

---

## REVIEWING ECONOMIC GROWTH FROM THE PERSPECTIVE OF DIGITAL ECOSYSTEMS AND MONEY VOLATILITY

Ali Farhan<sup>1</sup>, Ayu Rachmawati<sup>2</sup>

Sekolah Tinggi Ilmu Ekonomi Mahardhika<sup>1</sup>, Universitas Darul Ulum<sup>2</sup>

Email: [ali.farhan@stiemahardhika.ac.id](mailto:ali.farhan@stiemahardhika.ac.id)<sup>1</sup>, [Ayu.rachmawati125@gmail.com](mailto:Ayu.rachmawati125@gmail.com)<sup>2</sup>

---

### Abstract

*The massive expansion of financial access through digital instruments has stimulated growth in money demand, which in turn drives the volatility of money in circulation. This research aims to examine whether the existence of digital ecosystems and internet access which facilitate easier money usage impacts the economy. Furthermore, it investigates whether the ease of access leading to increased money volatility can moderate the influence of other variables on economic growth. Using a sample of Indonesia's economic conditions from 2023–2024, this research finds that QRIS and Internet Access have a positive and significant effect on economic growth, while money volatility has a negative but insignificant impact.*

**Keywords:** Money, Digital System, Internet, Growth, Inflation

---

### INTRODUCTION

The recent global growth of the Internet of Things (IoT) has created a new environment known as the digital ecosystem—a technology-enabled environment that facilitates interactions and transactions between various parties, including individuals, businesses, and devices (Adner, 2017; Gawer, 2014). As seen in many nations, the digital ecosystem has become an economic catalyst in Indonesia. Massive internet penetration in the Indonesian market has the potential to drive the country's digital economy to a dominant position in Southeast Asia (Purba, et al., 2025). In line with this, digital economic growth of 22% with a market capitalization of IDR 714.4 trillion in 2022 (Abdillah, 2024) has contributed positive sentiment toward Indonesia's post-digital transformation economy.

The expansion of digital ecosystems and financial systems is a phenomenon that not only creates new economic opportunities but also fundamentally changes how society transacts and interacts (Purba, et al., 2025). The integration of the internet into trade, services, and manufacturing contributes to the acceleration of information and transaction flows. However, this acceleration brings risks as well as benefits. Vujović (2023) argues that the ease of transactions in the digital era creates risks for currency stability and regulatory oversight, as digital mechanisms lead to a decentralization of money that results in volatility and instability of value.

The presence of digital ecosystems and digital currencies also introduces risks to monetary stability, as digital currency mechanisms often require underlying assets to guarantee value within the system (Lane, 2025). While some scholars (Levine et al., 2000; da Silva et al., 2018; Beck et al., 2000) view financial system development as a positive driver for economic growth, they also note long-term issues regarding instability. Conversely, Anake et al. (2020) found that volatility and interest rate growth (driven by the need for stabilizers in digital systems) do not have a significant correlation with economic growth.

**REVIEWING ECONOMIC GROWTH FROM THE PERSPECTIVE OF DIGITAL ECOSYSTEMS AND MONEY VOLATILITY**

Farhan & Rachmawaty, 2026

Given these diverse findings and the massive growth of the digital ecosystem in Indonesia, this research aims to analyze whether an economy anchored in digital ecosystems remains a viable policy choice. To understand this, the researcher will test how the digital ecosystem represented by internet development and QRIS usage is moderated by money volatility in its relation to economic growth.

**RESEARCH METHODS**

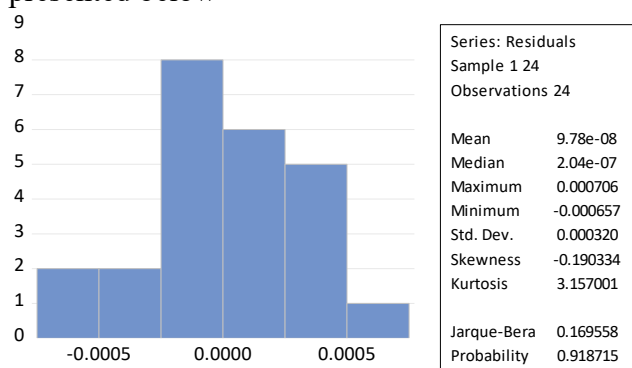
This research employs a quantitative approach to examine the correlation between digital ecosystem variables and economic growth. The digital ecosystem is represented by: QRIS usage and Internet infrastructure development.

These variables are moderated by **money volatility**. The research utilizes a sample from Indonesia covering the period of 2023–2024. For statistical analysis, this study uses **EIEWS** to perform regression testing.

**RESULT & DISCUSSION**

**Classical Assumption Tests**

Prior to conducting the regression analysis, classical assumption tests were performed to ensure the validity and reliability of the available data. These tests are essential for confirming that the model meets the necessary statistical requirements for linear regression. Here is the translation for the Normality Test section: Normality Test The results of the normality test indicate a probability value of  $0.918 > 0.05$ . This confirms that the data used in this research are normally distributed. The corresponding table and graph for these test results are presented below



**Figure 1. Normality Test Results**

**Autocorrelation Test**

The autocorrelation test is a statistical procedure performed to determine whether there is a correlation between residuals (prediction errors) in a given period and those from a previous period within the regression model. This test aims to detect violations of the classical linear regression assumptions, which is particularly critical for time series data. The results of the autocorrelation test show a Durbin-Watson statistic of 1.39544. Data is considered free from autocorrelation if the Durbin-Watson value falls within the

range of -2 to 2. Consequently, the data utilized in this research is confirmed to be free from autocorrelation issues

**Table 1. Autocorrelation Test**

Mean dependent var	1.000000	S.D. dependent var	0.000000
S.E. of regression	0.000343	Akaike info criterion	-12.96868
Sum squared resid	2.35E-06	Schwarz criterion	-12.77234
Log likelihood	159.6242	Hannan-Quinn criter.	-12.91659
Durbin-Watson stat	1.395654		

### Impact Test (Regression Analysis)

After passing the classical assumption tests, the next step in the analysis is to perform the regression test. The results of the regression analysis are presented in the following table:

**Table 2. Regression Results**

Stopping criterion: p-value forwards/backwards = 0.5/0.5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH	0.185734	0.000802	231.7283	0.0000
QRIS	0.000536	2.90E-05	18.45224	0.0000
INTERNET ACCESS	0.000596	4.24E-05	14.05361	0.0000
MONEY VOIATILITY	-0.000139	0.000145	-0.960138	0.3485
Mean dependent var	1.000000	S.D. dependent var	0.000000	
S.E. of regression	0.000343	Akaike info criterion	-12.96868	
Sum squared resid	2.35E-06	Schwarz criterion	-12.77234	
Log likelihood	159.6242	Hannan-Quinn criter.	-12.91659	
Durbin-Watson stat	1.395654			

#### Selection Summary

No regressors were chosen by the stepwise routine

Source: *Data Processed, 2026*

Based on the regression results provided, the analysis of each variable is as follows:  
 QRIS: The probability value is  $0.000 < 0.05$ , indicating that QRIS usage has a significant partial effect on economic growth<sup>1</sup>. The positive coefficient of 0.000536 implies that an increase in transaction volume or QRIS usage will positively impact economic growth<sup>2</sup>.  
 INTERNET ACCESS: The probability value is  $0.000 < 0.05$ , meaning that internet access has a significant partial effect on economic growth<sup>3</sup>. The positive coefficient indicates that the growth of internet usage directly drives economic growth<sup>4</sup>.  
 MONEY VOLATILITY: The probability value is  $0.348 > 0.05$ , with a negative coefficient of -0.0001395. This suggests that mon volatility is partially counterproductive to economic growth, although its significance is low or non-significant.

**REVIEWING ECONOMIC GROWTH FROM THE PERSPECTIVE OF DIGITAL ECOSYSTEMS AND MONEY VOLATILITY**

Farhan & Rachmawaty, 2026

**Table 3. F-Test (Simultaneous Test)**

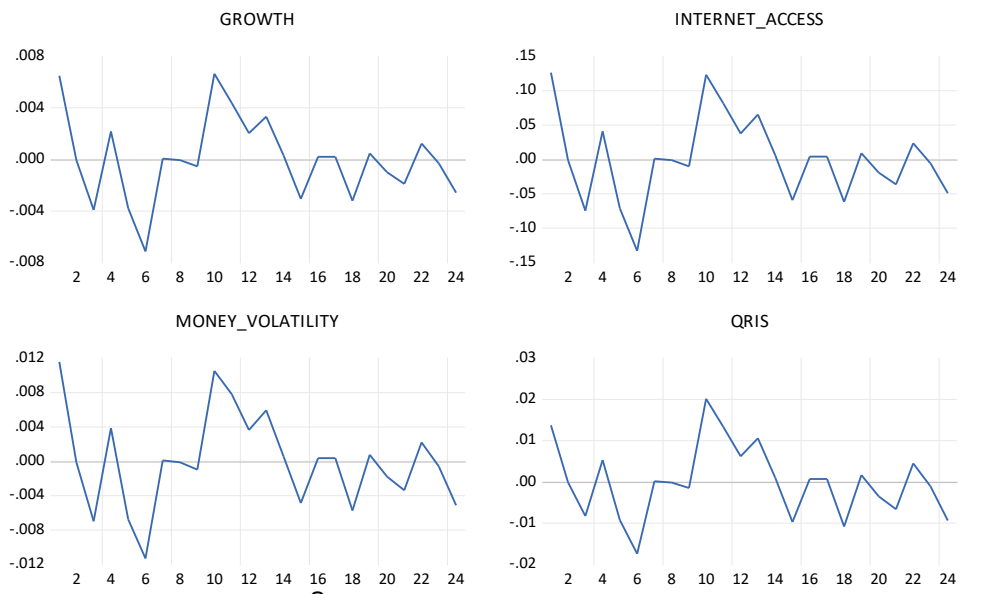
R-squared	0.346346
Adjusted R-squared	0.208734
S.E. of regression	1.31E-07
Sum squared resid	3.24E-13
Log likelihood	349.1817
F-statistic	2.516839
Prob(F-statistic)	0.075560

Source: Data Processed, 2026

Based on the F-test results in the table above, the Adjusted R-Squared value is 0.208 (20.8%). This indicates that the regression model shows GROWTH is influenced by approximately 20.8% by the variables QRIS, MONEY VOLATILITY, and INTERNET ACCESS. Meanwhile, the remaining 79.2% is explained by other variables not measured in this research. Furthermore, the F-test probability shows a value of  $0.07 > 0.05$ , which demonstrates that, simultaneously, the variables used in this test do not have a significant influence on economic growth.

Below is the display of the Gradients of the Objective Function graphic, which is used by optimization algorithms to find the point where the function reaches its optimal value (typically where the gradient approaches zero). In this graph, it can be observed that the Internet Access variable has the largest gradient (0.15), and its sharp fluctuations indicate that this variable provides a significant influence on changes in the objective function value at specific data points. Overall, the four variables tested in this article show a correlation, as the movements of these four variables demonstrate similarities.

Gradients of the Objective Function



Source: Data Processed, 2026

### Moderating Variable Test

After determining the relationship between the three independent variables and economic growth, the next step is to examine the impact of Money Volatility as a moderating variable. The results of this test are presented below.

**Table 4. Moderating Variable Test Results**

Variable	Coefficient		t-Statistic	
	After Moderated	Before Moderated	After Moderated	Before Moderated
GROWTH	0.136555	0.185734	12.59574	0.0000
INTERNET ACCESS	0.003534	0.000596	5.865371	0.0000
QRIS	-0.001519	0.000536	-3.207480	0.0000
MONEY VOIATILITY	0.029588	-0.000139	4.488313	-0.000139

Source: *Data Processed, 2026*

Based on these test results, it is observed that all independent variables (Internet Access, QRIS, and Money Volatility) underwent changes in their influence coefficients toward economic growth. Generally, all these variables show an insignificant effect on economic growth. Consequently, it can be concluded that Money Volatility serves as a moderator in this research, as its presence weakens the relationship between the other variables and economic growth.

This finding is relevant to the research by Berson (1983), which found that an increase in money volatility drives uncertainty and triggers inflation due to rising interest rates required to compensate for increased economic risks. However, this study differs from the findings of Papadia (2021), who concluded that money volatility is not an accurate predictor of inflation and therefore cannot be directly associated with economic growth.

### CONCLUSION

The findings of this article indicate that, partially, Internet Access and QRIS contribute positively to economic growth. However, this is not the case for Money Volatility, which in this research demonstrates a negative impact. Furthermore, the findings suggest that money volatility has the potential to act as a moderator for other variables in measuring economic growth. The results also show that internet access, QRIS, and money volatility possess a strong correlation. Nonetheless, this research has certain limitations, specifically the small sample size and potential endogeneity issues, where the variables used may mutually influence one another.

**REVIEWING ECONOMIC GROWTH FROM THE PERSPECTIVE OF DIGITAL ECOSYSTEMS AND MONEY VOLATILITY**

*Farhan & Rachmawaty, 2026*

**DAFTAR PUSTAKA**

- Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Journal of Management*, 43(1), 39–58. <https://doi.org/10.1177/0149206316639451>
- Anake, A. F., Mboto, H. W., Eyo, E. I., Ogar, A., Manyo, T. S., & Ugah, J. (2020). Economic Volatility, Money Supply Velocity and Economic Growth In Nigeria. *Journal of Critical Reviews*, 7(18), 3406-3413.
- Abdillah, F. (2024). Dampak ekonomi digital terhadap pertumbuhan ekonomi di Indonesia. *Benefit: Journal of Bussiness, Economics, and Finance*, 2(1), 27-35.
- Beck, Thorsten, Ross Levine, and Norman Loayza (2000), “Finance and the sources of growth.” *Journal of Financial Economics*, 58, 261 – 300.
- Berson, D. W. (1983). Money growth volatility, uncertainty, and high interest rates. *Economic Review*, 68(9), 23-38.
- da Silva, S. H., Tabak, B. M., Cajueiro, D. O., & Fazio, D. M. (2017). Economic growth, volatility and their interaction: What’s the role of finance?. *Economic Systems*, 41(3), 433-444.
- Fakhrudin. Machtra, Catona. 2016. Analysis of the Effects of Monetary Policy on Output in Indonesia. *Journal of Economics and Public Policy*. Volume 3 Number 1, May 2016 ISSN. 2442-7411.
- Gawer, A. (2014). Bridging differing perspectives on digital platforms: Toward an integrative framework. *Academy of Management Perspectives*, 28(4), 418–431. <https://doi.org/10.5465/amp.2014.0047>
- Keynes, J.M., 1936. general theory of employment, interest, and money.
- Lane, P. (2025). The digital euro: maintaining the autonomy of the monetary system. *SUERF Policy Note*, (369), 18.
- Levine, Ross, Norman Loayza, and Thorsten Beck (2000), “Financial intermediation and growth: Causality and causes.” *Journal of Monetary Economics*, 46, 31 – 77.
- Ogunmuyiwa, M. S., & Ekone, A. F. (2010). Money supply-economic growth nexus in Nigeria. *Journal of Social Sciences*, 22(3), 199-204.
- Papadia, F., & Cadamuro, L. (2021). Does money growth tell us anything about inflation? (No. 11/2021). *Bruegel Working Paper*.
- Purba, D. S., Permatasari, P. D., Tanjung, N., Rahayu, P., Fitriani, R., & Wulandari, S. (2025). Analisis Perkembangan Ekonomi Digital dalam Meningkatkan Pertumbuhan Ekonomi di Indonesia. *Jurnal Masharif Al-Syariah: Jurnal Ekonomi Dan Perbankan Syariah*, 10(1).
- Putra, M Umar Maya. 2015. Peran dan Kebijakan Moneter Terhadap Perekonomian Sumatera Utara. *Jurnal Wira Ekonomi Mikroskil*. Volume 5, Nomor 01, Oktober 2015.
- Radiany, M. A., Farhan, A., Sumaryono, R., & Harjanti, W. (2020). A Masterpiece from the Subprime Mortgage Crisis in America. *A Masterpiece from the Subprime Mortgage Crisis in America*, 8(6), 1420-1426.
- Robinson 1952. The Generalization of the General Theory. In *the Rate of Interests and other Essays*. Land. Macricular. pp. 547-582.
- Vujović, D. (2023). The impact of digital money on monetary and fiscal policy. *Ekonomika preduzeća*, 71(1), 65-76.