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INSIGHT INDUSTRY 4.0: AN ANSWER TO SMART VILLAGE POLICY TRANSFORMATION IN INDONESIA

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Abstract. This article highlights the perspective of smart village policy development in Indonesia along the entry of technological changes adopted as a form of transformation. The change towards the use of the Internet of Things is marked by the entry of the industrial revolution era 4.0. The village becomes the smallest unit of governance that is expected to adapt quickly and have a positive effect on the community. However, the problem is severe due to the increase in the flow of urbanization of rural communities. Therefore, it is expected that regulations will be present and facilitate basic needs in the village. The final rate of development and growth of smart villages was able to reach 12% per year 2016, exceeding the national economic growth which was only 5% per year at that time. This article is a type of qualitative research by collecting data electronically, including searching extensive literature research and conducting an online survey of smart village policies developing in Indonesia today and in the future. This survey was distributed to rural communities that are included in the priority of smart village development by the Ministry. The number of smart village policy developments covered in this review article, program or policy action, is to achieve the target of 3,000 smart villages with a period of 2020 - 2024. Based on this, key policy findings and recommendations for future smart village programs are presented. The program that has been carried out is the result of previous studies on this topic, so it will be interesting and can be used as recommendations in the future for the government as a policy maker at the national and local levels.

Keywords: Industrial Revolution, Policy Transformation, Smart Village

Abstrak. Artikel ini menyoroti perspektif perkembangan kebijakan desa cerdas di Indonesia seiring dengan masuknya perubahan teknologi yang diadopsi sebagai bentuk transformasi. Perubahan ke arah penggunaan Internet of Things ditandai dengan masuknya era revolusi industri 4.0. Desa menjadi unit pemerintahan terkecil yang diharapkan dapat beradaptasi dengan cepat dan memberikan efek positif bagi masyarakat. Namun, masalahnya semakin parah karena peningkatan arus urbanisasi. Oleh karena itu, kebijakan perlu hadir dan memfasilitasi di desa. Tingkat akhir pembangunan dan pertumbuhan desa pintar mampu mencapai 12% per tahun 2016, melebihi pertumbuhan ekonomi nasional yang hanya 5% per tahun saat itu. Artikel ini berjenis penelitian kualitatif dengan cara mengumpulkan data secara elektronik, termasuk mencari penelitian literatur yang ekstensif tentang kebijakan desa cerdas yang berkembang di Indonesia saat ini dan di masa depan. Banyaknya pengembangan kebijakan smart village yang tercakup dalam artikel review, program atau policy action ini, adalah untuk mencapai target 3.000 smart village dengan periode 2020 – 2024. Berdasarkan hal ini, temuan kebijakan utama dan rekomendasi untuk program desa pintar di masa depan disajikan. Program yang telah dijalankan merupakan hasil kajian sebelumnya mengenai topik ini, sehingga akan menarik dan dapat dijadikan rekomendasi ke depan bagi pemerintah sebagai pengambil kebijakan di tingkat nasional maupun lokal.

Kata Kunci: Revolusi Industri, Transformasi Kebijakan, Smart Village

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INTRODUCTION

The rapid phenomenon of advanced technology is marked by the entry of the Industrial Revolution 4.0 (Kazancoglu & Ozkan-Ozen, 2018). An era where advances in digital technology, connectivity, and automation make humans experience changes in how they work, communicate and live their lives. The term technology, information, and communication (ICT) brings changes in governance in various private sectors to government. Changing the mindset of decision makers to integrate services into the ICT usage process is a challenge. The use of technology is considered capable of providing effective and efficient solutions to public problems that occur (COVID-19 for example). Looking like in the private sector, producers are required to be able to develop the latest marketing methods and be able to reach even the farthest customers without having to hold face-to-face events. Similar to the government sector, officials leading public institutions must be able to improve services to the community and make their regions continue to grow by adopting technology, information, and communication (electronic services). Such as village governance, which is expected to be able to adapt to technological changes that are increasingly rapid, giving rise to many new policy innovations that relate to the use of technology (Khairunnisa et al., 2022).

The form of village policy program is to develop a smart village governance system. Where this term is an infringing point that was previously very familiar with the term smart city policy (Wijaya et al., 2023). Smart village is a concept of accelerating development that is able to encourage villages to utilize digital technology to educate the community and improve the ability of independent villages. The purpose of this development is to transform the use of digital technology to encourage the improvement of basic service quality and village development based on inclusive and sustainable community empowerment as follows the industrial era 4.0 (Munawar et al., 2023).The changes of the industrial age occurred already in the eighteenth century. The Industrial Revolution was first marked by the transition from manual work to mechanical work, the use of steam power, the creation of various production machines, and the establishment of diverse factories (Purwanto & Permadi, 2019). This first Industrial Revolution then marked significant societal changes, particularly in production and consumption. Then in the 19th century began the second Industrial Revolution called the technological revolution.

The second Industrial Revolution is that the industrialization phase is proceeding faster than before. The expansion of manufacturing industries and production technologies resulted in major inventions, such as the telegraph, telephone, radio, railway networks, automobiles, bicycles, electricity, water and fuel supplies (Mokyr & Strotz, 1998). The third industrial

revolution, known as the era of revolution with various digital uses, began in the 1960s, with the introduction of a computer use (Daemmrich, 2017). Human productivity has increased tremendously as a result of the development of new technologies and the internet. The Internet can be said to have brought a major revolution in the realm of digital technology, which has begun to be applied in the third Industrial Revolution. Technological advances then have an impact on accelerating globalization around the world. As a result, the Industrial Revolution 4.0 was born.

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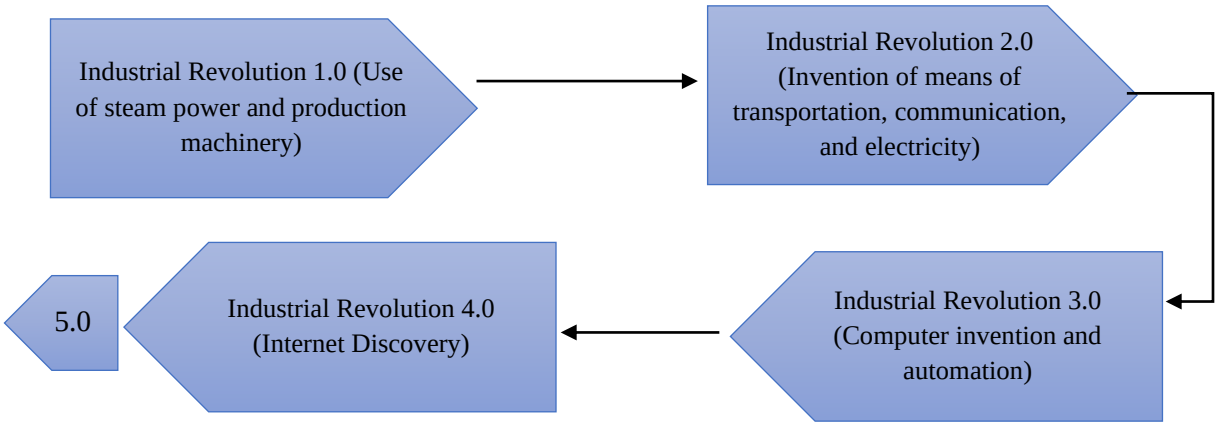

Figure 1. Industrial Revolution Process 1.0 – 4.0
Source: Author's processed data, 2024

The process of the industrial era 4.0 above, has changed the paradigm of society in carrying out activities that can use information and communication technology applications through the internet network. Changes in the flow of the use of the internet of things (IoT) can have an impact on increasing knowledge in data-based village governance. That then with the use of information and communication technology will be one of the tools to measure the success of government administration. The use of information and communication the technology is undeniable in village governance and the empowerment of the village community itself. The progress of the village was also realized that how much influence the development of information and communication technology is increasingly needed in the administration of village government. So that, village governance is able to adapt e-government which served effectively and transparency to gain participation of people and to decrease corruption.

Therefore, based on the background above, this article will discuss how developments occur related to the issue of smart village policies that have entered the industrial era 4.0. Through this article, it can also aim to be a consideration for policy makers in obtaining information that the entry of industry 4.0 is a way to answer Indonesia in adapting to the progress of the times. There is no doubt that Indonesia will soon enter the 5.0 era where the speed of public services must be created to the community through smart village policies. Thus, Indonesia's future development continues to be built from the periphery as an instrument of digital transformation policy, and remains a strategic priority project towards national development based on the Long-term policy 2020-2024.

METHOD

This is research method qualitatif is carried out by reviewing relevant literature references. Literature review is part of an effort to collect and search for material in the form of scientific articles from journals, books, and other documents to be able to describe the substance needed (Creswell, 2008). The type of data used by the author in this study is data obtained from literature studies from various journals, book sources, regulations, policies, news sources, and articles. The data obtained were reviewed and reviewed, then adapted then deepened the feasibility of the study in accordance with the study of sources related to the topic. Furthermore, it is processed with a descriptive analysis method, from the results of understanding, analysis is carried out with critical thinking so that the description can be thorough and up to date.

RESULTS AND DISCUSSION

Smart village policy initiates the growth of villages to have awareness of intelligence about the various potentials they have, so that each village will create its own pride from its various strengths. Smart Village will be filled by village networks throughout Indonesia by utilizing digital technology to support the availability of basic services and public services that are effective and efficient. The use of the internet of things (IoT) in the industrial era 4.0 is the key, namely being able to implement basic services, village institutional capacity and village apparatus capacity digitally with the term “cerdas”.

Based on research information in the field, smart village policies can provide components of accuracy and openness of information data in every planning, public services, village government administration, village community empowerment, and village government supervision system must be a priority. The idiom "Desa Cerdas" is not only building infrastructure in public facilities, but also building community capacity and strengthening the capabilities of every element of rural society to be able to compete in the 4.0 era which will soon lead to 5.0. More deeply, the guiding stick of the smart village system is to make it part of the implementation of various regulations that can be integrated with each other. Macro-wise, several regulations become a reference in village development, it has a sustainable direction for improving village governance itself.

Figure 2. Indonesia's Smart Village Sustainability Concept from UU No. 6/2014
Source: Author's processed data, 2024

As seen above, overall the sustainability indicators of the smart village policy concept are embodied in the Sustainable Development Goals (SDG's) itself. This principle is then in line with the principles of sustainability, equality and inclusivity in economic activities, government, society, and the environment. This is because Indonesia has entered the development of the industrial era 4.0 which applies the Internet of Things (IoT) as the main instrument used. This sustainability is in line with several dimensions and pillars of the smart village itself, including: Smart Society, Smart Economy, Smart Governance, Smart Environment, Smart Life, and Smart Mobility. The following is a table of developments from the linkage of smart villages to the achievement of sustainability principles; (Mishbah et al., 2018).

Table 1. Smart Village Integration for Future Sustainability

Poin	Smart Village Principles	Dimension	Example	SDG's relevance
1	Smart Society	Skills	Digital Literacy Program to Improve Skills	SDG 1: No poverty. SDG 5: Gender Suitability. SDG 10: Reducing inequality.
		Creativeness	Menggunakan keterampilan untuk meningkatan kreativitas online dan offline	
		Inklusi	Meningkatkan akses internet yang lebih inklusif	
2	Smart Economy	Business culture and innovation	Startup's and digital innovation	SDG 8: Viable enterprise and economic growth.
		Productivity	Technology to increase efficiency and productivity	
		Access to the market	Building an E-commerce Platform	

Poin	Smart Village Principles	Dimension	Example	SDG's relevance
3	Smart Governance	Data Disclosure	Collection and use of data that is easily accessible to community members	SDG 16: Peace, Justice, Institutions, the strong.
		Infrastructure	Investment in digitizing government offices and facilities	SDG 17: Cooperation in the achievement of goals.
		Service Administration	Improve the efficiency of citizen services and public administration	
		Online Services	Increase access to public services through digital technology	
4	Smart Environment	Sustainable and integrated natural resource management	Increase knowledge and efficiency of environmental conservation	SDG 6: Clean water and sanitation
		Sustainable regional development	Improve land and water use efficiency	SDG 7: Energy clean and affordable SDG 13: Weather action SDG 14: Life underwater SDG 15: Life in Soil surface
5	Smart Life	Education	Online Education and learning Platform	SDG 3: Health good and well-being Being
		Health	*Telemedicine* and enhanced preventive health tracking efforts	SDG 4: Quality Education
		Socio-Cultural	Increase cultural knowledge and social networks	SDG 18: Constitutional Dynamic Village and Culture Adaptive Village
6	Smart Mobility	Infrastructure	Physical development of digital infrastructure	SDG 9 – Industry, innovation and infrastructure.
		Network	Apps for *person-to-person connection*	
		Citizen services	Services that connect people with government	

Source: Author's processed data, 2024

As a major project of sustainability achievement for Indonesia, the use of digitalization is considered very necessary. It can be seen above that SDG's measurement in the implementation of smart village policies needs to pay attention; 1) qualified local/village authorities, 2) conformity of formulated principles, and 3) opportunities for the benefits of the digitization process. It is known that the village is an autonomous area of its own, so the village is able to determine development priorities to strive for and meet the needs of its community. This is in accordance with the substance in Law No. 6 of 2014 concerning Villages. Thus, villages get

different authorities and characteristics so that the optimization of smart village development is adjusted to the available resources.

The author's final data findings that this smart village policy program is expected to touch more than 3,000 villages in Indonesia throughout the range of 2020 to 2024. Until this article was written, *updates* on the development of smart villages continue to be carried out with a collaborative system from various stakeholders both from the content of the program and the budget allocation needed by each region. The implementation of smart village policy model development is contained in a Village Government and Development Strengthening Program (P3PD) which is an activity aimed at encouraging villages to utilize technology effectively for village development and improve the quality of village fund utilization. The use of village funds itself is utilized in several stages or quartiles of implementation. Until phase I in 2022, smart village activities are carried out through digital ambassadors and digital cadres. This element to attract attention is the acquisition of locus selection, where 235 villages in 18 districts were selected. Then it was increased in phase II that 1,350 villages in 78 districts were selected to implement smart village activities. And phase III by selecting 1,650 villages in 102 districts, until the final total obtained more than 3,000 smart villages in Indonesia. Here are the details as shown in table 2.

Table 2. Number of Districts, Villages Participation in Smart Village Program

Phase	Sum		Information
	Regency	Village	
I	18	235	Done
II	47	1.000	Process
III	102	1.350	Not Done Yet

Source: Author's processed data, 2024

As a development that continues to be carried out by the government, smart village policy can be used as one of the development recommendations in villages throughout Indonesia. This is done by bringing up various digitalization innovations that are in accordance with the use of the Internet of Things (IoT) concept in every corner of the village to overcome various problems that occur in the village itself. By adopting the Smart City component that has been widely studied, it is not impossible if from the village will emerge national economic strength based on BumDes (Village-Owned Enterprises) or the like, superior human resources, clean and transparent government, and a good social environment. Villages will also be able to make a considerable contribution in efforts to achieve National SDGs, so that urbanization rates will decrease if this smart village policy continues to be developed in the future.

CONCLUSION

Entering the era of the industrial revolution 4.0 in Indonesia, making significant progress towards villages. Smart village policies are able to influence certain conditions with the principles of sustainability, equality and inclusivity in various sectors. This then makes villages in Indonesia moved to implement the *Internet of Things* (IoT) system in every line of life of the government and village communities. These instruments include Smart Society, Smart Economy, Smart Governance, Smart Environment, Smart Life, and Smart Mobility. It is expected that smart villages in Indonesia will continue to move within a sustainable policy framework to touch more than 3,000 villages in Indonesia by 2024.

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