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The Impact of Smart Village Program: A Difference-in-Differences Approach

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Abstract:

The Indonesian government has launched many programs to increase development and independence in rural areas, including the Smart Village Program. This study investigated the impact of the Smart Village Program on village development proxied by the Developing Village Index (Indeks Desa Membangun/IDM).

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1. Introduction

Village, occupied by 43,6% of Indonesia's population. However, a publication by Badan Pusat Statistik (2023) revealed that over the last 2 (two) decades, the ratio of poor people in rural areas has always been higher than poor people in urban areas. In terms of village development, the results of the 2023 Village Development Index (IDM) assessment show that of the 75.265 villages assessed, 16% of them still have the status of disadvantaged villages and very disadvantaged villages. Furthermore, the urban-rural digital gap is also significant, according to the survey by Asosiasi Penyelenggara Jasa Internet Indonesia (2023) the contribution of rural internet penetration is only 35,43%, quite far from the contribution of internet access penetration in urban areas which reaches 64,57%.

As the National Development Goal is to create a just and prosperous society, ending the gap between urban and rural areas is the main focus of development in rural areas (Hilmawan et al., 2023). As the National Development Goal is to create a just and prosperous society, ending the gap bet-

ween urban and rural areas is the main focus of development in rural areas (Hilmawan et al., 2023). If socio-economic problems in rural areas can be resolved, then most of Indonesia's development challenges will be resolved, considering that 91% of Indonesia's territory is rural. (Iskandar, 2020). The regulator's partiality towards rural areas has become increasingly evident with the enactment of the Law of The Republic of Indonesia Number 6 of 2014 which regulates the village. The Indonesian government's ongoing commitment to accelerating village development is also realized by including this as one of the regional development strategies in the National Medium-Term Development Plan (RPJMN) 2020- 2024, realization This strategy is through the formulation and implementation of village community development and empowerment programs, one of which is Smart Village, a program to achieve village transformation through the use of technology.

In 2020, the Ministry of Villages, Development of Disadvantaged Regions and Transmigration, through funding from the World Bank, initiated the Smart Village program, starting with a piloting project in 2021, and then replicating it in 1000 villages in 30 provinces of Indonesia in 2022 and the village locus continues changes every year until 2024. Through the Smart Village program, the Government is optimistic that it can make 50% of Indonesian villages have the status of independent villages (Munawar et al., 2023).

Apart from being assessed by output, the effectiveness of the village development program can be assessed using the Development Village Index (IDM) (Saputra, 2023), which assesses and groups Indonesian villages into five status classifications: Independent (>0.8155); Advanced (>0.7072 and <0.8155); Developing (>0.5989 and <0.7072); Disadvantaged (>0.4907 and <0.5989); and Very Disadvantaged (<0.4907). Therefore, this research tries to see the effectiveness of the Smart Village program through its impact on obtaining IDM scores which determine the status of progress and independence of a village.

2. Literature Review

a. Participatory Development Concept

The theory/concept of Participatory Development was explained by Robert Chamber in 1983 through his book entitled "Rural Development: Putting the Last First". Through this concept, he emphasized the importance of local community involvement in the development planning and implementation process, including in rural areas. Deep knowledge of the social, economic, and environmental conditions in which they live will be an important factor in successful development. By introducing the concept of participatory theory in rural development, Chambers encourages a more democratic, inclusive, and sustainable approach to development (Olivia, 2023).

These participatory characteristics are in line with the Smart Village program because this program emphasizes the importance of social inclusion through community involvement in development activities in the village (Decree of the Minister of Villages, Number 55 of 2024 concerning General Guidelines for Smart Village Development, 2024), This program also places rural communities not only as objects but also as subjects of development.

b. Smart Village Program

Development goals that pay attention to sustainability in rural areas can be achieved with various strategies. One of the promising forms facilitating the process of sustainable development of rural areas is the smart village concept, taking into account the specialization of regions and local systems (Adamowicz & Zwolinska-Ligaj, 2020). The smart village concept that adopts the success of Smart City has been widely implemented in several countries, including the Chinese government (Zhang & Zhang, 2020); Lithuania (Atkočiuniene & Vaznoniene, 2019); Poland (Adamowicz & Zwolinska-Ligaj, 2020); and India (Ramesh, 2022) also implementing the smart village concept to support the continued development of rural areas.

In 2020, the Ministry of Villages promoted the smart village concept as a flagship village development program. Smart Village implemented by the Ministry of Villages is a development planning concept that utilizes data based on digital technology, for village management such as improving the quality of basic government and community services as well as increasing human resources and inclusive and sustainable community empowerment towards the welfare and independence of village communities (Decree of the Minister of Villages, Number 55 of 2024 concerning General Guidelines for Smart Village Development, 2024). The transformation of villages into Smart Villages is part of the 2020-2024 Strategic Plan (Renstra). Starting with planning in 2020, piloting the project in 2021, and replication at different loci in 2022 and 2024.

Adamowicz & Zwolinska-Ligaj (2020) explaining that the successful idea of a smart village accentuates care not only for the community's life quality but also for the natural and cultural environment. Jayanthi et al. (2022) found that the geographical situatedness of Smart Village matters. This is in line with IDM which assesses village development based on the dimensions of economic, social, and environmental resilience (Prasetyo & Sonny, 2020). Furthermore, Zhang & Zhang (2020) defined that smart villages represent villages that have chosen a development path to realize their own development, namely making maximum use of resources and realizing optimal village development. This means that the success of a smart village can be seen from the level of independence of the village.

c. Developing Village Index

The Government's strategic programs in reducing the rural-urban gap and optimizing village development have been widely implemented, such as infrastructure development affordability programs and village fund transfers. However, the success of these programs is sometimes challenging to measure accurately (Olivia, 2023). Therefore, the Government has developed an exploratory tool to measure the success of the program, by providing an assessment of village progress and independence through a resilience index which is broken down in detail into several dimensions. The tool is called the Village Developing Index (Indeks Desa Membangun/IDM).

IDM was designed in 2016, and formed based on three components, Social Resilience Index, Economic Resilience Index, and Ecology Resilience Index. Based on this, IDM groups villages into five statuses based on the scoring results through these three components. The

groupings are as follows: Independent Villages; Advanced Villages; Developing Villages; Disadvantaged Villages; and Very Disadvantaged Villages. This regulation also explains that IDM is used as an instrument for coordinating development and empowering village communities, as well as for mapping village typologies and setting priorities for the use of village funds. According to Rahmawati & Amalia (2024), several countries have implemented village classification. For example, in China, which divides status based on six types of economy, or in Europe, which divides rural areas into remote, middle, and integrated regional classifications. Previous research has linked the influence of rural policies on IDM, such as Hilmawan et al. (2023) which analyzes the impact of village funds on rural development (measured using the village development index), dan (Olivia) (2023) which analyzes the existence of BUM Des against the IDM assessment.

3. Data and Methodology

a. Data

The empirical analysis in this research uses various data published by the Ministry of Villages, such as data on determining 1000 villages with smart village locations, data on determining the status of progress and independence of villages, and data on the existence of BUM Desa. We also use money data published by the Wonogiri Government, in the form of Village Fund Allocation data.

Smart Village was implemented from 2020 to 2024. After successfully implementing planning in 2020 and piloting the project for 350 villages in 2021, in 2022 the Ministry of Villages will replicate the Smart Village program to 1000 other villages, including 65 villages in Central Java spread across three districts, namely Grobogan, Sukoharjo, and Wonogiri. Of the three districts, Wonogiri is the district with the highest percentage of independent villages based on IDM 2023 data, so the author is interested in analyzing the success of the villages in Wonogiri. This research uses panel data one year before and after the implementation of the Smart Village program at the research object, namely in 2021 (before the Smart Village program runs in Wonogiri) and 2023 (after the Smart Village program runs in Wonogiri).

b. DID Method

Because we will analyze the impact of a policy, we use the DiD approach. The DiD method includes a set of control groups that are not affected by the program/policy and uses it for comparative analysis (Pan et al., 2020). Sampling of the control group is based on research Bhavani et al. (2022) where the control group is selected randomly from people who are not affected by the policy.

Table 1. Sub-district in Wonogiri

Sub-district in Wonogiri	Smart Village (Treatment)	Non-Smart Village (Control)	Total
Batuwarno	2	2	2
Selogiri	1	1	
Manyaran	1	1	4

Giriwoyo	1	1	2
Baturetno	2	2	2
Wonogiri	3	3	4
Pracimantoro	2	2	6
Purwantoro	1	1	4
Tirtomoyo	1	1	2
Nguntoronadi	1	1	2
Jatiroto	1	1	2
Girimarto	2	2	2
Jatipurno	1	1	4
Slogohimo	1	1	2
Bulukerto	2	2	2
Jatisrono	1	1	4
Eromoko	1	1	2
Karangtengah	1	1	2
Total	25	25	50

Source: Processed data, 2024

The variables examined in this study were the dependent variable, treatment variable, and control variable which is predicted to influence the dependent variable. The model used as follows:

$$IDM_{i,t} = a + \beta_1 Smart_i + \beta_2 Period_t + \beta_3 Smart_i * Period_t + \beta_4 ADD_{i,t} + \varepsilon_{i,t} \quad (1)$$

In which: $IDM_{i,t}$ is a dependent variable in the form of an IDM score; $Smart_i$ is the dummy treatment variable of Smart Village (0 = not status as Smart Village, and 1= status as Smart Village); $Period_t$ is the time dummy variable (0 = 2021 and 1= 2023); $\beta_3\ Smart_i * Period_t$ is the interaction between treatment variables and time; $ADD_{i,t}$ as first control variable in the form of the nominal village fund budget, this variable is taken according to the study of Helmi & Khoirunurrofik (2023); $\varepsilon_{i,t}$ is an error term

4. Results and Discussion

a. Statistic Descriptive

Table 2. Statistic Descriptive

Variable	Obs	Mean	Std. dev.	Min	Max
PERIOD	100	0.5	0.5025189	0	1
SMART	100	0.5	0.5025189	0	1
ADD	100	550162.5	98383.45	381963	914988
IDM	100	0.740953	0.0704197	0.6063	0.8865

Source: Processed data, 2024

The results of descriptive statistics for 50 villages in Wonogiri (as treatment and control groups) above show that first, the value of the Village Fund Budget is not more than one billion rupiah, the highest ADD is IDR 914.988.000, which is managed by Gunungan village in 2023. Second, the IDM value is quite balanced, until 2023, there will be no underdeveloped villages

in Wonogiri because the lowest IDM value is 0.6063 which is still categorized as a developing village.

b. DiD Regression

Tabel 3. DiD Regression Result

IDM	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval
ATET PERISMART (1 vs 0)	0.0103221	0.0227788	0.45	0.652	-0.0354536	0.0560978
Observation	100					

Note: ATET estimate adjusted for covariates, group effects, and time effects.

Source: Processed data by STATA 17, 2024.

Based on the results of processing using STATA 17 which groups villages into two groups (control and treatment) in two different years and includes control variables, it is known that the impact of the Smart Village Program on Village Development as proxied by IDM is positive but only 1%. Furthermore, the P value is 0,652 which is still more than the significance of 0,05 so the impact is not significant.

It is possible that the Smart Village program has not yet been fully settled because its implementation has only been running for one year in Wonogiri. Then, the impact of the Smart Village program may be more significant in other aspects of community life outside of the economic, social, and environmental aspects as aspects covered in the IDM.

5. Conclusion

From the existing data, it can be seen that the Smart Village Program does not have a significant impact on increasing village development. To be more comprehensive, future research needs to cover all program locus and other impact measurements (e.g. digital literacy index), as well as extending the observation period to consider the ideal period for implementing the Smart Village program

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