

Smart Village based on Agriculture Data Analytic for Regional Development in Indonesia : Situational Analysis

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Abstract

One of the efforts to accelerate the achievement of the Sustainable Development Goals (SDGs) in Indonesia is carried out by accelerating village development. The digital village is one of the real development programs that is increasingly being carried out by Indonesia. The digital village is a driving force for strengthening smart village development. The Indonesian government fully supports village development through the issuance of the Village SDGs which were initiated due to the increasing enthusiasm of local governments in building smart villages. Because rural areas in Indonesia are dominated by agricultural activities, this research is focused on smart villages based on Agriculture Data Analytic (ADA). This study aims to analyze Indonesia's readiness in ADA-based smart village development through optimization of 2019 Village Potential data. The methods used in this study were descriptive analysis and multiple regression analysis and clustering. The variables used in the multiple regression analysis are the implementers of ICT management, implementers of agricultural based business activities, and implementers of renewable energy management in the village which are linked to existing sources of funds in the village. The variables used for clustering consist of 25 variables in 60.195 village potential data 2019, related to the condition of ICT infrastructure, ICT management, transportation, agricultural businesses and activities related to renewable energy. The results of multiple regressions show that the sources of regional budget revenue (APBD), Village Original Revenue (PAD), self-subsistent (Swadaya) and other funds give a very significant contribution to the implementation of ICT management activities, agriculture, and transportation with an Adjusted R^2 value of more than 0,9. However, different results show that the sources of Swadaya funds and PAD are less contributing to implementing renewable energy activities in the village (Adjusted R^2 value is less than 0.6). The results of the clustering show that there are 5 village clusters with 5 levels of smart village potential. The clustering model has good validity with SS_b value of 546.077,3. A quantitative approach of village potential data in Indonesia to assess the readiness of smart village development has not been widely used. Therefore, this research can be an alternative recommendation for stakeholders in formulating policies related to acceleration of village development in the context of regional development in Indonesia.

Keywords:

Agriculture data analytic, Digital village, Smart village, SDGs, Clustering

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Eneng Tita Tosida is a doctoral student in Computer Sciences, IPB University, and also as lecturer in the Department of Computer Sciences, Faculty of Mathematics and Natural Sciences, Universitas Pakuan. She teaches in Simulation Techniques and Data Mining, Linear Programming and Optimization Models and research methods. She leads research group of Decision Support System (DSS) and Socio Informatic, and actives on educational digital media base on game, Augmented Reality and Virtual Reality research. She also actives on Indonesian Operations Research Association (IORA) as Secretary and member of member of the Institute of Electrical and Electronic Engineer (IEEE). Now is serving as head of Community Services Center, Universitas Pakuan.

Yeni Herdiyeni received PhD degree in Computer Science in 2010 from Faculty of Computer Science, University of Indonesia. She had worked as senior data scientist at IBM Indonesia since 2017-2020. She works as an associate professor at Department of Computer Science, IPB University. Her primary research interest are in computer vision, remote sensing, biodiversity informatics, big data analytics and advanced predictive modeling.

Marimin received the B.S. honor in agroindustrial technology, Bogor Agricultural University, Bogor, Indonesia, in 1984. In 1990, he received the M.Sc. degree in computer science from the University of Western Ontario, Canada, PhD degree from Faculty of Engineering Science, Osaka University, Japan in 1997. Since 2003, he has been a professor in Systems Engineering with IPB University (Bogor Agricultural University). His research interests are intelligent and fuzzy expert systems, intelligent decision support systems, Green and Sustainable Industrial Development and sustainable supply chain management. Marimin is a member of the Institute of Electrical and Electronic Engineer (IEEE), Indonesian Engineer Association and as well as Indonesia Logistic and Supply Chain Management

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