

# SEPAKUNG VILLAGE: MICRO RESILIENCE IN BORDERLESS ERA

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## Abstract

Sepakung Village is also known as the digital village because of the installation of wireless internet connection facilities in 12 districts around the village. The difficulty of obtaining information in the industry 4.0 era has allowed village officials to create unlimited access opportunities for rural communities as part of the digital benefits and simplify the administrative procedures for residents currently outside the village. This research aims to measure the level of cyber resilience of digital villages, and to find a model of cyber resilience for the development of digital villages in Indonesia based on laws and policies, economy, society and culture, politics and technology. This study is based on the survey data collection method, using questionnaire surveys, and closed-end statements based on the supplementary survey data filling method, using the Likert scale (interval) as the measurement mode of the respondent's answer. The number of participants was 11, most of them were between 15-20 years old. This study shows that most of the interviewees have sufficient understanding, insight and response measures to the threats facing the digital world, but lack collective improvement activities. Cooperation among village stakeholders (including officials, communities, scholars and governments) is needed to realize a digital village community with comprehensive and sustainable network resilience in a borderless global community.

**Keywords:** Digital Village; Industrial Era 4.0; Cyber Resilience; Micro Community.

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## 1. INTRODUCTION

If the village used to be a production base in the trade chain, in this era of free market competition, the village is just a market. At this time, the village as a production base must strictly compete with the entry of imported products with competitive prices and quality. People's production bases are mostly located in villages, starting with agriculture, plantations, fisheries, animal husbandry, community mining, and small, medium and micro enterprises. The micro-economy is one of the pillars of the country's economic strength (Doran & Fingleton, 2015) and it has become the foundation of millions of Indonesians. The village is the lowest level of government in the administrative area of Indonesia's regional/city government. According to BPS 2014 data, the number of villages and streets in Indonesia is 82,190. Based on the landforms of the archipelago, the villages are divided into 12,827 villages near the sea and 69,363 villages not near the sea. The province with the most urban villages is Central Java with 8,578, and the least is DKI Jakarta with 267. From this point of view, this village has great potential for development in the era of free competition (Fahmi & Sari, 2020).

Central Java is one of the provinces with the largest number of villages in Indonesia. In January 2018, Ganjar Pranowo, Governor of Central Java Province, unveiled the Sepakung Village in Banyubiru District, Semarang County. Previously, Sepakung Village was a village with poor cellular network conditions. Because of its location in a mountainous area, cellular operators were reluctant to build towers in the area. Therefore, it is difficult for residents to obtain information. Based on these conditions, the Sepakung village government of Banyubiru District, Semarang County launched the Digital Village Project with Wi-Fi internet connection facilities being installed in 12 small villages in Sepakung Village ("Provider Selular Enggan Bangun Tower, Sepakung Justru Gagas Desa Digital - Pemerintah Provinsi Jawa Tengah," 2018). In the era of Industry 4.0, the residents/communities of Sepakung village encountered difficulties in obtaining information, which caused residents and local village managers to take the initiative to establish independent communication lines by establishing Wi-Fi networks throughout the village. The concept advocated by the Sepakung village agency is to create opportunities for rural communities to enter unrestrictedly as part of the benefits of digitalization, and to promote the villagers currently dispersed outside the city as students and workers in the private sector and the digital economy (Slamet et al., 2016).

The era of the Internet of Things encourages changes in the daily life of rural communities. One of the positive aspects is to overcome isolation and establish communication and information networks for the community to encourage government, social, economic, and cultural activities (CISCO, 2016). On the other hand, certain impacts must be managed so they will not cause harm to the village community. One of them is the effect of digital e-commerce, which can be accessed by various groups through smart phone devices, and its functions and convenience have increased consumption in rural communities. As for the production department, it must be observed that the production department is still based on traditional and high-cost technologies, which are often unattractive and begin to be abandoned, turning to a production department based on innovation and digitization. For example, farmers on the slopes of Merbabu build a digital service based business for the sale of organic vegetables produced by their farm (Rasyid, 2020).

Currently, in the digital age, villages and their communities are facing rapid technological progress and the wave of digitization. This global change requires villages to transform and adapt (Boyes, Isbell, & Watson, 2016). Some previous studies have shown that the transformation and digitization of rural areas have improved life satisfaction and happiness, especially for those directly involved in production, they have the opportunity to use the development of knowledge and technology, and use their skills to make a living in the village's strategy (Conklin, Shoemaker, & Kohnke, 2017). The need of network resilience for public service systems and infrastructure (smart cities) is consistent because it involves the availability of important public services that are accessible to the public. Being prepared for anything, being able to quickly adapt to change and survive and being able to quickly recover from damage, because when dealing with the rapidly changing development situation of the online world, security alone is not enough. Resilience is the ability of families, communities and countries absorb and recover from shocks, while

actively adjusting and transforming their structures and methods to cope with long-term pressures, changes and uncertainties (Manoby et al., 2021).

The concept of resilience is associated with the village which has the ability of rural areas to adapt to the external environment that changes in a way to maintain a satisfactory standard of living (Heijman, Hagelaar, & Heide, 2007). The perspective of rural resilience refers to the ability of the village to cope due to the economic, ecological and cultural vulnerability. Therefore, network security alone is not enough to overcome the increasing, proliferating, complex and inevitable network attacks. Therefore, cyber resilience is needed to have the ability to face continuous attacks. Resilience enables the government to continue to provide services to the community, business world, the industry to continue operations, and people to continue to carry out daily activities while resisting or responding to cyber-attacks that occur at any time (Ran & Qi, 2018). Cyber security does not only contain ideas about cyber-attack defense and prevention but also emphasizes actions to respond quickly and survive in times of crisis. Considering the urgency of the above issues, Indonesia's digital village development requires a network resilience model.

## 2. LITERATURE REVIEW

### 2.1. Digital Village Legal Framework

The 2004 Decree No. 32 of the regional government defines the village as a legal community unit, which has the right to regulate and manage the interests of the local community according to the local ancestry and customs recognized by the national government system as District/Urban area. The law arrangement also shows that the village, as a unit of a common law community, has the right to regulate and manage the interests of its community and has the opportunity to fulfill its potential. This is the spirit widely promoted by Law No. 1, Document No. 32 of 2004, the spirit of organization and management in accordance with local conditions in various regions. In order to strengthen the village, the government subsequently issued the Minister of the Interior's Regulation No. 30 of 2006 about the procedures of delegating district/city government affairs to the village. The regulations explain that 31 (thirty-one) district (city) government affairs can be delegated to the village, including: agriculture and food security, forestry and plantation affairs, education and culture, public works, information and communication fields, and the field of village community empowerment.

Therefore, in further development, the digital village project was born in several regions of Indonesia, and its foundation can be traced back to the 1945 Constitution, especially Article 28C Paragraph (1) and Article 28F. Article 28C paragraph (1) stipulates that everyone has the right to develop himself by satisfying his basic needs, to be educated and to benefit from science, technology, art and culture in order to improve the quality of life and benefit the people. Article 28F of the 1945

Constitution stipulates that everyone has the right to communicate and obtain information for the development of their personal and social environment, and to use all possible channels to seek, obtain, possess, store, process and transmit information. Decree No.12 of 2011 about the formulation of laws and regulations and the Presidential Regulation No. 1 of 2007 on the approval, legislative and dissemination of laws also indicate the need for an Internet-based information system. Then there is the Presidential Decree No. 20/2006 on the National Information and Communication Technology Commission to also support this need.

In addition, Presidential Directive No. 3 of 2003 on the national policy and strategy for the development of e-government also clearly stipulates the government's obligation to disseminate information through the use of information technology networks. Even if matters in the information and communication fields are stipulated as one of the matters that can be submitted to the village in the Minister of the Interior's Regulation No. 30 of 2006, this indirectly provides a legal basis and an opportunity to make the digital village plan happen. The provisions of Article 7 of "Public Information Disclosure" No. 14 of 2008 can also be understood as another legal basis closely related to the implementation of the Digital Village Program. In essence, Article 7 requires public institutions, such as legislative, administrative, and judicial institutions, to provide and/or publish public information within their jurisdiction to public information applicants in addition to information excluded in accordance with regulations and public agency, using electronic and non-electronic facilities or media.

## 2.2 Village Digitization and Cyber Resilience

The development of the digital village that is promoted by the government stands with the slogan "Make Indonesia 4.0". The slogan achieves inclusive and sustainable digital development by covering various fields so that "no one is left behind." The slogan was also supported by the development of Indonesia's cyber security strategy (Agarwal, Dhingra, & Gryseels, 2018). The digital village concept is a derivative of the smart city concept and is currently widely used in many cities in Indonesia, and Semarang is one of them. Why is a cyber-security strategy important? Because the concept of digitalization in public services has entered the field of infrastructure and it must be protected from various threats (Young, 2019). If the communication and information infrastructure (critical infrastructure) that enters the public service does not work properly, it will damage the community, lead to chaos in public services, and even provide social, economic, political and other massive chaos (Ormrod & Turnbull, 2018). Therefore, according to the National Network and Encryption Agency (BSSN), information and communication technologies are used in social, economic, legal, organizational, health, education, cultural, government, security, national defense etc. in proportion to the high utilization of information and communication technology and the risks and threats of abuse of information and communication technology are becoming higher and more complex. The strategic goal

of Indonesia's cyber security strategy is to achieve cyber resilience, public service security, cyber law enforcement, cyber security culture and cyber security in the digital economy (Chotimah, Iswardhana, & Pratiwi, 2019).

The development of cyber resilience in the digital sphere must be carried out immediately, because security alone is not enough to deal with cyber-attacks and cyber-crimes. The ability to survive, adapt, and evolve requires not only technological development, but also other developments. At present, there are still few or almost non-existent researches on cyber resilience in Indonesia. Research related to cyberspace is still focused on cyber-crime, cyber defense, cyber security, and e-commerce. There must be a difference between defense and cyber resilience, and both have two different and separate meanings. Research related to cyber defense is mainly used for military purposes. The scope of cyber defense is narrow, and only includes anticipation or response to the actions and protection of critical infrastructure of organizations, government entities, and other possible networks. The scope of cyber resilience is broader, that is actions to strengthen collective capabilities before attacks, detect upcoming attacks, respond to attacks, reduce the impact of attacks, track the source of attacks, and quickly restore their functions, as well as attend to classes at the same time, given the circumstances and conditions of the attack that occurred. On the other hand, the scope of cyber resilience is broader than cyber defense, covering legal and policy aspects, economic aspects, social and cultural aspects, politics, international cooperation, good governance, management, and technology.

In addition, cyber resilience is one of the keys to overcoming the digital economy. It refers to various economic activities, including the use of digital information and knowledge as key elements of production, modern information networks as an important activity space, and effective use of information and communication technology (ICT) as an important driving force for productivity, growth and optimizing the economic structure. In this context, the concept of digital economy has become more common, marked by the existence of modern information networks and the use of ICT. In addition, one of the OECD teams in 2016, the digital economy cannot do without talking about technology and its very wide-ranging impact, not just talking about e-commerce, but covering all fields (Skapars et al., 2017). The digital economy is a combination of multiple technologies, namely general technology (GPT) and various economic and social activities that people carry out through the Internet and related technologies. This includes physical infrastructure based on digital technologies (broadband lines, routers), devices for access (Google, Salesforce), and powerful applications (Internet of Things, data analysis, and cloud computing).

### 3. RESEARCH METHODS

This article uses qualitative analysis to test and collect data in the elastic phase of use. The resilience stage is divided into 4 stages: a) identification; b) safety; c) response; d) recovery; e)

adaptation (see Figure 1) (Firth, Ayoub, & Nayaz, 2017). Each stage has an express statement about the use of digital utilities on a daily and economic basis. Twenty statements are based on survey data collection methods using questionnaires, and closed statements are based on supplementary survey data filling methods.



FIGURE 1. CYBER RESILIENCE PHASE

#### 4. FINDINGS AND RESULTS

The study found 11 interviewees, of which 3 female and 9 male leaders were located in Sepakung Village, with a high Internet usage rate. These people are chosen because they are all village cadres, who provide convenience for the villagers to deal with digital and Internet usage. Therefore, the research results become valid and can represent the actual situation of Sepakung Digital Village in terms of network resilience.

The first stage is identification. In the identification stage, the 5 statements reflected the respondents' activities of using equipment and using the Internet in the daily activities of Sepakung Village. The majority of respondents indicated that they often use digital devices that support daily activities (30%). A total of 42% of respondents said that they provide first-class security for their digital devices. In digital or Internet activities, 37% of respondents said they always use it for various activities, such as mobile banking, online shopping and other activities. The majority of respondents in Digital Sepakung Village's digital developments are always concerned about these developments (46%) and 27% of respondents understand that there are threats in the online world. Therefore, it can be concluded that in the identification stage, although most interviewees use and utilize their digital devices for daily activities, few people still know that there are threats to the online world.

In the security phase, there are 5 statements addressed to interviewees. The majority of respondents stated that they rarely use antivirus software or double passwords on their digital devices (50%). When making the password, the interviewee said that the password is a combination of passwords that is easy to remember. This can also be seen in the statement, which is the ability to detect attacks in the digital world, such as viruses or malware. The majority of respondents stated that they rarely recognize digital attacks or network threads (55%). Regarding the digital security participation of Sepakung Village, the majority of respondents indicated that they participated in security activities (55%). In terms of vigilance against the use of digital activities, a part of respondents stated that they have been vigilant (28%).

In the response stage, the statement takes the form of the responder's simulated response. In the statements about the ability of respondents to use antivirus software or their resources to deal with digital attacks, an almost half of the respondents said they can overcome this (46%). Although the interviewees in the statement knew what to do when they encountered cyber threats such as phishing or spam, most people said they know (55%). In dealing with third parties (other than the respondent) to respond to cyber threats, an almost half of respondents said that they rarely ask for help from others (46%).

During the recovery phase, the interviewees had two statements in which they could overcome the problems found in their digital devices. The first statement is about the ability to reset a digital device without the help of others. A part of respondents stated that they can reset their digital devices (37%). However, they also did not hesitate to ask others for help (37%) when dealing with the restoration of digital devices, and they always sought help from others (27%).

In the adaptation phase, the interviewees are at a stage where they can be said to have become accustomed to or adapted to other digital threats and network threads. This is also related to how the interviewees overcome these problems. There are 4 statements describing the situation in the adaptation phase. The first statement is a situation where the interviewee always keeps track of software updates on the technical side, such as regularly updating their digital devices or tracking the development of existing digital devices. This is done because the digital world or the Internet has new things all the time, so do the various network threads that continue to evolve with the digital development itself. Most of the interviewees stated that they are always concerned about digital development or software updates (50%). The second statement is about the "self-improvement" or self-development of digital devices or other things related to the digital world. Respondents' responses indicate that they rarely do "self-improvement" or "social improvement" (50%). This shows that although most interviewees have "unlimited knowledge windows", they still lack the use of the digital world or the Internet itself. Most users only struggle on the device and will not improvise outside of the digital device, such as various knowledge about the online world.

Among the statements that indicated that respondents are capable of detecting cyber-attacks or threats that are the same or similar to previous incidents, the majority of respondents agree that they are able to "self-identify" (55%). The fourth statement is about distributing information to the surrounding community or a group of interviewees (if they experience or are currently experiencing digital attacks or cyber threats). A part of respondents stated that they rarely provide information to surrounding communities about digital threats and how to overcome them (37%).

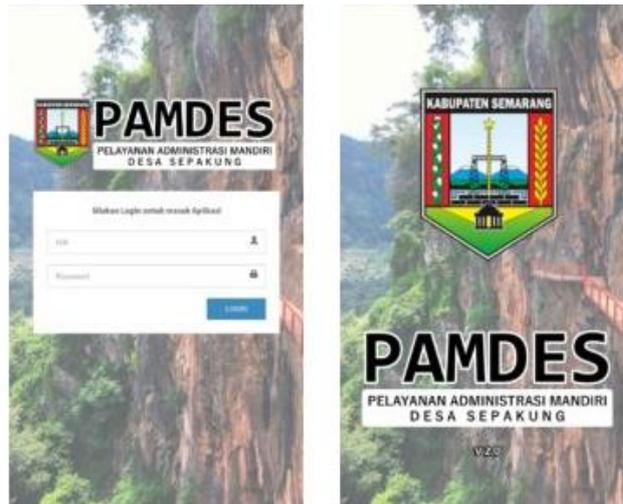


FIGURE 2. SEPAKUNG VILLAGE MOBILE APPLICATION

Source: Google PlayStore

Regardless of the survey questions, the concept of digital village advocated by the village machine is not only the digital product of Sepakung Village, but also the simplification of administrative procedures. It is also a free and paid WIFI network. The concept of the digital administrative process is to create a special application (See Figure 2) for Sepakung Village (available through the Google play store), which includes the following:

- a. Check Family Members: to view your family member's information if there is a missing family member
- b. Administration Letters: to view information on your letter application process, to make an application for a business permission letter/ certificate and etc.

## 5. DISCUSSION

From the qualitative method, several findings were noted to form a conclusion. First, this study points out that digital literacy also grows with the growth of villagers' curiosity to increase their insight and knowledge, especially in exploring the village's potential, managing, developing, and optimizing commercialization opportunities. This can be reflected in the highly responsive phase of security updates and application improvements to match modern development.

Secondly, Sepakung mobile application shows that the village government and the villagers increasingly believe that the digital technology in the village will further promote administrative management, village administration, improve service quality, develop the village and seize potential marketing opportunities in the village. Later, this change will also affect citizens' growing awareness of maintaining, managing, and professionally protecting the rural environment. The digital village is a

place for cooperation between the village government, village residents and village stakeholders. Indirectly, digital villages have become an inherent power in rural areas, which can create dynamic sustainability and improve the village's ability to adapt to independent villages.

Furthermore, resilience as the organizational capability means can sense, resist, and react to disruptive events, adapting and reshaping operations in environments where there are either foreseeable or unforeseeable risks. Collective resilience in Sepakung Village needs to develop, as technological change is so rapid and that's becoming more challenging to predict the risk in the digital space. This will affect not only the stakeholders or the people in Sepakung, but also the business within ecosystem itself.

## 6. CONCLUSION

Based on the findings and results of this research, it can be observed that from the identification stage, security stage, response stage, and recovery to adaptation; the majority of the interviewees in Sepakung Village have good knowledge, insight and ability to respond to the threats facing the digital world. From the perspective of each stage of network resilience, compared with collective community development or collective resilience, most respondents have quite good self-resilience. However, the threats of the digital world, whether it is digital equipment or the Internet, not only partially attack individuals, but also attack collective cyber threats. The main goal is to target the entire defense, power, and security systems. The key question is how the organization can achieve sustainable and resilient operations in the network ecosystem. They must decide whether and how to achieve business results in an ecosystem where it cannot be assumed that individuals will survive in the digital world.

At the level of "collective resilience", survey data shows that most interviewees have not carried out collective import activities in society, especially when it comes to the scope of the digital village community. Therefore, the next step that the Sepakung village government must take is to provide a collective awareness of cyber threats, identification, countermeasures, and how to adapt to these attacks and threats. Surely, this cannot be achieved only by some village officials, and the overall cooperation of society, government, and academia is needed to make a digital village community with comprehensive and sustainable network flexibility in a borderless global society. The government can help by ensuring education policies to promote the supply of cyber specialists and make sure that all stakeholders are together in building cyber resilience.

## REFERENCES

- Agarwal, V., Dhingra, A., & Gryseels, M. (2018). *INDONESIA OFFICE Cybersecurity and digital resilience: Seven practices for companies in Indonesia A robust cybersecurity program requires much more than increasing spending on security risks-digital resilience must also be built into busi*. Retrieved from [https://www.mckinsey.com/id/~media/McKinsey/Featured Insights/Asia Pacific/Cybersecurity and digital resilience Seven practices for companies in Indonesia/Cybersecurity-and-digital-resilience-Seven-practices-for-companies-in-Indonesia.ashx](https://www.mckinsey.com/id/~media/McKinsey/Featured%20Insights/Asia%20Pacific/Cybersecurity%20and%20digital%20resilience%20Seven%20practices%20for%20companies%20in%20Indonesia/Cybersecurity-and-digital-resilience-Seven-practices-for-companies-in-Indonesia.ashx)
- Boyes, H., Isbell, R., & Watson, T. (2016). Critical Infrastructure in the Future City Developing Secure and Resilient Cyber-Physical Systems. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 8985, 13–23. [https://doi.org/10.1007/978-3-319-31664-2\\_2](https://doi.org/10.1007/978-3-319-31664-2_2)
- Chotimah, H. C., Iswardhana, M. R., & Pratiwi, T. S. (2019). Penerapan Military Confidence Building Measures dalam Menjaga Ketahanan Nasional Indonesia di Ruang Siber. *Jurnal Ketahanan Nasional*, 25(3), 331. <https://doi.org/10.22146/jkn.50344>
- CISCO. (2016). *Cyber Resilience : Safeguarding the Digital Organization*. Cisco Public.
- Conklin, W. A., Shoemaker, D., & Kohnke, A. (2017). *Cyber Resilience: Rethinking Cybersecurity Strategy to Build a Cyber Resilient Architecture*. Retrieved from <https://search.proquest.com/docview/1897660614/fulltextPDF/C3F829DF8B56475DPQ/3?accountid=49069>
- Doran, J., & Fingleton, B. (2015). Resilience from the micro perspective. *Cambridge Journal of Regions, Economy and Society*, 8(2), 205–223. <https://doi.org/10.1093/cjres/rsv004>
- Fahmi, F. Z., & Sari, I. D. (2020). Rural transformation, digitalisation and subjective wellbeing: A case study from Indonesia. *Habitat International*, 98, 102150. <https://doi.org/10.1016/J.HABITATINT.2020.102150>
- Firth, C. M., Ayoub, R., & Nayaz, M. (2017). *Cyber resilience in the digital age*.
- Heijman, W., Hagelaar, G., & Heide, M. van der. (2007). Rural Resilience As A New Development Concept. In D. Tomic & M. M. Sevarlic (Eds.), *European Association of Agricultural Economists (EAAE)* (Vol. 148, pp. 148–162). Serbia: Serbian Association of Agricultural Economists. <https://doi.org/10.22004/ag.econ.162359>
- Manoby, W. M., Afriyanni, A., Fitri, S. E., Pranasari, M. A., Setyaningsih, E., Rosidah, R., & Saksono, H. (2021). Digital Village: The Importance of Strengthening Village Resilience in the Digital Age. *Jurnal Bina Praja*, 13, 53–63. <https://doi.org/10.21787/jbp.13.2021.53-63>
- Ormrod, D., & Turnbull, B. (2018). *Cyber Resilience as an Information Operations Action to Assure the Mission*. Retrieved from <https://search.proquest.com/docview/2077000320/fulltextPDF/C3F829DF8B56475DPQ/1?accountid=49069>
- Provider Selular Enggan Bangun Tower, Sepakung Justru Gagasan Desa Digital - Pemerintah Provinsi Jawa Tengah. (2018, January 29). Retrieved September 15, 2021, from <https://jatengprov.go.id/publik/provider-selular-enggan-bangun-tower-sepakung-justru-gagasan-desadigital/>
- Ran, B., & Qi, H. (2018). Contingencies of Power Sharing in Collaborative Governance. *American Review of Public Administration*, 48(8), 836–851. <https://doi.org/10.1177/0275074017745355>
- Rasyid, S. (2020, June 1). Petani Merbabu Ini Jualan Sayur Lewat Instagram, Omzet Ratusan Juta Rupiah per Bulan | merdeka.com. Retrieved September 15, 2021, from <https://www.merdeka.com/jateng/petani-merbabu-ini-jualan-sayur-lewat-instagram-untung->

ratusan-juta-rupiah.html

- Skapars, R., Jekabsone, S., Priede, J., Skribane, I., Skapars, R., Jekabsone, S., ... Skribane, I. (2017). *Productivity and its Impact on the Competitiveness of Latvia. European Research Studies Journal* (Vol. XX). Retrieved from <https://search.proquest.com/docview/1945553997/fulltextPDF/7AC1BE58D7674FB9PQ/20?accountid=49069>
- Slamet, R., Nainggolan, B., Roessobiyatno, Ramdani, H., Hendriyanto, A., & Ilma, L. lu'ul. (2016). Strategi Pengembangan UKM Digital dalam Menghadapi Era Pasar Bebas. *Jurnal Manajemen Indonesia*, 16(2), 136–147. <https://doi.org/10.1002/mop>
- Young, J. C. (2019). Rural digital geographies and new landscapes of social resilience. *Journal of Rural Studies*, 70, 66–74. <https://doi.org/10.1016/J.JRURSTUD.2019.07.001>