SMART VILLAGE READINESS USING DECISION TREE ANALYSIS THE CASE OF BANYUMAS REGENCY INDONESIA

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ABSTRACT

Digital transformation is now inevitable for anyone, individually and organizationally, including village government organizations. Therefore, the village government must be ready to transform into a smart village. The smart village component consists of smart government, smart environment, smart economy, smart mobility, smart people, and smart living. This study aims to analyze the readiness of local communities for smart villages. This research uses quantitative methods, where the population is local people. Kalikidang Village, located in Sokaraja, Banyumas regency, was used as a case study. The number of respondents was 20, taken through proportional random sampling techniques. Data analysis techniques use decision trees that are processed through Rapidminer software. The results showed that individual characteristics significantly influence the readiness of smart villages where the domicile attribute is the most influential.

Keywords: Decision Tree, Individual Characteristics, Readiness, Smart Village, Smart Government, Smart Economy, Smart Mobility

INTRODUCTION

Most of the territory of Indonesia is rural, and local communities live in an agrarian culture. A village is a legal community unit with territorial boundaries and authority to regulate government affairs. The interests of local communities based on community initiatives, rights of origin, and traditional rights recognized and respected in the government system of the Unitary State of the Republic of Indonesia (*Law of the Republic of Indonesia Number 6*, 2014). Based on data from the Central Statistics Agency (BPS), there were 83,931 village-level administrative areas in Indonesia in 2018. The number consists of 75,436 villages (74,517 villages and 919 Nagari in West Sumatra), then 8,444 villages and 51 Transmigration Settlement Units (UPT)/Transmigration Settlement Units (SPT). The province with the most village-level areas in Central Java has 8,559 villages/kelurahan. Then, East Java with 8,496 villages/kelurahan in second place and Aceh with 6,508 villages in third place (Kusnandar, 2019).

Along with the modernization process, rural communities have undergone many changes in various sectors of life. Especially due to information and communication technology (ICT) such as the internet, faster social changes occur in rural areas. Hootsuit reported that the number of internet users in Indonesia in January 2022 have grown to 204.7 million, due to the collaboration of the rapid development of technology, the provision of digital infrastructure, and the improvement of digital services. This figure is also supported by the internet penetration rate, which reaches 73.7 percent of the total population (Blogorian, 2022).

Although currently, internet users are dominated by urban communities, along with the Covid-19 pandemic, which forces people to interact online, the number of internet users in rural areas is also increasing. Therefore, the Indonesian Ministry of Communication and Informatics (Kominfo) is also accelerating the development of internet access to all Indonesian villages to

support digital transformation in the country (Hermawan, 2021; Nasution, 2016; Putra, 2020; Surry, 2021).

With reliable and stable internet access in the village, it will improve people's productivity by utilizing technology. Meanwhile, in terms of economy and business, every villager has an equal opportunity to grow and develop their market. Not only in the region concerned but nationally and even globally according to the borderless nature of internet technology. Meanwhile, from the government's side, both central and regional, reliable internet access is needed to support public services so that all citizens can access them. (Juanda, 2020).

The penetration of ICT users in villages that is increasing and triggered by the Covid-19 pandemic, which requires restrictions on direct interaction in village government public services, has given birth to alternative village government governance that utilizes ICT. As a result, the village government is expected to manage its village into a smart village, managing village governance affairs and serving the community using ICT.

One of the village development concepts suitable for the current era is the smart village concept. Samart village refer to utilizing digital technology for public services and regional development, such as infrastructure, information technology, communication technology, transportation, zoning, irrigation, drainage, and energy (Masterplandesa, 2020). Smart village adopted from smart city that have been developed before (Aziiza & Susanto, 2020; Bahirah, 2022; Herdiana, 2019a).

Research on the implementation of smart villages is still limited and can be found in both implementation cases in Indonesia and abroad. The study of smart villages is still mainly limited strategies, prototyping, and initiatives toward the implementation of smart villages (Anderson et al., 2017; Darwin et al., 2019; Mohanty et al., 2020a, 2020b; Rachmawati, 2018; Salvia et al., 2016; Taibah et al., 2020; vratnik et al., 2018)

These studies show that smart villages are a new model for rural community development. However, the majority of the growing studies are only at the preparation stage for implementation, which reinforces that the study of community readiness for smart villages is very urgent to do and can fill the research gap in the field of village community development.

Banyumas Regency is located in the province of Central Java, consisting of 27 s-districts and 30 sub-districts, and 301 villages. Banyumas Regency is mostly a rural area, and most of the population lives in a rural environment. Kalikidang is one of the villages that is part of the Sokaraja District and Banyumas Regency. This village by the Communication and Information Service and the Sokaraja District Government is being directed to become a prototype smart village of Banyumas Regency based on the considerations; (1) is a small and medium enterprise center in Banyumas Regency, (2) some of its residents have become Internet users and are active in social media, (3) have environmental problems, (4) some of its residents have been active in digital marketing. This paper discusses the readiness of local communities for the implementation of smart villages, which include elements of smart government, smart economy, smart environment, and smart mobility. The componen selection has been adjusted to the community's characteristics and the village's geographical environment.

RESEARCH METHOD

This research is located in Kalikidang Village, Sokaraja District, Banyumas Regency. The method used is quantitative. The study population is the Kalikidang village community which amounts to 5815 people. The number of respondents 200 was determined through the Slovin Formula, with a margin of error of 0.075. Respondents were selected through a proportional random sampling technique in which each area of residence was represented. The primary data

source comes from a questionnaire filled out by respondents. Other data sources come from village statistics books and performance reports of the Kalikidang Village Government.

RESULTS AND DISCUSSION

Table 1. Frequency Distribution of Individual Characteristics (n=200)

Individual Characteristics		Frequency	Percent
Gender	Male	109	54.5
	Female	91	45.5
Domicile	Rural	160	80.0
	Resident Complex	40	20.0
Age	11-20	12	6.0
	21-30	28	14.0
	31-40	60	30.0
	41-50	62	31.0
	51-60	38	19.0
	>60	0	0
Occupation	Formal	46	23
	Non-formal	136	68
	Student/No Occupation	18	9
Education	Elementary School	61	30.5
	Junior High School	33	16.3
	Senior High School	72	36
	Diploma (D3)	7	3.5
	Undergraduate (S1)	26	13
	Master's Degree (S2	1	0.5

Most respondents were male (54.5%) and lived in rural areas, not in residential complexes (80%). Their age is at most 41-50 (31 %). Their occupation is mostly in the non-formal sector (68%). The education level of the majority of graduates from senior high school (36%).

Decision Trees of Smart Village Readiness

The components of the smart village, according to the reference (Hadian & Susanto, 2022; Herdiana, 2019b; Jamaludin & Bachtiar Abdullahi, 2021; Mishbah et al., 2018; Patnaik et al., 2020) at least consist of smart people, smart environment, smart living, smart mobility, smart economy, and smart government. In this study, not all components were used as variables, but only variables that were following village conditions and community characteristics, namely (1) smart government, (2) smart environment, (3) smart economy, and (3) smart mobility. The findings of each component can be described in the following graphs.

Smart Government

The smart government refers to the implementation of ICT in public service in the field of governance effectively (Iin Saputri & Madani, 2021). Based on the diagram below, it can be explained that the variable that most affects the readiness of local communities for smart government is the domicile variable, which is at the top of the decision tree. There is a noticeable difference between respondents living in native villages and housing complexes. Respondents who lived in the original village did not express strongly agree with the smart government. The respondents who strongly agreed were all domiciled in residential complexes, where those who had a bachelor's degree (S1) and had the following additional characteristics; (1) Anyone who has a non-formal sector occupation, (2) They have a formal occupation, but in social media, they are in the active and very active category.
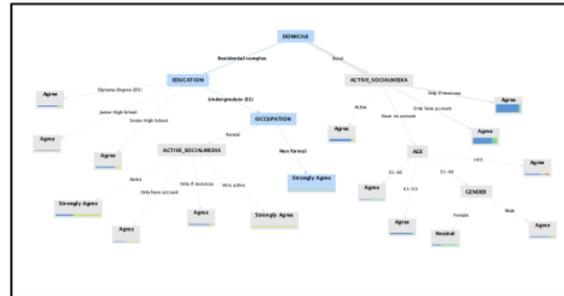
Figure 1. Smart Government Readiness

Smart Environment

Smart environment refers to the adaptability of physical surroundings to inhabitants' preferences and requirements and to be able to adapt to its inhabitants, it must be equipped with various ICT tools and systems (Cicirelli et al., 2017). In this study, the smart environment is the second component of the smart village. The results showed that domicile is at the top of the decision tree, meaning that domicile is an individual characteristic variable that most affects the readiness of local communities towards the smart environment. The decision tree for this component is different from the smart government as described above; the occupation variable is not in the decision tree. This fact means that occupations have no effect on their readiness for the smart environment. The results of this component are also very interesting, where respondents who live in the original rural (not in a residential complex) all of them agree without being influenced by individual characteristics. Meanwhile, respondents who live in residential complexes who say they agree with the smart environment are influenced by their level of education, and who say they strongly agree are determined by their activeness in using social media.
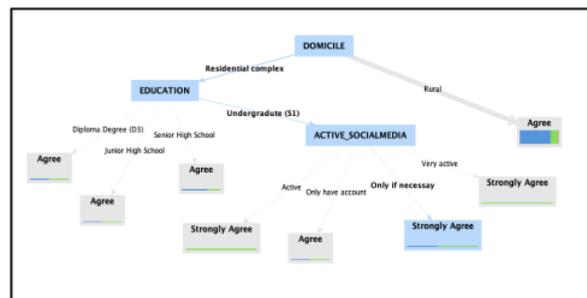

Figure 2. Smart Environment Readiness

Smart Economy

A smart economy can be defined as an economy that is based on technological innovation, resource efficiency, sustainability, and high social welfare as engines for success. It adopts innovation and new entrepreneurial initiatives and increases productivity and competitiveness with the overall goal of improving the quality of life of all citizens (Frank & Fernández-Montesinos, 2020). In this study, the smart economy is the third component of smart villages. The results showed that in this component, domicile is also in the top position in the decision tree, meaning that it is the variable that most affects the smart economy. The most interesting

result of this component is that of respondents who live in the original rural (not in a residential complex), all of them have said they are neutral to the smart economy, except for respondents aged 21-30, male and only if necessary using social media, said agree. For respondents who live in residential complexes, there are only two variations of answers, namely, agree and neutral. The answer agrees with the smart economy, more widely stated by respondents who already have occupations (not students) and are active in using social media.
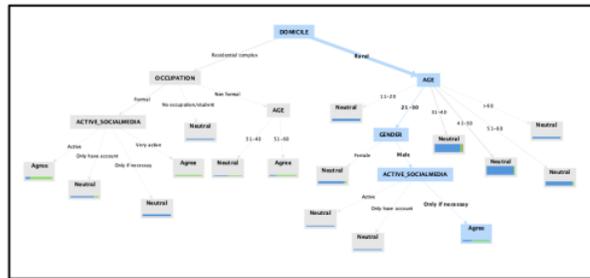

Figure 3. Smart Economy Readiness

Smart Mobility

Smart mobility refers to using modes of transportation alongside or even instead of owning a gas-powered vehicle. This can take many forms, including ride-sharing, car-sharing, public transportation, walking, biking, and more (Geotab, 2018). The domicile component is also a factor that affects people's readiness for smart mobility. In this component, the readiness of the local community is very different compared to other components. No one expressed agree and strongly agreed. All answers are only two variations, namely neutral and disagree. Even people who lived in the original rural (not in the residential complex) expressed disagreement. Female respondents who live in residential complexes tend to disagree with smart mobility. In contrast, male respondents answer neutral and disagree depending on occupation and level of activeness in using social media.
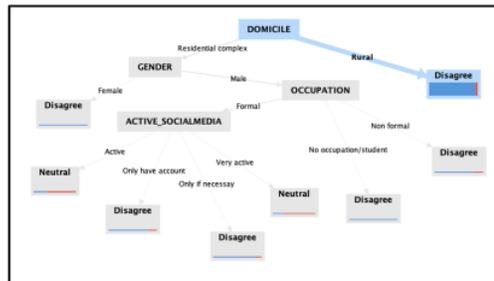
Figure 4. Smart mobility Readiness

From the results of the four components of the smart village above, it can be explained that the domicile variable is at the top of all figure decision trees. This proves that domicile is a variable or attribute that strongly influences individuals to accept or reject smart villages. Domicile is a binomial attribute consisting of two variations: domicile in the original rural and residential complex. This attribute is used because the Kalikidang Village area consists of original rural or village and residential complexes or housing.

The results of this study also prove that individual characteristics influence respondents' attitudes toward smart villages. In addition to domicile, other individual characteristics that

influence attitudes towards smart village are gender, occupation, age, education level, and intensity in using social media. These results are consistent with previous studies that have resulted in the finding that individual characteristics will influence a person's attitude in various cases (Afridi et al., 2022; Aschemann-Witzel & Grunert, 2015; Çebi et al., 2022; Colledani et al., 2021; Fancourt & Mak, 2020; Flor & Finger, 2006; Fujii et al., 2021; Jafarkarimi et al., 1 C.E.; Kim et al., 2019; Losada-Rojas & Gkritza, 2021; Villani et al., 2019).

Of the four components used as smart village attributes, the smart mobility attribute was the one that received the most negative response from respondents. The majority of respondents answered disagree and neutral. This is in line with previous research that smart mobility still encounters many obstacles in various cases in several countries (Butler et al., 2022; Golub et al., 2019; Sánchez-Ávila et al., 2020; Vrščaj et al., 2020)

CONCLUSION

The local community of Kalikidang Village is relatively ready for the implementation of smart villages. However, smart mobility received the most negative response of the four components of smart villages that were used as variables.

Based on data analysis using decision tree techniques, it was found that individual characteristics influence the readiness of local communities for the application of smart villages. Domicile is an individual character who is always at the top of the decision tree. This means that the domicile of the local community is the most influential attribute on the attitude of respondents in the application of smart villages. Other influential characteristics of individuals are their occupation, age, education, and intensity in using social media.

This study recommends that similar research needs to be carried out in other villages in various parts of Indonesia, which have different characteristics. Differences in location and characteristics of villages are very likely to affect local communities on implementing smart villages so that they will get different results.

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