acceptance Model (TAM)

TAM is a system concept that represents how consumers start using information technology (IT). TAM is widely used to explain intention to use and the actual system usage of (IT). From several theories and models, TAM has been seen as the most commonly used and the most prominent model for understanding the use and orientation of consumers [8], [14], [4]. Developed the Technology Acceptance Model (TAM) in studying the determinants of IT use. The purpose of TAM is "to provide an explanation of the determination of system acceptance which is generally able to explain user behavior in various technologies, while at a specified and theoretically justified time" [4].

2.2 **Perceived ease of use**

Perceived Ease of Use is defined by [4] as: "The degree to which a person believes that using a particular system would be free from effort" means the level of one's confidence that using a particular system does not require a hard effort. Although the business according to each person is different - in general to avoid rejection from system users for the system being developed, the system must be easily applied by users without spending effort that is considered burdensome. If Perceived Usefulness emphasizes the benefits of a system or technology, the Perceived Ease of Use emphasizes the ease of use of the system or technology. A system that is difficult to control will give Perceived Ease of Use a negative level. In accordance with TAM, perceived usefulness is also influenced by perceived ease of use because the easier a system is used, the more useful the system is felt. A sense of ease of using information technology systems will cause a feeling in him that the system has a use, and therefore creates a sense of comfort when working with information technology systems [16].

2.3 **Perceived usefulness**

Usefulness Perceived Usefulness is defined by [4] as: "The degree to which a person believes that using a particular system would enhance his or her job performance". Perceived Usefulness can be interpreted as "a person’s level of trust that using a particular system can improve the performance of his work". From this definition, it is known that the use of perception is a belief about the decision making process. In the TAM model, Perceived Usefulness is used to measure how much a customer feels that technology can be useful for himself. A system with high perceived usefulness, customers believe can provide a positive "use-relationship performance".

2.4 **Attitude toward use**

Attitude toward usage or attitude to use in TAM is conceptualized as an attitude towards the use of a system in the form of acceptance or rejection as an impact when someone uses technology in his work. [3]. The output of the evaluation process takes the form of acceptance or rejection of technology. In TAM, attitudes towards use are referred to as evaluative effects of individual positive or negative feelings in performing certain behaviors [12], [15]. In TAM, attitude (attitude) as one of the aspects that affect individual behavior consists of cognitive elements or ways of looking (cognitive), affective (affective), and components related to behavior (behavioral components).

2.5 **Intention to Use**

According to [4] Intention to use is the desire of someone to perform certain behaviors that are considered correct. Intention to use is an attitude or behavior that tends to want to use technology [17]. Intention to use is influenced by culture, social, personal, and psychology. Psychological factors that influence consumer decisions include motivation, learning, opinions, beliefs, and attitudes. The main factor is opinions, beliefs, and attitudes to be factors that can influence consumer decisions that cause consumer interest to eventually want to use. The indicator of intention to use is the possibility of using, interested in using new technology shortly, and wanting to use new technology when there is an opportunity [4].

2.6 **Actual System Usage**

Actual system usage is real behavior in adopting a system. In [4], actual system usage is defined as a form of external psychomotor response that is measured by someone with real use. According to [13],
actual usage is measured based on repeated use and more frequent usage by the amount of time spent interacting with the technology or the frequency of use of the technology.

3. Methodology

In this study conducted to look for causes or things that affect the occurrence of something and use [9],[11] in other words this research is included in exploratory research. Using the theory of Technology Acceptance Model (TAM) in predicting factors that are significant to the model applied in the Digital Village application. In this study using the method of analysis with PLS (Partial Least Square), PLS is an alternative approach that shifted from a-based SEM approach covariance to variant-based [7]. Covariance-based SEM generally tests causality or theory while PLS is more predictive in nature. In modeling with the aim of predicting PLS has differences with SPSS, especially in the test of validity and reliability [5][10]. For example, testing can be done without a strong theoretical basis, the data do not have to be normally distributed, the sample does not have to be large.

Partial Least Square (PLS)

PLS is the equation model Structural Equation Modeling component or variance-based(SEM). PLS is an alternative approach that shifted from a covariance-based SEM approach to a variant based [1]. Covariant SEM generally tests theory while PLS is more predictive. PLS is the analysis method powerful because it is not based on many assumptions. The PLS method has its advantages including the data do not have to be normally distributed and the sample size is relatively small (recommended around 30 to 100). PLS can be used to confirm theories and also explain the presence or absence of relationships between variables. PLS can be used as well as analyzing variables that are formed with formative indicators and reflective indicators. According to [2][6][7] states, therefore, parametric techniques to test the significance of parameters are not needed. So the PLS evaluation model is based on predictive measurement which has non-parametric properties.

| Criteria                      | PLS                              | SEM                                               |
|-------------------------------|----------------------------------|--------------------------------------------------|
| Objectives                    | Orientation prediction           | Parameter orientation                            |
| Approach                      | Variance based                   | Covariance based                                 |
| Assumptions                   | specifications                   | Multivariate normal distribution, independence observation (parametric) |
|                               | Predictor(non parametric)        |                                                  |
| Estimation of parameters      | Consistent as indicators and number of samples Increasing | Consistent                                      |
| Scores of variables           | Explicit Explicit estimation     | Indeterminate                                    |
| Relationship of variables - indicators | Can be in the form of reflective or formative | Only with reflective indicators |
| Implications                  | Optimal for the accuracy of predictions | Optimal for parameter accuracy |
| Model complexity              | Large complexity (100 variables and 1000 indicators) | Small - medium complexity (less than 100 indicators) |
Sample size

| Sample size Details | Minimum recommended range of samples |
|---------------------|--------------------------------------|
| The strength of the analysis is based on the portion of the model that has the largest number of predictors. A minimum of 30 to 100 samples is recommended. | A minimum recommended range of 200 to 800 samples. |

![TAM Modeling Framework](image)

**Figure 1: TAM Modeling Framework**

Through previous empirical studies, the following hypotheses are prepared.

- **H1**: Perceived Ease of has a significant effect on Perceivelness.
- **H2**: Perceived Ease of Use has a significant effect on Attitude Towads Use.
- **H3**: Perceived Usefulness has a significant effect on Attitude Towards Use.
- **H4**: Perceived Ease of Use has a significant effect on Intention to Use.
- **H5**: Attitude Towards Use has a significant effect on Intention to Use.
- **H6**: Perceived Usefulness has a significant effect on Intention to Use.
- **H7**: Intention to Use has a significant effect on Actual System Use.

4. **Result and Discussion**

**Descriptive Analysis**

The results of the descriptive analysis are as follows:

| Table 2 Descriptive Analysis |
|-----------------------------|
| Indicator | Min | Max | Total | Ave  | Std.Dev |
| PE1      | 2   | 5   | 320   | 4.94 | 0.57    |
| PE2      | 3   | 5   | 325   | 5.00 | 0.56    |
| PE3      | 3   | 5   | 335   | 5.12 | 0.45    |
| PE4      | 2   | 5   | 318   | 4.91 | 0.55    |
| PE5      | 2   | 5   | 317   | 4.90 | 0.58    |
| PU1      | 3   | 5   | 321   | 4.95 | 0.58    |
| PU2      | 2   | 5   | 320   | 4.94 | 0.62    |
From Table 2, the maximum and minimum values of each indicator with the lowest minimum value, namely the AT3 indicator is 1 and the maximum value shows the value of 5 on each indicator. Furthermore, the total value of each indicator with the lowest score range on the AU1 indicator is 295 to the highest score on the PE3 indicator of 335. Then for the average score on each indicator with a range of 4.63 - 5.00. Then the last is the standard deviation with a range on each indicator of 0.45 to 0.82.

Analysis of Measurement Model

a) Convergent Validity

Based on the output results, it is known that the loading factor value for the indicators AT1, AT2 and AT3> 0.5, which means that the third the indicator is valid in measuring the Attitude Toward Use variable. For the Actual System Usage variable, it can be seen that the three loading factor values indicate a score> 0.5, which means the indicators AU1, AU2, AU3 are considered valid in describing the Actual System Usage variable. Furthermore, the loading factor values for indicators IU1, IU2, IU3 show values> 0.5 so that they are declared valid in measuring the Intention to Use variable. Then the indicators PE1, PE2, PE3, PE4, and PE5 show the loading factor value> 0.5 so that it is declared valid in describing the Perceived Ease of Use variable. Furthermore, the loading factor values for PU1, PU2, PU3, and PU4 indicators> 0.5 then the indicator is valid in measuring the Perceived Usefulness variable.
b) Average Variance Extracted (AVE)

| Variable | AVE  | Explanation |
|----------|------|-------------|
| AU       | 0.713 | Valid       |
| AT       | 0.706 | Valid       |
| IU       | 0.637 | Valid       |
| PU       | 0.626 | Valid       |
| PE       | 0.519 | Valid       |

From Table 4 above it can be seen that the AVE value for each variable, namely actual system usage (AU), attitude toward use (AT), intention to use (IU), perceived usefulness (PU), perceived ease of use (PE) have values higher than 0.5, which have values between 0.51 to 0.71. Thus, the value of each variable with its indicator can be said to be good because it meets the minimum value requirements.

c) Discriminant Validity

| AT1 | 0.822 |
| AT2 | 0.835 |
| AT3 | 0.864 |
| AU1 | 0.382 |
| AU2 | 0.352 |
| AU3 | 0.559 |
| IU1 | 0.625 |
| IU2 | 0.48  |
| IU3 | 0.522 |
| PE1 | 0.55  |
| PE2 | 0.507 |
| PE3 | 0.469 |
| PE4 | 0.524 |
| PE5 | 0.565 |
| PU1 | 0.541 |
| PU2 | 0.607 |
| PU3 | 0.574 |
| PU4 | 0.67  |

Table 5 shows that the Cross Factor Loadings value of each variable is higher than the value of each of the other variables. Thus, judging from the value of distinguishing validity, each variable is a good variable and differs from other variables because it has a higher value when compared to other variables.

d) Reliability Test

| Variable | Composite Reliability | Cronbach's Alpha |
|----------|-----------------------|------------------|
| AU       | 0.881                 | 0.795            |
| AT       | 0.878                 | 0.792            |
Based on Table 6 it appears that the value of composite reliability and Cronbach's Alpha for actual system usage (AU), attitude toward use (AT), intention to use (I U), perceived usefulness (PU) and perceived ease of use (PE) can be said to have good reliability as a measurement tool in this study.

### Analysis of Structural Model

#### a) Determination Coefficient Value ($R^2$)

| Variable                  | $R^2$ | Criteria |
|---------------------------|-------|----------|
| Actual System Usage       | 0.343 | Moderate |
| Intention to Use          | 0.497 | Moderate |
| Attitude Toward Use       | 0.621 | Moderate |
| Perceived Usefulness      | 0.607 | Moderate |

#### b) Path coefficient estimation

| Hypothesis | Path Coefficients | Sample Mean | Std Error | T Statistics | P Values |
|------------|------------------|-------------|-----------|--------------|----------|
| H1. PE -> PU | 0.779            | 0.785       | 0.048     | 16.095       | 0        |
| H2. PE -> AT | 0.352            | 0.348       | 0.127     | 2.762        | 0.006    |
Thus the interpretation of the resulting model can also be explained as follows:

1. Perceived Usefulness is influenced by Perceived Ease of Use of 0.779 (positive and significant), meaning that when the Perceived Ease of Use variable increases by one unit, it will increase the Perceived Usefulness variable by 0.779 units.

2. Attitude Toward Use is influenced by the Perceived Ease of Use of 0.352 (positive and significant), meaning that when the Perceived Ease of Use variable increases by one unit, it will increase the Attitude Toward Use variable by 0.352 units.

3. Attitude Toward Use is influenced by Perceived Usefulness of 0.482 (positive and significant), meaning that when the Perceived Usefulness variable increases by one unit, it will increase the Attitude Toward Use variable by 0.482 units.

4. Intention to Use is influenced by Attitude Toward Use of 0.454 (positive and significant), meaning that when the Attitude Toward Use variable increases by one unit, it will increase the Intention to Use variable by 0.454 units.

5. Actual System Usage is influenced by Intention to Use by 0.586 (positive and significant), meaning that when the Intention to Use variable increases by one unit, it will increase the Actual System Usage variable by 0.586 units.

c) Q-square predictive relevance

Table 9 Relevance of Predictions Based on Blindfolding Results

| Variabel | SSO | SSE    | Q²    |
|----------|-----|--------|-------|
| AU       | 240 | 186.822| 0.222 |
| IU       | 240 | 168.675| 0.297 |
| AT       | 240 | 142.204| 0.407 |
| PU       | 320 | 202.865| 0.366 |
| PE       | 400 | 400    |       |

In Table 8 the Q² value in the research model shows the value above no for the four dependent variables, namely actual system usage (AU) (0.222), attitude toward use (AT) (0.297), intention to use (IU) (0.407), perceived usefulness (PU) (0.366). This indicates that the model in this study already has good predictive relevance.

5. Conclusion

Based on the results of the discussion related to the measurement of the implementation of Digital Village applications to residents in Jabodetabek towards the tourism location of Kadubungbang Village using the Technology Acceptance Model, in this case, I can conclude that: fulfilled to give a feeling or attitude towards the use that will later arise intentions in using the Village application Digital

Five accepted hypotheses are PE against PU, PE against AT, PU against AT, AT against IU, and IU against AU. So in statistical analysis, the factors that can influence the acceptance of the implementation of the Digital Village application are:

- PE (Perceived Ease of Use) affects the use of the Digital Village application (AU) indirectly.
- PU (Perceived Usefulness) has an indirect effect on the use of the Digital Village (AU) application.
- PE (Perceived Ease of Use) and PU (Perceived Usefulness) influence AT (Attitude Toward Use).
• AT (Attitude Toward Use) affects the IU (Intention to Use) that is felt in the use of the Digital Village application.
• IU (Intention to Use) has a direct influence on the AU (Actual System Usage) of the actual use of the Digital Village application.

6. References
[1] Alfidella Shindy, Kusumo Dana Sulistyo, Jatmiko S.Dawam Dwi 2015. Pengukuran Usability I-Caring berbasis ISO 9241-11 dengan menggunakan Partial Least Square (PLS). Universitas Telkom Bandung.
[2] Chin, W. W. (1998). The Partial Least Squares Approach to Structural Equation Modeling. Modern Methods for Business Research, 295, 336.
[3] Chinomona Richard. 2013. The influence of perceived ease of use and perceived usefulness on trust and intention to use mobile social software. ResearchGate.
[4] Davis, F.D. 1989. “Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology”. MIS Quarterly. Vol. 13.
[5] Dewi Alina Cynthia, Wiratmadja Iwan Inrawan. 2014. Pengembangan Model Pengaruh Praktik Inovatif dan Inovasi Produk Terhadap Performansi Industri Kecil dan Menengah (IKM) Pakaian Muslim Di Bandung.
[6] Ghozali, Imam. 2006. Aplikasi Analisis Multivariate dengan Program SPSS. Cetakan IV. Badan Penerbit Universitas Diponegoro. Semarang.
[7] Ghozali, Imam. (2008). Structural Equation Modelling, Edisi II, Universitas Diponegoro, Semarang.
[8] Gu Donxian, Khan Salman, Khan Ikram Ullah, Khan Safeer Ullah. 2019. Understanding Mobile Tourism Shopping in Pakistan: An Integrating Framework of Innovation Diffusion Theory and Technology Acceptance Model. Hindawi.
[9] Hair, et al, 2014, Multivariate Data Analysis, New International Edition., New Jersey : Pearson.
[10] Haris Salsabila Tyas Pradipita, Maulidya Ninda Putri, Desari Lulu Chyntia, Dewi Alina Cynthia. 2018. Analisis Pengaruh Kenyamanan, Ketersediaan, dan Keamanan Pelayanan Kampus Terhadap Kepuasan Mahasiswa UPN “Veteran” Jakarta (UPNVJ).
[11] Lianasari, Dwi, 2009, Sumber Stress pada Karyawan Lini Depan Perbankan: Studi Kasus PT.Bank Rakyat Indonesia (Persero) tbk Kantor Cabang Jakarta Pasar Minggu dan Depok, Skripsi Sarjana, Fakultas Ekonomi Universitas Indonesia Depok.
[12] Matikiti Rosemary, Mpinganjira Mercy, Roberts-Lombard Mornay. 2018. Application of the Technology Acceptance Model and the Technology–Organisation–Environment Model to examine social media marketing use in the South African tourism industry. Aosis.
[13] May Chiun Lo, Thurasamy Ramayah, Abang Azlan Mohamad. 2014. Does intention really lead to actual use of technology? A study of an E-learning system among university students in Malaysia. Croatian Journal of Education.
[14] Natalia, Bianca Silva, Pradipta Indry Aristianto. 2019. Analysis User Acceptance Of Wonderful Indonesia Application Using Technology Acceptance Model (case study: Indonesian Ministry Of Tourism. Universitas Bina Nusantara.
[15] Schierz Paul Gerhard, Schilke Oliver, W.Wirtz Bernd. 2013. Understanding consumer acceptance of mobile payment services: An empirical analysis. Elsevier.
[16] Venkatesh, V. dan Davis, F.D. 2000. A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. Management Science, 46 (2), pp. 186–204.
[17] Widyapraba et al., “Analisis Faktor Faktor Yang Mempengaruhi Niat Pengguna Untuk Menggunakan Aplikasi Daftar Online Rumah Sakit (Studi Kasus : RSUD Gamberan Kediri),” 2016.