Understanding the smart society in rural development

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Abstract. The smart society is a global movement that is highlighted in line with digital technology advances. Most studies of the smart society focus on the use of technology to aid human activities, especially in urban areas. Yet, the study on how technology impacts rural communities is still limited. As such, this paper provides an understanding of the smart society in a rural development context by examining the role of digital technology. The study applied qualitative research methods to understand the complexity of an empirical study and used in-depth interviews with key informants. Then, a qualitative content analysis method was used by analysing communication systematically and objectively. The study found that the rural community was able to access and utilize external resources to provide added value to the community. Moreover, interactions between the rural and urban communities generated ideas through a learning process. One of these ideas was the application of digital technology to stimulate the social and economic development of rural communities. Digital technology was used to promote the potential of the village and facilitate the community in preserving local culture. Regardless, rural communities still have limited skills in using and developing this technology independently.

1. Introduction

The evolution of information and communication technology drastically changes society through the Internet of Things (IoT), artificial intelligence (AI) and robotics, or also called a digital transformation. On the one hand, digital transformation contributes to improving the quality of human life. On the other hand, the environment and values of society are becoming increasingly complex and diverse [1]. This digital transformation is a pillar of global industrial policies, e.g. Society 5.0 in Japan, Smart Cities in Asia, Industry 4.0 in Europe, and the Industrial Internet in North America [1]. These policies emphasize innovation, including the development of digital technology and its integration with social and economic activities. In line with the development of digital technology, the smart society is highlighted in various global issues. Most studies have explained the smart society as the use of digital technology to help human activities, especially for the urban community [1–3]. Meanwhile, the innovation and development of digital technology have also spread to rural areas.

In many urban and rural studies, the concept of smart emphasizes innovation as a solution to the challenges of development [4, 5–7]. In addition, this concept highlights the use and integration of information and communication technology in the public service sector. Meanwhile, in the smart village concept, villages use digital technology as a tool to innovate and optimize resources or potential, both internal and external, for their needs [5]. In this regard, external knowledge, interaction, networking, and collaboration in research and development are important [4, 8, 9]. Therefore, smart is...
translated as an innovation to optimize resources and meet local needs, including the use and development of digital technology.

The smart society is not yet clearly explained in a rural development context. The term smart for rural development, known as the smart village concept has been described several studies as a strategy for improving rural development perspective. Generally, the smart village concept emphasizes the ability of village societies to create and develop new opportunities from their own resources so that these villages will be more developed, productive, and independent [4,6,10,11]. However, rural local culture tends not to be compatible with technological developments[12,13]. Related with the smart society, rural communities are expected to create added value for rural development by adopting technology that is appropriate to the characteristics and local culture. Thus, it is important to examine the role of technology in developing rural communities.

Development studies have researched the smart society by focusing on the use and development of technology to aid human activities[2,11,14]. However, these studies have not examined the extent to which technology can benefit rural communities with their local culture. Responding to this gap in the literature, this paper provides an understanding of the smart society in rural development through an empirical study. Furthermore, this paper shows the benefits and constraints of the development of digital technology for rural communities. The results of the research can be applied as strategies in optimising local potentials in rural areas by using digital technology.

2. Methods
To provide an understanding of the role of the smart society in rural development, we employed qualitative research methods through an empirical study. We used qualitative research to understand the complexity of the interactions and social phenomena that highlight the role of digital technology in rural development. In doing so, we conducted in-depth interviews with key informants who play a role in village development and who know the process of developing digital technology in their village. Subsequently, the respondents were selected based on recommendations by previous respondents who fulfilled the criteria (snowball sampling). The key informants consist of community leaders, the village chief, village tourism managers, and related government agencies. They were 9 (nine) key informants and were selected based on criteria, including managing tourist villages and/or tourist attractions, participating in the development of a tourism village website, participating in making content on social media, and decision-makers. We used Lamajang Village, Pangalengan District, Bandung Regency, Indonesia as our case study. The people in this village have applied digital technology to their social and economic activities in the form of websites and social media. We obtained the data for this study from key informants and related documents. In addition, we made observations to see the conditions and interactions of the community.

The variable being chosen for observation and interview include the use of appropriate digital technology, the ability to think outside the village itself, the ability to build new networks and alliances with diverse communities, the ability to think for yourself, which is about local societies who take stock of local assets, utilize the best available knowledge, and take initiative. We used the qualitative content analysis method to study and analyse communication systematically and objectively by paying attention to the context[15]. In the process, we first sorted and coded the relevant data. Then we reassembled the data which involved choices, such as what points to take from existing quotes, how to build hierarchical relationships, and how to design a matrix. In this step, we compiled the interview citations and then searched for the meanings contained in the message or text and interpreted these. Furthermore, we formulated conclusions based on patterns found in the data [16]. To prevent bias by including personal opinions, we conducted three procedures in the analysis process, i.e., making constant comparisons between different key informants, observing and restructuring findings that initially seemed similar but did not fit the flow of analysis, and lastly looking for alternative explanations for initial observations[17].
3. Result and Discussion

This section explains the analysis and results that consist of the development of rural tourism by rural communities, the role of digital technology, and our findings regarding the smart society and the process of rural development.

3.1. The Development of a Cultural Tourism Village: An Overview of the Case Study

Lamajang Village is located in the Pangalengan Sub-District which contains an agglomeration of tourist objects and attractions in Bandung Regency, West Java, Indonesia. The region especially offers natural tourism attractions. As can be seen in Figure 1, Lamajang Village is a hilly rural area located in the highlands with agriculture as the dominant land use. Since 2011, the local government has designated this village as a cultural tourism village in Bandung Regency and since then the village is promoted on the national level. In this cultural tourism village, tourists are given local knowledge and experience with the life of the village community. For example, tourists can do farming or herd buffalos while being provided with local knowledge about the history, values, and farming methods. Many of the tourists who visit this village are city people, especially from outside Bandung Regency.

Figure 1. The Location of Lamajang Village in Bandung Regency, West Java, Indonesia.

The tourist attractions in Lamajang Village consist of traditional arts (dance, music, handicrafts), traditional foods, the local culture, village people's lives, and a natural environment. As can be seen in Figure 2, Lamajang’s famous attraction is the traditional village which is called Kampung Adat Cikondang. It contains materials and cultural norms that have been created 360 years ago, such as traditional houses, heirlooms, and early manuscripts. Some of the cultural norms include the four celebrations called 'traditional rituals' which must be carried out in this village each year. These rituals include the Wuku Tawun ritual at the end and beginning of the Islamic Year; the Hajat Lembur ritual in the middle of the village; and the water rituals called Hajat Solokan and Hajat Paralon.

Each celebration contains values that are ingrained in the community. For example, the Wuku Tawun ritual is performed by the community as a form of gratitude to God who has provided crops that can sustain the community throughout the year. It also aims to welcome the Islamic New Year and ask for protection and safety for the upcoming year. This ritual has been carried out for more than three centuries and has become a part of the culture of the community until now. Moreover, the
indigenous communities own paddy fields and forests. The indigenous community is a group of people who are descended from founding fathers of the village or have biological family relationships. They have the right and responsibility to preserve the traditional villages. In addition, the indigenous community is part of the greater rural society where they participate in social and economic activities like all the other villagers.

The rural community manages the tourism activities in Lamajang Village independently. There are community leaders who facilitate community participation in the development of cultural tourist villages. In this village, local culture is diverse and agglomerated. In addition, this village has a natural rural environment that is still beautiful and has many water sources. The community leaders used this location as objects and attractions for tourists to learn local knowledge and experience local life. The community leaders and the local communities cooperate to make tour packages in this village. All the potential in this village is used for tour packages, ranging from one day to ten days tour packages depending on the wishes of tourists. For example, a day package includes traveling to the Cikondang Traditional Village and the Batu Eon Site and watching local dance or music performances at night.

![Figure 2. The Attractions of Lamajang Tourism Village: Traditional architecture.](image)

Initially, local communities were less accepting of tourist activities but by now they realized the importance of tourism activities for their villages. They get economic benefits from tourism activities and their daily lives in farming, art training, and making traditional food and crafts now generate additional income. The tourist visit also brought additional costs for environmental maintenance in the area of traditional villages. Yet, the tourist visits provided income as houses around the traditional village of Cikondang were used as homestays, the number of stalls increased and opened until in the evening, and motorcycle transport services were set up for local transportation of tourists. Broadly speaking, tourist activity provided economic benefits for rural communities. Furthermore, rural communities were encouraged to maintain and preserve local culture and the uniqueness of their villages.

### 3.2. The Role of Digital Technology

Lamajang Tourism Village has a website to promote itself as a tourism destination. The information on the website is integrated with Google Maps and contains photos and videos. Moreover, there are also videos taken using drones to show the overall potential of the village, especially the landscape. In addition, many online social media were used to market Lamajang Tourism Village. As can be seen in Figure 3, the website and the content were created by people outside the community such as universities (innovation development centres and students), private parties (internet providers and consultants), the government and tourists. Generally, these outside contributors are from cities. Yet, the process of creating content on websites and in social media involved the local community. In
In this regard, there was a process of discussion and briefing between outside and local communities to ensure the cultural norms and rules are adhered to.

Initially, village tourism was promoted by word of mouth and through a website since 2015. Through the website, the village could reach a wider market and consequently, the number of tourists increased. Information on the website attracts the viewer to come and find out more about Lamajang Village. Moreover, the website facilitates the viewer to get more detailed information that might not be listed on the website through the contact person on the website. This service was implemented to facilitate tourists to obtain information that might not be listed on the website. Moreover, the website helps the tour manager in fulfilling the desires of tourists because there are several alternative village tourism packages. When visitors order a tour through the website, the manager also has time to prepare the local community. As quoted in the interview by the manager of the tourism village:

“The website development aims to promote Lamajang Village. Lamajang Village is the primary tourism village in Bandung Regency because of the large number of tourists and many other indicators. (...) After the website was developed, the number of tourists increased. The website helps the promotion of village tourism.”

Digital technology has facilitated the indigenous community to introduce their local culture consisting of local knowledge, norms, and cultural materials to the wider public. Indigenous communities in Lamajang preserved their local culture through the transfer of knowledge and interaction with the wider public, especially those visiting Cikondang Traditional Village. Thus, the preservation of local culture was indirectly facilitated. Moreover, tourists were attracted to visit the village because of information on the website or social media. Therefore, digital technology can facilitate learning and understanding other cultures but cannot provide the experience that tourists feel when they visit the village.

3.3. Smart Society and Rural Development Process: Findings from Lamajang, Indonesia

The smart concept focuses on creating innovation as a solution to the challenges of development [2, 4–7]. In addition, this concept highlights the use and integration of information and communication technology in the public service sector. Smart also means being able to use digital technology according to their needs, while collaborating, building cooperation, and taking initiatives to make changes towards better local conditions [4, 5]. In this regard, the existence of a local and creative economy is a key determinant of economic growth in rural areas [4, 18]. Thus, the smart society can be understood as the ability of rural communities to create and develop opportunities from their own resources through innovation, collaboration, and access to knowledge and technology that benefits the rural community.

Lamajang Village has been visited by tourists or parties who are interested in rural life, including academics, researchers, students, and television media. Those visitors generally come from cities in
Indonesia and have learned about this village from the internet, on their website or on social media. In this regard, digital technology could provide greater opportunities for rural communities and could facilitate the interaction between rural and urban communities. Communities leaders were also often invited by the government to share knowledge and experiences in developing tourism villages and local culture. Furthermore, the interaction between rural and urban communities provides lessons for rural communities to improve their conditions yet, at the same time, preserve local values. As such, the rural communities were able to access external resources and knowledge.

Naldi et al. [4] stated that the smart concept is characterized by innovation and is spurred by external knowledge, interaction, networks, and collaboration, especially in research and development. Innovation has the potential to maintain economic sustainability thereby contributing to rural development [19,20]. Meanwhile, local culture has the potential to foster rural development and rural communities’ well-being [3,18]. Through access to external knowledge, village communities put forward ideas to develop their village as a cultural tourism village by focusing on education or learning activities. To achieve this goal, the village communities interacted with the government and tourists and then saw opportunities to get economic benefits and to preserve their local culture. As quoted in the interview with a key informant who said:

“I shared the local knowledge and culture, and I also got new knowledge from them about the results of their research and experiences. Hence, I began to seek ideas to preserve our local culture from them and from various sources such as the internet and my family. (...) I requested the tourism agency that Kampung Adat Cikondang is developed as cultural and educational tourism, not entertainment tourism.”

Rural societies have a local culture that consists of local knowledge, values, norms, and cultural material. This local culture internalized in the social system of society and also preserved by the village community. This local culture is a unique social and economic resource that the community possesses. This potential was disseminated through digital technology thereby their local culture became well-known and attracts the wider public who seek to get to know and learn about local culture. In addition, digital technology could be able to facilitate learning and understanding of other cultures worldwide. Moreover, digital technology overcame the constraints of local norms that restrict certain tourists from coming to traditional villages so that they can still learn the local culture. For the indigenous community, many people knowing and learning about their local culture is more valuable than economic benefits. The indigenous community was open to ideas or external assistance in accordance with their cultural norms that could help preserve their local culture. As quoted in the interview with a key informant who said:

“Many people came for research and study. TV stations are allowed to record the local culture here as long as it is for education purposes. I am not trading or looking for a property, but my goal is to preserve culture and history. If those who are researching are non-Islamic such as from abroad, then they can only be in front but they cannot enter the traditional villages.”

To sum up, we conclude that the smart society is defined as the ability of society to learn, construct, and develop their knowledge to become an innovation that provides economic and social benefits for the society itself. Moreover, communities use digital technology as a tool in line with the values and cultural norms of these societies. Moreover, digital technology facilitates the interaction between rural and urban society and also facilitates local communities to access external knowledge and resources. Therefore, digital technology is used to innovate, thereby contributing to rural development.
4. Conclusion
The smart society is seen as a condition of people who benefit and take advantage of the development of information and communication technology (ICT) based on the Internet of Things (IoT), artificial intelligence (AI) and robotics [1,3]. Although the development of ICT has spread and is sensed in rural areas, the translation of the smart society concept is less relevant in the rural context because rural societies still have limited skills in using and developing ICT independently. However, rural societies have a wealth of local culture and potential that is not present in cities. This uniqueness attracts urban dwellers to learn, experience, and develop ICT in their areas. Smart society uses all resources, both internal and external, for the welfare of the community itself. In this regard, the interaction and collaboration among rural and urban communities are important for rural development [4,8,9]. Meanwhile, digital technology is used as a tool that can facilitate interactions and can help local communities to access external knowledge and resources. For this reason, a continuous collaboration between the community, universities, and the industry is needed. Rural societies are not yet able to manage the digital technology that is developed in their villages sustainably. College or industry training is often not enough so better knowledge management is needed, especially external knowledge that benefits the villages.

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References
[1] Fukuyama M 2018 Society 5.0: Aiming for a New Human-Centered Society Jpn. SPOTLIGHT 47–50
[2] Morandi C, Rolando A and Di Vita S 2016 From smart city to smart region: Digital services for an Internet of Places (NYC: Springer)
[3] Shiroishi Y, Uchiyama K and Suzuki N 2018 Society 5.0: For Human Security and Well-Being IEEE Comput. 51 91–5
[4] Naldi L, Nilsson P, Westlund H and Wixe S 2015 What is smart rural development? J. Rural Stud. 40 90–101
[5] European Network for Rural Development 2018 Smart Village European Network for Rural Development (Brussel: ENRD)
[6] Sutriadi R 2018 Defining smart city, smart region, smart village, and Technopolis as an innovative concept in Indonesia’s urban and regional development themes to reach sustainability IOP Conference Series: Earth and Environmental Science 202 (IOP Publishing) p 012047
[7] Shrestha N, Keitsch M M and Singh S 2017 Exploring Smart Rural Planning at Jhong, Mustang: A Step towards Sustainable Development Proceeding of IOE Graduate Conference 5 361–69
[8] Cohen W M and Levinthal D A 1990 Absorptive capacity: A New Perspective on Learning and Innovation Adm. Sci. Q. 35 128–152
[9] Cantwell J and Zhang F 2012 Knowledge Accession Strategies and The Spatial Organization of R&D Firms Innov. Growth 1 88–111 10.1093/acprof:oso/9780199646685.003.0005
[10] ENRD 2018 Smart Villages: Revitalising Rural Services (Brussel: ENRD)
[11] Zavratnik V, Kos A and Stojmenova Duh E 2018 Smart Villages: Comprehensive Review of Initiatives and Practices Sustainability 10 2559
[12] Rachman N F and Siscawati M 2016 13 Forestry law, Masyarakat Adat and Struggles for Inclusive Citizenship in Indonesia Routledge Handb. Asian Law 224-49
[13] Sugiswati B 2012 Perlindungan Hukum Terhadap Eksistensi Masyarakat Adat di Indonesia (Legal protection for indigenous peoples in Indonesia Perspective) Perspektif 17 31–43
[14] Poggi F, Firmino A and Amado M 2015 Moving Forward on Sustainable Energy Transitions: The Smart Rural Model Eur. J. Sustain. Dev. 4 43–50
[15] Babbie E 2007 The practice of social research (Belmont, CA: Thomson Learning (Inc))
[16] Hendrarso E S 2005 Penelitian Kualitatif: Suatu Pengantar, dalam Metode Penelitian Sosial: Berbagai Alternatif Pendekatan (Qualitative Research: An Introduction, in: Social Research Methods: Various Alternative Approaches) editor Bagong Suyanto (Jakarta: Penerbit Kencana)
[17] Yin R K. 2017 Case Study Research and Applications: Design and Methods (Newbury Park: Sage Pub)
[18] Bell D and Jayne M 2010 The Creative Countryside: Policy and Practice in The UK Rural Cultural Economy J. Rural Stud. 26 209–18
[19] Hansen E G, Grosse-Dunker F and Reichwald R 2009 Sustainability Innovation Cube—A Framework to Evaluate Sustainability-Oriented Innovations Int. J. Innov. Manag. 13 683–713
[20] Giddings B, Hopwood B and O’Brien G 2002 Environment, Economy and Society: Fitting Them Together Into Sustainable Development Sustain. Dev. 10 187–196