

Conceptualizing Research Trends of the Digital Economy (1998 – 2024) Evidence from Bibliometric Analysis

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Abstract

The existence of the digital economy brings novelty to global economic activities, through technological transformation that continues to grow rapidly from year to year. This research focuses on conceptualizing the development trend of digital economy research publications from 1998 – 2024 by looking at publication trends, annual publication growth rates, recent publications, most relevant sources, and country contributions to publications. In addition, this study also aims to provide information on the relevance of keywords needed in digital economy research in the future. This research took the Scopus database of 1,177 documents and used bibliometric analysis with a descriptive approach. The researchers also used R Studio tools to obtain key information and VOSviewer to conduct a thorough analysis. The results of the analysis show that the growth of literature has increased significantly since 2016 and shows a positive trend. Recent publications on the digital economy are dominated by articles written by Wang Y. Keyword analysis shows that the focus of digital economy research is interrelated with 4 main clusters, namely; innovation, economic growth, digital technology, and China as a country that dominates research contributions on the topic of digital economy. The data visualization results also present how the focus of research trends over the past 5 years. With the focus of research in 2020 – 2022, namely on innovation, digital economy, economic growth and things that lead to digitalization. Post-pandemic, the focus of research has shifted slightly to addressing problems caused by environmental damage. With a research focus on digitalization and green innovation.

Keywords: Digital Economy, Research Trend, Bibliometric Analysis, VOSviewer, R Studio

INTRODUCTION

The government as the executor of development requires quality human resources (HR) as the main foundation of development. To create quality human resources, various quality improvement efforts need to be made. Human quality itself can be measured through the Human Development Index (Jasasila, 2020). The Human Development Index (HDI) is an indicator of a country's progress that is also used to measure people's quality of life. Since 1990, the development of the level of human living standards (HDI index) around the world has been studied and reports published by the United Nations Development Program (Primananda et al., 2023).

The HDI issued by the United Nations Development Program (UNDP) is used to measure successful performance in human development. In 2010, UNDP introduced a new Human Development Index (HDI) model with several key indicators. These include the Health index, which is measured by life expectancy at birth, the Education index, which includes Expected Years of Schooling and Average Years of Schooling, and the Decent Living Standards Index, which reflects the economic well-being of the population (Fitriani, 2022). Economic development is essentially a continuous process, and human resources are a key element in driving economic development at the regional level. Increasing HDI is a priority in national development, especially in efforts to reduce poverty and improve the quality of human resources.

Indonesia's Human Development Index in 2019 was 71.92, which continues to increase every year. Based on data from the Indonesian Central Bureau of Statistics, the five provinces that have the highest Human Development Index (HDI) values are DKI Jakarta, Yogyakarta, Riau Islands, East Kalimantan, and Bali.

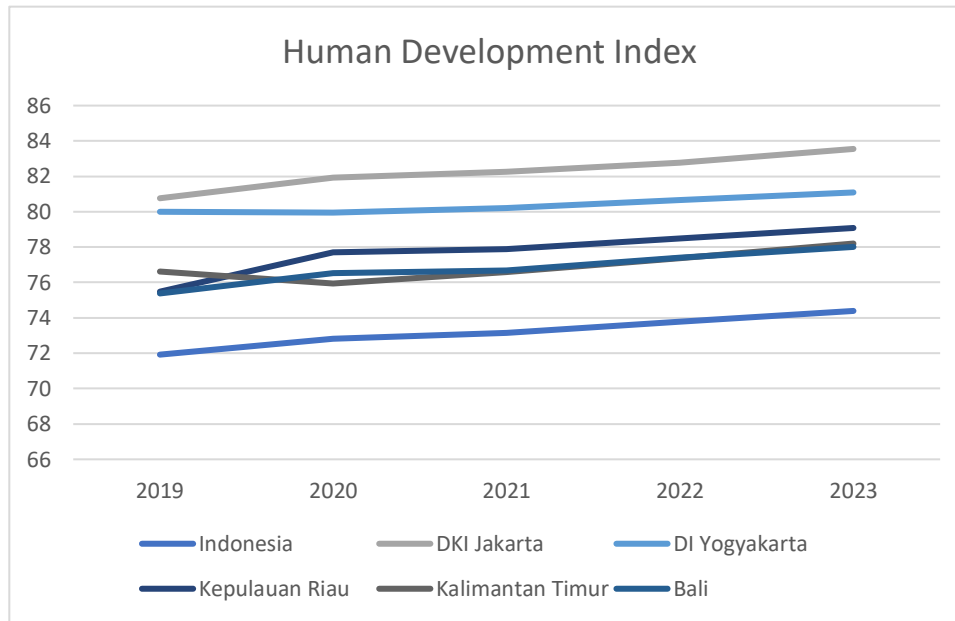


Figure 1. *Human Development Index (Badan Pusat Statistik, 2023)*

Figure 1. shows that the Development Index has increased from 2019 to 2023 except for the provinces of DI Yogyakarta and East Kalimantan which experienced a decline in 2020. Based on UNDP standards, the HDI of DKI Jakarta, DI Yogyakarta, Riau Islands, East Kalimantan, and Bali are included in the high category. Despite the increase, there is still a gap in each indicator of the Human Development Index.

One of the strategies implemented by the Indonesian government to accelerate the increase in HDI is through various social assistance programs. The food social assistance program (bansos sembako) and the Smart Indonesia Program (PIP) are designed to help the poor to meet basic needs and improve access to education for children from poor families, including access to education and health. This social assistance is expected to not only reduce poverty directly but also reduce school dropout rates and increase educational participation. Education is one of the important dimensions in the HDI, so these programs are expected to boost the HDI in Indonesia. The existence of social assistance programs in Indonesia, there is a common understanding that the purpose of receiving assistance is human development (Djulus et al., 2022). Based on the background described, this study aims to analyze the effect of food social assistance programs and the Smart Indonesia Program (PIP) on increasing HDI in Indonesia.

METHOD

This method uses quantitative data to process data and aims to determine how independent variables can affect independent variables. The panel data regression method combines time series data and cross section data (Julihaanza & Khoirudin, 2023). This study uses Panel Estimated Generalized Least Squares analysis with the following econometric model:

$$\log IPM = \beta_0 + \beta_1 \log BANSOS + \beta_2 \log PIP + \varepsilon$$

$\log$ = Logarithm

β_0 = Constant

$BANSOS$ = Food Social Assistance Budget

PIP = Program Indonesia Pintar Distribution Budget
 ε = Error term

The data in this study were converted into logarithmic form with HDI, BANSOS, and PIP. The data used is panel data for the provinces of DKI Jakarta, DI Yogyakarta, Riau Islands, East Kalimantan, and Bali from 2019 to 2023. The data source of this research is based on the Central Statistics Agency (BPS) and the Ministry of Education and Culture's PIP (PIP Kemendikbud).

RESULTS AND DISCUSSION

Panel Regression Model to adopt the most suitable model used in managing panel data, there are several tests that can be done, namely the Chow test, Hausman test, and Lagrange Multiplier (LM) test (Julihaanza & Khoirudin, 2023).

Chow Test

Table 1. Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	23.009888	(4,18)	0.0000
Cross-section Chi-square	45.261702	4	0.0000

In accordance with Table 1. it can be noticed that the probability value is 0.0000 (<0.10) which indicates that the selected model is FEM.

Hausman Test

Table 2. Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.298746	2	0.8612

In accordance with Table 2. it can be noticed that the probability value is 0.8612 (>0.10) which indicates that the selected model is REM.

LM Test

Table 3. LM Test Result

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	30.00313 (0.0000)	0.668476 (0.4136)	30.67160 (0.0000)
Honda	5.477511 (0.0000)	-0.817604 (0.7932)	3.295052 (0.0005)
King-Wu	5.477511 (0.0000)	-0.817604 (0.7932)	3.295052 (0.0005)
Standardized Honda	7.022118 (0.0000)	-0.326436 (0.6280)	1.925318 (0.0271)

Following Table 3. it can be noticed that the probability value is 0.000 (<0.10) which indicates that the selected model in this study is REM. Depends on the results of the Chow Test, Hausman Test, and LM Test, the best model in this study is REM.

Panel Data Regresion

Table 4. EGLS Panel Model Result

Dependent Variable: LHDI

Method: Panel EGLS (Cross-section random effects)

Sample: 2019 2023

Periods included: 5

Cross-sections included: 5

Total panel (balanced) observations: 25

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.758485	0.313042	12.00632	0.0000
LPIP	0.019475	0.012563	1.550227	0.1354
LBANSOS	0.004326	0.002481	1.743481	0.0952
Effects Specification				
			S.D.	Rho
Cross-section random			0.033486	0.8935
Idiosyncratic random			0.011558	0.1065
Weighted Statistics				
Root MSE	0.010415	R-squared		0.253404
Mean dependent var	0.666181	Adjusted R-squared		0.185532
S.D. dependent var	0.012302	S.E. of regression		0.011102
Sum squared resid	0.002712	F-statistic		3.733543
Durbin-Watson stat	1.604447	Prob(F-statistic)		0.040174
Unweighted Statistics				
R-squared	0.277703	Mean dependent var		4.366716
Sum squared resid	0.015513	Durbin-Watson stat		0.280469

The results of the panel data estimation obtained an F-statistic value of 3.733543 with a probability of 0.040174 (<0.10) indicate that the Indonesia Smart Program (PIP) Distribution Budget and the Food Social Assistance Budget (BANSOS) together have a significant effect on the Human Development Index (HDI).

Based on table 4. the results of the R² coefficient of determination test can be seen in the Adjusted R-squared value of 0.185532 which shows that the independent variables together are able to provide an explanation of the dependent variable of 18.55%, while the other 81.45% is influenced by variables outside this study.

At the 10 percent significance level, the BANSOS variable is statistically significant, there is a significant relationship. The results show that a 1% increase in the Food Social

Assistance Program Budget will affect a 0.004326% increase in the Human Development Index. In contrast, there is no relationship between PIP and HDI because the probability value shows 0.1354 (>0.10).

CONCLUSION

This study uses panel data series on five provinces in Indonesia that have the highest Human Development Index values, namely, DKI Jakarta, Yogyakarta, Riau Islands, East Kalimantan, and Bali. In this study, the results of the EGLS model show that the food social assistance budget has a significant effect on increasing the Human Development Index (HDI) in the five provinces with the highest HDI in Indonesia. Food social assistance plays an important role in improving people's welfare, especially in terms of improving health and reducing poverty, and contributes to the increase in HDI. The program is proven to strengthen the purchasing power of the poor, enabling them to better access basic needs such as food, health and education.

Meanwhile, the budget distribution of the Indonesia Smart Program (PIP) does not show a significant effect on HDI in these provinces. This indicates that PIP aims to improve access to education for students from underprivileged families. However, the program has not been implemented optimally and evenly in certain areas, especially remote rural areas, so it has not been able to overcome various structural challenges in the education sector. Other factors such as the quality of education, school infrastructure and the readiness of teaching staff could also be more influential variables in improving the quality of education in areas with high HDI. Dengan adanya pengaruh signifikan anggaran bantuan sosial pangan terhadap IPM, pemerintah perlu memperkuat program ini dengan memastikan bahwa bantuan tersebut tepat sasaran dan diterima oleh kelompok masyarakat yang paling membutuhkan. Periodic monitoring and evaluation of program implementation also needs to be conducted to ensure the effectiveness of the program in improving community welfare.

The results show that PIP has not had a significant impact on HDI, especially in provinces with high HDI. Therefore, it is necessary to conduct an in-depth evaluation of the implementation of this program as well as a review of the PIP aid distribution mechanism, the quality of education received by students, and support for education infrastructure and resources in areas with relatively good education levels. Through investment in education, a society can improve its literacy, knowledge and skills levels, which in turn will have a positive impact on the Human Development Index (Harsono, 2024).

Improving HDI does not only depend on education interventions, but also involves aspects of health and economic income. Therefore, social assistance and education programs need to be integrated with other policies that support the improvement of overall quality of life, such as improving access to health services, creating jobs, and improving workforce skills. Although this study focuses on provinces with the highest HDI, the findings can be used as a reference to improve program effectiveness in other provinces. Social assistance and education programs need to be designed more responsively to the needs of regions with low HDI in order to narrow the development gap between regions.

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