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# THE IMPACT OF THE SMART ECONOMY ON SMART LIVING WITH THE MEDIATOR OF THE NATIONAL ECONOMY IN INDONESIA

Nadia Octaviana Lubis [a*)], Yuhana Astuti[a)]

[a)] *Telkom University, Bandung, Indonesia*

[*)]*Corresponding Author: nadiaoctavianaa@student.telkomuniversity.ac.id*

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**Abstract.** The national economy includes increasing output and productivity, government spending policies, infrastructure development initiatives, and cooperation with other countries. In Indonesia, economic growth and technological advances result from the government and community collaboration in building smart cities. A critical dimension of a Smart City is a Smart Economy and Smart Living, which aim to improve city performance, create innovation, encourage e-commerce, and ensure the feasibility of people's living standards. This study aims to examine the impact of the Smart Economy on Smart Living in Indonesia, with a particular focus on the mediating role of national economic performance. The methodology used is quantitative, with statistical analysis of Partial Least Square Structural Equation Modeling (PLS-SEM) using the Smart PLS 4 application. The population of this study includes smart cities in Indonesia, and purposive sampling techniques were applied to select relevant samples. This research examines the main dimensions of a Smart City, namely Smart Economy and Smart Living, and their related indicators. The study results show that the Smart Economy positively and significantly influences Smart Living in Indonesia. Moreover, national economic performance also plays a positive and significant mediating role in this relationship. However, the variance accounted for (VAF) test shows that only 16% of the total effects of Smart Economy on Smart Living are mediated by national economic performance, indicating that while this mediation relationship is statistically significant, the mediation effect is weak. This research provides insight into the relationship between economic performance and quality of life in the context of smart-city initiatives.

**Keywords:** Smart city, smart economy, smart living, national economy, PLS-SEM

## I. INTRODUCTION

Indonesia is a country that is active in implementing technological development to achieve the goals of the cities in it, so that they are more advanced and efficient. This effort is carried out through the implementation Smart City concepts, which consist of five main dimensions, namely smart governance, smart people, Smart Living, smart mobility, Smart Economy, and smart environment **[1].** The implementation of Smart City concept in Indonesia includes several aspects. First, smart ICT infrastructure is the main foundation to support connectivity and information technology in all cities in Indonesia. Smart City governance is also a focus, with an emphasis on efficiency and innovation in the implementation of public services **[2].** The influence of economic growth on the economy. Economic growth is an important indicator, a comprehensive understanding of the national economy requires a holistic view of the structure and dynamics involving various sectors and economic factors. These aspects together form a more comprehensive framework for analysing a country's economic health and economic progress, recognizing that economic growth is only one component of the bigger picture **[3].**

The Smart Economy in Indonesia, especially in the creative economy sector, has one of its applications in increasing public interest in MSME products through e-commerce platforms **[4].** The role of MSMEs in Indonesia's economy is significant in the creative economy industry sector, able to absorb 117 million workers or 97 percent of the total workforce and collect 60.4 percent of total investment. This shows that MSMEs are a vital source of job creation and investment for the country **[5].** On the other hand, MSMEs not only benefit from e-commerce, but also help reduce the level of poverty, have a significant contribution to GDP and can reduce inflation by continuing to innovate and maintain people's purchasing power **[6].** This increase in population brings challenges for the government, because it must deal with population growth while maintaining the standard of living of its population. Therefore, the Smart Living dimension can play an important role in facing these challenges. Such as an increase in demand for goods, demand for urban transportation, housing, and infrastructure.

Moreover, improving Smart Living to improve the quality of human life includes easy access to clean and sustainable transportation, energy, water, and air, waste management, and adequate public spaces and employment **[7].** Smart Living can also affect household consumption spending, as ICT has become a fundamental part of daily life. The use of smart home products in telecommunications, information and communication technology has become a fundamental part of

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daily life. The use of products used by households such as smart home products, for example, can help people control and manage the use of electrical energy in households. In addition, telecommunications also play an important role in supporting learning, working and communicating methods **[8].** Indonesia has shown its commitment to realizing Smart Cities through the National 100 Smart City Movement program. This is evidenced by the creation of the Smart City Masterplan which contains guidelines and directions for Smart City development at the central and regional levels. This masterplan is expected to create integration, synchronization, and synergy between various stakeholders in realizing a sustainable Smart City **[1].**

This study aims to evaluate the impact of the Smart Economy on Smart Living in Indonesia, as well as the impact of the Smart Economy on the National Economy and the impact of the National Economy on Smart Living. In addition, this study also wants to find out the influence of Smart Economy on Smart Living through the mediation role of the National Economy in Indonesia.

## II. RESEARCH METHOD

The methodology used in this study is a quantitative method with statistical analysis of Partial Least Square Structural Equation Modelling (PLS-SEM). The sample in this study is Indonesia Residents who take part in Smart Cities in Indonesia, namely Smart Economy, Smart Living, and National Economy calculated as sampling data for the period 2018 to 2022. With the consideration of the population of Indonesia indirectly contributing to the national economic activities carried out by the population itself, which includes the production, distribution, consumption of goods and services, which is relevant to the research variables. The hypotheses used in this study are as follows: H1: Smart Economy has a positive and significant effect on Smart Living. H2: Smart Economy has a positive and significant effect on the National Economy. H3: The National Economy has a positive and significant effect on Smart Living. H4: The National Economy positively and significantly mediates the relationship between Smart Economy and Smart Living. Table 1 shows the indicator variables used in this research.

Tabel 1. Variable Indicator

| Variable | Indicator |
|---|---|
| Smart Economy (X) | SME Turnover Due to E-Commerce (X1) |
| | Knowledge-intensive workforce (X2) |
| | ICT staff as a percentage of total employment (X3) |
| | ICT's contribution to GDP (X4) |
| | Individual online *consumption* in domestic and national markets (X5) |
| | Import of ICT products (X6) |
| | Fixed assets as a percentage of GDP (X7) |
| Smart Living (Y) | Working Hours (Y1) |
| | Proportion of leisure time and working hours (Y2) |
| | Household consumption expenditure per capita in Rupiah (Y3) |
| | Vulnerable jobs (Y4) |
| | Urban population rate (Y5) |
| | Crime rate (Y6) |
| National Economy (M) | Gross Domestic Product (GDP) (M1) |
| | GDP growth (2018-2022) per quarter (M2) |
| | Energy consumption per capita (M3) |
| | Unemployment rate (M4) |
| | Entrepreneurial level (M5) |
| | Inflation rate (Consumer Price Index) (M6) |

## III. RESULTS AND DISCUSSION

### Structural Equation Model (SEM) Analysis

*a) Outer Model Measurement*

Based on loading factor results, there are eight indicators that are invalid, namely X1 and X3 (Smart Economy), Y1, Y2 and Y6 (Smart Living) and M1, M4, and M6 (National Economy) because they have an outer loading value of less than 0.708. After removing several indicators and reprocessing them, it is known that all indicators have a loading factor value above 0.708. Therefore, all these items are declared valid and can be used to measure the variables in the study. Table 2 shows the result of outer model measurements in this research.

Tabel 2. Outer Model Measurements

| Indicator | *Loading Factor* | *AVE* | *Cronbach alpha* | *Composite Reliability)* |
|---|---|---|---|---|
| X2 | 0.903 | 0.742 | 0.913 | 0.930 |
| X4 | 0.877 | | | |
| X5 | 0.898 | | | |
| X6 | 0.838 | | | |
| X7 | 0.742 | | | |
| Y3 | 0.956 | 0.851 | 0.913 | 0.993 |
| Y4 | 0.716 | | | |
| Y5 | 0.987 | | | |
| M2 | 0.912 | 0.870 | 0.925 | 0.952 |
| M3 | 0.969 | | | |
| M5 | 0.889 | | | |

*b) Inner Model Measurement*

The hypotheses used in this study are as follows: H1: Smart Economy has a positive and significant effect on Smart Living. H2: Smart Economy has a positive and significant effect on the National Economy. H3: The National Economy has a positive and significant effect on Smart Living. H4: The National Economy positively and significantly mediates the relationship between Smart Economy and Smart Living. Hypothesis testing was carried out using bootstrapping techniques, with data that had passed the measurement stage. This hypothesis test is part of the Structural Model and shows the hypothesized relationships through simulation. The purpose of this bootstrapping test is to determine the direction and significance of the relationship between latent variables. In the first stage, hypothesis testing is carried out by comparing the t-count value obtained with the one-tail t-table, where the t-count must be greater than 1.65 for a 5% error rate or a p-value below 0.05. The second stage looks at how far the mediation variables are obtained by the Variance Accounted For (VAF) test. Therefore, here are the results and hypothesis testing of each variable:

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Table 3. Inner Model Measurements

| *Variabel* | *T statistics* | *P values* | *VAF* |
|---|---|---|---|
| *SE -> SL* | 89.712 | 0.000 | |
| *SE*-> NE | 51.020 | 0.000 | |
| NE -> *SL* | 1.841 | 0.033 | |
| *SE* -> NE-> *SL* | 1.830 | 0.034 | 16% |

Based on the results in Table 3 Smart Economy (SE) and Smart Living (SL) have a significant impact on the National Economy (NE) and vice versa. However, in the second test stage of the mediation test using the VAF Test, the results obtained are a VAF value of 16%, showing that only 16% < 20% which means that there is no mediating effect of the total effect of the Smart Economy on Smart Living through the mediation of the National Economy, this indicates that even though there is a statistically significant mediation relationship, however, the mediation has a weak relationship and is not significant from the VAF test.

*c) Discussion of Findings*

Impact of Smart Economy on Smart Living, Analysis of path models, t-tests, and p-values shows a positive and significant relationship between Smart Economy and Smart Living. With the highest path coefficient of 0.767, the Smart Economy significantly affects Smart Living. This positive and significant relationship is reinforced by the acceptance of hypothesis 1, which shows the substantial impact of the Smart Economy on Smart Living, with an R value of 0.833 for Smart Living and an f-square value of 0.759. This indicates the strong and significant influence of the Smart Economy on Smart Living. These findings show that progress in the Smart Economy contributes significantly to improving the quality of life and well-being of the community. Indicators of this impact include increased incomes and a reduction in vulnerable jobs due to SME growth through e-commerce, which in turn increases per capita household consumption spending. Better job opportunities and better life balance, facilitated by the growth of knowledge-intensive sectors, also contribute to this positive impact. In addition, the integration of technology in daily life, which is indicated by the high percentage of ICT staff in total employment, improves work efficiency, reduces crime rates through better security systems, and ultimately improves living standards.

In addition, the ease of access to goods and services through online consumption and the availability of advanced technology such as the import of ICT products significantly contribute to improving the quality of life. These findings underscore the importance of investing in technology and innovation to support the Smart Economy which has a profound impact on people's welfare. The role of the government, along with the private sector, in developing digital infrastructure and adaptive economic policies is critical in fostering a dynamic and responsive Smart Economy and improving Smart Living. These findings are in line with previous research by **[9]** which also supports the positive and significant impact of the Smart Economy on Smart Living.

The impact of the Smart Economy on the National Economy, the analysis shows that there is a positive and significant relationship between the Smart Economy and the National Economy, with the highest path coefficient of 0.886. This strong correlation is further validated by the acceptance of hypothesis 2 which highlights the substantial impact of the Smart Economy on the National Economy, with an R value of 0.785 and an f-square value of 3.649. These findings show that the Smart Economy has a significant and strong influence on the National Economy. Key indicators of this impact include an increase in SME turnover through e-commerce, which contributes to GDP growth and strengthens the economic base. Increasing the workforce in knowledge-intensive fields improves the quality and productivity of the workforce, drives GDP growth, and facilitates innovation. ICT integration in various sectors increases efficiency and productivity, reduces unemployment, and increases ICT's contribution to GDP

In addition, ICT's significant contribution to GDP reflects the economy's reliance on technology, which in turn drives GDP growth and supports the development of the digital economy. Increased online consumption facilitates access to goods and services, increases per capita consumption, and reduces inflation due to price competition. In addition, the increase in imports of ICT products reflects wider access to advanced technologies, increasing productivity and energy efficiency, and ultimately improving the quality of life. These findings emphasize the important role of the Smart Economy in driving national economic growth through increasing GDP, sustainable economic growth, and increasing efficiency and productivity. Investments in technology, innovation, digital infrastructure, adaptive economic policies, and digital skills education and training are essential to harness the full potential of the Smart Economy and its impact on national economic growth. These results are consistent with previous research by **[10]** which also confirmed the positive and significant impact of the Smart Economy on the National Economy.

Impact of the National Economy on Smart Living, the findings show that there is a positive and significant relationship between the National Economy and Smart Living, with the highest path coefficient of 0.886. The acceptance of hypothesis 2 confirms the significant influence of the National Economy on Smart Living, with an R value of 0.833 and an f-square value of 0.033. Although the impact is moderate, it is still significant. Indicators of this impact include GDP growth, which reflects the health of the economy and contributes to an increase in per capita household consumption spending, thereby improving the quality of life. Steady GDP growth indicates a sustainable and strong economy, reducing vulnerable jobs, and increasing urban populations through more job opportunities and improved urban infrastructure.

Efficient energy consumption, which indicates more sustainable and cost-effective use, supports a balance between working hours and leisure time and improves the quality of life. A low unemployment rate indicates an economy that can create jobs, reduce vulnerable jobs, and

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increase household economic stability. High levels of entrepreneurship indicate innovation and dynamism in the economy, creating new job opportunities, increasing income, and reducing crime rates by providing legitimate job alternatives.

Controlled inflation maintains price stability, supports purchasing power, and contributes to an increase in per capita household consumption expenditure and a better quality of life. A strong national economy increases income and purchasing power, reduces social inequality, supports local economic development, and enables investment in innovation and technology. Additionally, a strong economy provides resources for education and training, ensuring people have the necessary skills to participate in the modern economy and enjoy a better quality of life. These findings are in line with previous research by **[11]** which also supports the positive and significant impact of the National Economy on Smart Living.

The Role of National Economic Mediation between Smart Economy and Smart Living. An analysis of the mediating role of the National Economy between Smart Economy and Smart Living, as shown, indicates that the National Economy mediates this relationship. However, the mediation effect was not significant, as evidenced by t-values higher than 1.65 (1.830) and p-values lower than 0.05 (0.034). The VAF test result of 16% shows that only 16% of the total effects of the Smart Economy on Smart Living are mediated by the National Economy, which indicates a weak and statistically insignificant mediating effect.

These findings show that the National Economy does not significantly mediate the relationship between Smart Economy and Smart Living. From an economic perspective, the implementation of Smart City initiatives, especially Smart Economy and Smart Living, in Indonesia is uneven, especially in terms of investment. Resource allocation, both financial and non-financial, should be focused directly on the development of the Smart Economy and Smart Living without having to depend on the growth of the National Economy.

It is important to optimize economic policies to increase their effectiveness in improving the quality of life. Strategic planning in infrastructure, such as high-speed internet, expansion of e-commerce platforms, and sustainable transportation systems, is essential to ensure equitable access to technology throughout Indonesia. Efforts to strengthen the synergy between the Smart Economy and the National Economy must be focused on efficiency and productivity through smart technology, including the development of digital infrastructure, supportive innovation policies and regulations, improved digital skills education, and collaboration between the public and private sectors.

As such, economic strategies must continue to drive direct growth in the Smart Economy and Smart Living while optimizing national economic policies for greater impact in the future. These findings are consistent with previous research by **[12] [13] [14] [15] [16]** which emphasized the importance of optimizing economic policies to improve the quality of life through direct investment in the Smart Economy and Smart Living.

## IV. CONCLUSION

The smart economy has significantly and positively impacted smart living in Indonesia. This impact can be measured by the turnover of Small and medium-sized enterprises (SMEs) through e-commerce, the presence of a knowledge-intensive workforce, and the contribution of Information and communication technology (ICTs) to the country's GDP. The impact leads to increased income, improved job opportunities, and improved quality of life through technological efficiency and balance.

Furthermore, the Smart Economy is critical in strengthening the National Economy by creating value-added jobs and supporting sustainable economic growth. A strong national economy, demonstrated by GDP growth, efficient energy consumption, and low unemployment rates, significantly improves the quality of life of the people of Indonesia.

However, the impact of the national economy on the relationship between the smart economy and smart living could be more substantial. This suggests that efforts to improve the quality of life through the Smart Economy must be carried out directly, without relying on the national economy.

Therefore, it is essential for the government and the private sector to concentrate on implementing data-driven policies, enhancing ICT infrastructure, supporting SMEs, and reducing social inequality to maximize the positive impact of the Smart Economy on Smart Living.

Additionally, further research is needed to develop a more comprehensive model of the relationship between the Smart Economy, the National Economy, and Smart Living, considering additional variables such as education, access to health, and the environment. Conducting long-term studies to understand the changes and cumulative effects of the Smart Economy will also be beneficial.

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