Smart Communities and Community Empowerment for Environmental Sustainability

H Herdiansyah\textsuperscript{1*} and A D Januari\textsuperscript{2}

\textsuperscript{1} School of Environmental Science, Universitas Indonesia, Jakarta, Indonesia. ORCID ID: 0000-0003-2684-3551
\textsuperscript{2} Cluster Interaction, Community Engagement and Social Environment School of Environmental Science, Universitas Indonesia, Jakarta, Indonesia.

\textsuperscript{*}herdis@ui.ac.id, \textsuperscript{2}artydwi@gmail.com

Abstract. The development of urban systems towards smart cities encourages the existence of smart communities as well. Smart communities are influenced by social developments in the community, which is dynamic and influenced by society and individuals' social level. Therefore, this study aims to analyze the use of social capital in building a smart society. This article uses the qualitative method analysis which is a literature study of 18 documents. Based on the literature study, the use of social capital in the community can encourage community empowerment activities because trust and a cooperative attitude are built among residents. This will affect the habits and activities of individuals in society, such as the development process of protecting the environment. Increasing empowerment activities will help accelerate the process of developing a smart community. Therefore, social capital is essential in the development of smart communities and smart cities.

1. Introduction

Urban development is inseparable from the existence of development in economic and social aspects. Social development is a change in society towards a higher standard of living by improving individual life quality. Social development is closely related to the existence of social capital through cooperation’s carried out by individuals. Several previous studies have been conducted on the use of social capital in various fields \cite{1–4}. Social capital is used to increase resilience to disasters or the impact of climate change \cite{1}. Social capital in the form of bonds between individuals is able to influence actions in mitigating floods and land subsidence \cite{2}. When a disaster occurs, individuals with higher levels of social capital will take proactive action. People with lower incomes have fewer social ties, so they have less ability to adapt to disasters. The research provides suggestions for increasing social capital so that the community has the resilience to disasters.

Social capital is a method to minimize the occurrence of crime \cite{5}. Crime prevention happens in street crimes, but not robbery cases, although we still have to explain further the types of street crimes. Creating an environment in which the community participates in local networks has an impact on crime prevention. Social capital can be used through community empowerment in marine spatial planning \cite{3}. The method of social capital mobility can improve individual relationships or cooperation’s. The existence of community empowerment provides an opportunity for the community to have greater control over resource management.
Social capital and the level of satisfaction of the residential environment have a positive correlation [4]. When people have high social capital, they feel they have closeness, high relationship intensity, and high trust which in turn will give a high level of satisfaction of the living environment. Won & Lee [6] conducted a multilevel analysis between social capital and the housing environment, which was related to norms and individual health. Social capital is associated with the accessibility of individuals in the form of the availability of transportation or public facilities in their environment. Facilities in the form of the availability of parking areas are correlated with social capital, but the availability of Green Open Space (RTH) is not associated with social capital. Building a smart community can be done through the development of interactive communication and easier information accessibility [7]. Therefore, this study aims to analyze the use of social capital in building a smart community. This study was conducted as an early stage in the process of building a smart community by utilizing existing social capital in the community.

2. Method

This research was conducted using a qualitative method by policy analysis and conducting a literature study on journals related to "smart community" and "social capital". The process of studying the literature was carried out using the qualitative content analysis method. The research process was carried out during May 2021 to analyze the contents of the journal documents collected, interpret, and draw conclusions from the contents of these documents. The document collection was performed using the Google Scholar search engine and the national website bps.go.id. The total documents that we collected and analyzed were 18. The documents were chosen by considering the data accessibility and time availability.

3. Results and discussion

3.1. Social Capital and Community Empowerment

Utilization of social capital is important in developing responsible behaviors towards the environment [8]. Concern for the environment is related to social trust, which is a variable of social capital [9]. Environmental responsibility can be developed through gardening activities or participation in green spaces [10]. The results show that the utilization of social capital in Australia can have an impact on environmental sustainability and improving the health of the population. This gardening community is able to tie together, bridge, and connect social capital. These activities are able to build networks and provide opportunities for other collaborative actions through social capital [11]. Management of natural resources, both agriculture and animal husbandry, is carried out through developing social capital [12]. This social capital will build community resilience in governance, management skills, and finance.

Research on social capital and environmental behavior was also conducted by Hua, Dong, & Goodman [13] by analyzing the relationship between social capital, situational factors, and differences in individual behaviors on the management of shipping waste and on the relationship of positive influence on the behavior of waste classification associated with social capital. Social capital increases individual willingness to participate in environmental management by creating opportunities for individuals to communicate with each other, consolidate and increase trust between individuals. Social capital can help in optimizing the management of NGO projects, which is the main driver in knowledge management [14]. Social capital is very important in environmental management when environmental problems are caused by excessive use or caused by collective problems [9]. Strengthening social capital between individuals is one approach in a community-based social development [15].

Several previous studies that have been conducted underline the importance of trust in building social capital [9,15,16]. High trust in the community can be influenced by the level of income and education. Communities with high incomes and higher education have a higher level of community trust, while in areas with less education and income, the level of trust is lower [15]. The level of development in low-income areas has a low level of development due to the lack of adequate infrastructure. According to Edward [17], in low-income areas, community initiatives are low because they do not know how to
develop or seek social capital. In these areas, community empowerment programs cannot be developed due to the low quality of the community. Therefore it is necessary to increase knowledge of empowerment and provide infrastructure to support development.

Currently, in Indonesia, trust and cooperation in terms of the perception of getting help from other people in the community are relatively low, especially in the big city (see Figure 1). Because of that, the development of social capital is an essential step that needs to be taken towards a smart community. The role of the community or society needs to be present through community-based development (bottom-up), which is considered to have more advantages compared to conventional top-down development [15].

![Figure 1. Perception of Getting Help from Others. [18]](image)

Through community-based development empowerment, it is possible to increase social interaction in the community. The interaction will increase trust and encourage them to participate in community activities. Such activities are able to develop social capital in the community and have an impact on communities that are increasingly empowered in dealing with their own problems. Community empowerment has been carried out in the management of natural reserves in South Africa [12]. The synergy between wildland and communities is influenced by the role of social capital that can increase community resilience. Through empowerment, the community gets direct benefits in the form of the availability of jobs and income from visitor fees. In addition to that, there is a continuation of management in the natural reserve area. Empowerment must be focused on cooperation that emphasizes trust and builds collective awareness in order to achieve common goals [15]. Smart city can be achieved if it is supported by a smart community. To realize the smart city concept in urban areas, this study aims to discuss the method of increasing community participation based on empowerment and social capital to achieve smart communities in urban development.

3.2. Smart Community

The foundation of community development is built through empowerment accompanied by the increase in social capital [19]. Social capital supports the formation of community prosocial behaviors.

Smart communities are related to the formation of smart cities, both of which complement each other, though having different foci. According to Lombardi, Giordano, Farouh, & Yousef [20], smart cities are characterized by governance or participation, human resources, environment, quality of life for the community and competitiveness of the economy. Achieving a smart city requires investment in human capital (HR), social capital and communication infrastructure. Human and social capital are also
important determinants of people's capacity to respond to challenges in their environment [21]. This capital will function if it interacts with social structures. Through this investment, wise and sustainable natural resource management will be formed through participatory governance [22]. Through the use of technology and the internet by exercising control, optimization and development of technology can turn cities into smart cities [7], and can ensure sustainable development. Smart city is characterized as having decent economy, people, governance, mobility, environment and standard of living. In building a smart city, it is necessary to integrate the roles of the city, government and society which are interrelated and supportive. The implementation of the development of information and communication technology towards a smart city can be done through improving the economy, community participation and government efficiency [23].

The establishment of a smart city aims to overcome urban problems, which require a smart community. In the formation of a smart city, the community has a role and position in development [24], namely through contributions to local community-based development, one of which is contributing to the community. The community has the power in joint management or empowerment, both in the economic, social, cultural and environmental fields. In the formation of smart communities, the focus is on providing information or education through empowerment related to the use of technology. According to Yamagata, et al. [25], in forming a smart community, it is necessary to practice and integrate concepts such as land use, building mobility and interaction in development, both from a social and environmental perspective. Community participation in forming a smart city can be present in the form of ideas, innovations or the ability to participate. One example of such is the research [24] conducted in Slovakia regarding the approach to smart community through encouragement from the city government.

4. Conclusion
This research concludes that social capital can be used as a foundation in developing a smart community. Social capital can increase the trust and cooperative considerations among individuals, which lead to community empowerment. Nevertheless, developing social capital in the community is not an easy task. There are many challenges that needs to be faced. Other than that, our study still needs to be tested at the community level. Therefore, for the near future, we recommend studying social capital in the level of community. Through social capital, the community is able to increase contribution and participation in local life and increase awareness and develop initiatives through smart communities. The local community is able to present innovations as a place for community meetings, discussions, creations, and arts.

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