

**THE EFFECT OF DIGITALIZATION DEVELOPMENT,  
TECHNOLOGICAL ECONOMIC GROWTH, AND HUMAN  
DEVELOPMENT INDEX ON ECONOMIC GROWTH IN INDONESIA**



**SUBMITTED TO THE FACULTY OF ISLAMIC ECONOMICS AND  
BUSINESS, SUNAN KALIJAGA STATE ISLAMIC UNIVERSITY,  
YOGYAKARTA, AS ONE OF THE REQUIREMENTS FOR OBTAINING  
A BACHELOR'S DEGREE IN ECONOMICS**

**WRITTEN BY:**

**MOH. ARIFAL ABROR**

**NIM: 21108010136**

**SUPERVISOR:**

**Dr. ABDUL OOYUM. S.E.I., M.Sc.Fin.**

**NIP. 19850630 201503 1 007**

**DEPARTMENT OF SHARIA ECONOMICS  
FACULTY OF ISLAMIC ECONOMICS AND BUSINESS ISLAMIC  
STATE UNIVERSITY OF SUNAN KALIJAGA  
YOGYAKARTA**

**2025**

**THE EFFECT OF DIGITALIZATION DEVELOPMENT,  
TECHNOLOGICAL ECONOMIC GROWTH, AND HUMAN  
DEVELOPMENT INDEX ON ECONOMIC GROWTH IN INDONESIA**



**SUBMITTED TO THE FACULTY OF ISLAMIC ECONOMICS AND  
BUSINESS, SUNAN KALIJAGA STATE ISLAMIC UNIVERSITY,  
YOGYAKARTA, AS ONE OF THE REQUIREMENTS FOR OBTAINING  
A BACHELOR'S DEGREE IN ECONOMICS**

**WRITTEN BY:  
MOH. ARIFAL ABROR  
NIM: 21108010136**

**SUPERVISOR:  
Dr. ABDUL QOYUM. S.E.I., M.Sc.Fin.  
NIP. 19850630 201503 1 007**

**DEPARTMENT OF SHARIA ECONOMICS  
FACULTY OF ISLAMIC ECONOMICS AND BUSINESS ISLAMIC  
STATE UNIVERSITY OF SUNAN KALIJAGA  
YOGYAKARTA  
2025**

# THESIS RATIFICATION PAGE



KEMENTERIAN AGAMA  
UNIVERSITAS ISLAM NEGERI SUNAN KALIJAGA  
FAKULTAS EKONOMI DAN BISNIS ISLAM  
Jl. Marsda Adisucipto Telp. (0274) 550821, 512474 Fax. (0274) 586117 Yogyakarta 55281

## PENGESAHAN TUGAS AKHIR

Nomor : B-1387/Un.02/DEB/PP.00.9/08/2025

Tugas Akhir dengan judul : THE EFFECT OF DIGITALIZATION DEVELOPMENT, TECHNOLOGICAL ECONOMIC GROWTH, AND HUMAN DEVELOPMENT INDEX ON ECONOMIC GROWTH IN INDONESIA

yang dipersiapkan dan disusun oleh:

Nama : MOH. ARIFAL ABROR  
Nomor Induk Mahasiswa : 21108010136  
Telah diujikan pada : Rabu, 20 Agustus 2025  
Nilai ujian Tugas Akhir : A

dinyatakan telah diterima oleh Fakultas Ekonomi dan Bisnis Islam UIN Sunan Kalijaga Yogyakarta

## TIM UJIAN TUGAS AKHIR



Ketua Sidang

Dr. Abdul Qoyum, S.E.I., M.Sc.Fin.  
SIGNED

Valid ID: 68ab9dced89eb



Penguji I

Muh. Rudi Nugroho, S.E., M.Sc.  
SIGNED

Valid ID: 68a86c5835a06



Penguji II

Dr. Miftakhul Choiri, S.Sos.I., M.S.I.  
SIGNED

Valid ID: 68a9927d6c44b



Yogyakarta, 20 Agustus 2025  
UIN Sunan Kalijaga

Dekan Fakultas Ekonomi dan Bisnis Islam

Prof. Dr. Misnen Ardiansyah, S.E., M.Si., Ak., CA., ACPA.  
SIGNED

Valid ID: 68abc1472ccc0

## THESIS APPROVAL PAGE

Subject : Undergraduate Thesis by Moh Arifal Abror

To:

**Yth. The Respectable Dean of The Faculty of Islamic Economic and Business**

**UIN Sunan Kalijaga**

In Yogyakarta

*Assalamu`alaikum Wr. Wb.*

After reading, researching, providing guidance and corrections, and making necessary improvements, we are as supervisors, are of the opinion that your thesis:

Name : Moh Arifal Abror

NIM : 21108010136

Title : The Effect Of Digitalization Development, Technological Economic Growth, And Human Development Index On Economic Growth In Indonesia


It can be submitted to the Faculty of Islamic Economics and Business, Department of Sharia Economics, UIN Sunan Kalijaga Yogyakarta as one of the requirements for obtaining a Bachelor's Degree in Islamic Economics.

We hope that your thesis can be submitted soon. For that, we thank you.

*Wassalamu`alaikum Wr. Wb.*

Yogyakarta, 13 Agustus 2025

Supervisor



**Dr. Abdul Qoyum, S.E.I., M.Sc.Fin.**

NIP. 19850630 201503 1 007

## AUTHENTICITY STATEMENT PAGE

### AUTHENTICITY STATEMENT PAGE

The undersigned:

Name : Moh Arifal Abror  
NIM : 21108010136  
Study Program : Sharia Economics  
Type of Work : Thesis

Stating that the thesis entitled " THE EFFECT OF DIGITALIZATION DEVELOPMENT, TECHNOLOGICAL ECONOMIC GROWTH, AND HUMAN DEVELOPMENT INDEX ON ECONOMIC GROWTH IN INDONESIA " is really the work of the author himself, not a duplication or a copy of the work of others, except for the parts that have been referred to and mentioned in the bodynote and bibliography. If at another time it is proven that there are irregularities in this work, then the responsibility lies entirely with the compiler. Thus, I make this statement so that it can be understood and used as necessary.

Yogyakarta, 13 Agustus 2025

Author,

Moh Arifal Abror

STATE ISLAMIC UNIVERSITY  
SUNAN KALIJAGA  
YOGYAKARTA

## **PUBLICATION APPROVAL PAGE FOR ACADEMIC PURPOSES**

As a member of the academic community at UIN Sunan Kalijaga Yogyakarta, I am, the undersigned:

Name : Moh Arifal Abror  
NIM : 21108010136  
Study Program : Sharia Economics  
Faculty : Islam Economic and Bussiness  
Type of Work : Thesis

For the sake of scientific development, I agree to give UIN Sunan Kalijaga Yogyakarta a non-exclusive royalty free right for my scientific work entitled:

**“THE EFFECT OF DIGITALIZATION DEVELOPMENT, TECHNOLOGICAL ECONOMIC GROWTH, AND HUMAN DEVELOPMENT INDEX ON ECONOMIC GROWTH IN INDONESIA”**

Along with existing devices (if needed). With this Non-Exclusive Royalty-Free Right, UIN Sunan Kalijaga Yogyakarta has the right to store, transfer/format, manage, in the form of a database, maintain and publish my final project as long as I still include my name as the compiler and as the copyright owner.

Thus, I made this statement in truth.

STATE ISLAMIC UNIVERSITY  
**SUNAN KALIJAGA**  
YOGYAKARTA

Made in: Yogyakarta

On 13 Agustus 2025



(Moh Arifal Abror)



## **MOTTO**

Do the best, and let god do the rest



## DEDICATION PAGE

My parents, almarhum Nor Cholis and Mother Binati, as well as my older brothers and sister who have always given me endless support, and have prayed for my success all this time. I'm so grateful for all your support.

To everyone involved in the smooth process of compiling this thesis, thank you for your thoughtfulness. I pray that your kindness brings you endless blessings.

Last, if there's anybody in my life who I should probably thank, it's you





## ARABIC LATIN TRANSLITERATION GUIDELINES

The transliteration of Arabic words used in this study is guided by the Joint Decree of the Minister of Religion and the Minister of Education and Culture of the Republic of Indonesia Number: 158/1987 and 0543b/U/1987.

### A. Single Consonant

Arabic Front	Name	Latin Letters	Description
ا	Alif	Not symbolized	Not symbolized
ب	Ba	B	Be
ت	Ta	T	T
ث	ša	š	Es (with the above point)
ج	Jim	J	Je
ح	ḥa	ḥ	Ha (with the above point)
خ	Kha	Kh	ka and ha
د	Dal	D	De
ذ	Zal	Ž	zet (with the above point)
ر	Ra	R	Er
ز	Zai	Z	Zet
س	Sin	S	Es
ش	Syin	Sy	Es and Ye
ص	ṣad	ṣ	Es (with the above point)
ض	ḍad	ḍ	De (with the above point)
ط	ṭa	ṭ	Te (with the above point)
ظ	ẓa	ẓ	Zet (with the above point)
ع	Ain	... ‘ ...	Inverted comma above

Arabic Front	Name	Latin Letters	Description
غ	Gain	G	Ge
ف	Fa	F	Ef
ق	Qaf	Q	Qi
ك	Kaf	K	Ka
ل	Lam	L	El
م	Mim	M	Em
ن	Nun	N	N
و	Wawu	W	We
هـ	Ha	H	Ha
ء	Hamzah	... ' ...	Apostrof
ي	Ya	Y	Ye

## B. Dual Consonants for Shaddah Written in Multiple

مُتَّقِدِينَ	written	<i>Muta`aqqidīn</i>
عِدَّة	written	<i>`iddah</i>

## C. Ta Marbutah

1. When turned off h

هَيْبَةٍ	written	<i>Hibbah</i>
جِزْيَةٍ	written	<i>Jizyah</i>

2. If ta marbutah lives or with harakat, fathah, kasrah and dammah it is written t

زَكَاةَ الْفِطْرِ	written	<i>zakātul fiṭri</i>
-------------------	---------	----------------------

#### D. Short Vowels

Vokal	Fathah	written	A
َ	Kasrah	written	I
ُ	Dammah	written	U

#### E. Long Vowels

fathah + alif جاهلية	written	A <i>Jāhiliyyah</i>
fathah + ya sukun ياسلي	written	A <i>yas'ā</i>
kasrah + ya sukun كريم	written	I <i>Karīm</i>
dammah + wawu sukun فروض	written	U <i>furūd</i>

#### F. Double Vowels

fathah + ya' sukun بَيْنَ	written	Ai <i>bainakum</i>
fathah + wawu sukun قَوْل	written	Au <i>Qaul</i>

#### G. Sequential Short Vowels in One Word Separated with Apostrophe

أَنْتُمْ	written	<i>a'antum</i>
أَعِدَّتْ	written	<i>u'iddat</i>
لَا تُنْكِرْ	written	<i>la'in syakartum</i>

## H. The article Alif + Lam

1. If followed by the Qomariyyah letter:

القرآن	written	<i>al-Qur'ān</i>
القياس	written	<i>al-Qiyās</i>

2. If followed by the letter Syamsiyah written by duplicating the letter Syamsiyah that follows it, and removing the letter (*el*).

السماء	written	<i>as-samā</i>
الشمس	written	<i>asy-syams</i>

## I. Arrangement of words in a series of sentences

ذوي الفروض	written	<i>ẓawi al-furūd</i>
------------	---------	----------------------

## PREFACE

All praise be to Allah SWT, Lord of the universe, for His abundant mercy, guidance, and blessings, which have enabled the author to successfully complete this thesis entitled “The Effect of Digitalization Development, Technological Economic Growth, and the Human Development Index (HDI) on Economic Growth in Indonesia.” May peace and blessings be upon the Prophet Muhammad SAW, his family, companions, and all his followers until the end of time.

The preparation of this thesis would not have been possible without the help, prayers, guidance, and support of various parties. Therefore, on this occasion, the author would like to express his deepest gratitude and appreciation to:

1. To my beloved father Almarhum Nor Cholis and my beloved mother Binati, for all your prayers, love, and sacrifices. Also to my beloved siblings Raudatul Jannah, Roihanul Fajri, Rafa Al Faroby, and Rafid Momtaz, who have always provided encouragement and full support throughout this journey.
2. Prof. Noorhaidi Hasan, S.Ag., M.A., M.Phil., Ph.D as Rector of Sunan Kalijaga Yogyakarta State Islamic University.
3. Prof. Dr. Misnen Ardiansyah, S.E., M.Si., Ak., CA., ACPA. as Dean of the Faculty of Islamic Economics and Business
4. Dr. Miftakhul Choiri, S.Sos.I., M.S.I., as Head of the Sharia Economics Study Program
5. Dr. ABDUL QOYUM. S.E.I., M.Sc.FiN., as my thesis supervisor and my role model, a lecturer who always provides extraordinary insight.

From him, I learned many things, one of which is integrity. Once again, thank you very much for your patience and thoroughness in providing guidance, direction, and valuable input during the process of writing this thesis.

6. Mrs. Anggari Marya Kresnowati, SE., ME, as DPA, who has devoted much of her time and energy to guiding and advising on all matters related to the world of higher education.
7. Mrs. Nor Nabilla Muhammad for her dedication, guidance, and sincere support in helping me complete this thesis.
8. to Mrs. Latis, Mrs. Narti, Mrs. Riris, Mrs. Eza, Mr. Dani, Mr. Rudi, Mr. Hilmi, all lecturers of the Sharia Economics Study Program and the Faculty of Economics and Islamic Business, as well as Mr. Izra and Mrs. Galuh, for their valuable knowledge, guidance, and support. And All employees and administrative staff of FEBI UIN Sunan Kalijaga who always assist in the smooth running of academic processes.
9. Se-Frikuensi: Zein, Nabil, Deni, Hatta, Iza, Izmil, Isfi, Mirda, and Fida, for their positive companionship, support, and enthusiasm that has accompanied this journey. May this brotherhood remain strong despite the distance that separates us. You are all amazing!
10. All my friends from the Angkatan EKSYPAR 21, whether you are still fighting to graduate or have chosen not to continue with us, you are all amazing. Thank you so much for everything. Clara and my friends who

kindly offered their help at that time, without you I would not be where I am today.

11. To my friends who fought alongside me in DEMA FEBI 2024 in the Abhipraya Cabinet—BPH, all the administrators/Pengurus, all the staff, FEBILLIONAIRE Comitte and the Sobat Khusus (Sosus) who accompanied me in my service to FEBI students—being together with you has been an invaluable and wonderful experience. Thank you for your dedication and sacrifices, a memory I will never forget.
12. All my friends in the Emerald Corps who always share laughter—Deni, Dayat, Romi, Rusydan, and everyone else—thank you for your colorful companionship and invaluable support.
13. To all my friends from the Solidarity FKMSB Jogja class of 2021, your kindness will never be forgotten. Thank you for your sincerity and camaraderie, which have made you like family to me during my time in Jogja
14. To all my friends who have fought alongside me in various organizations, including HMPS ES 2022, ForSEBI, GenBI, and other organizations that I cannot mention one by one, thank you very much for your companionship, struggle, and dedication that we have gone through together.
15. To my beloved person, with student ID number 21108010005, thank you so much for your loyalty in accompanying me, providing support, prayers, and encouragement throughout every step of my journey. Your



presence has been an invaluable source of strength and inspiration, making this academic journey feel lighter and more meaningful. May all your kindness and sincerity be rewarded with blessings.

16. To all those who have helped me, both in my studies and in completing this thesis, whom I cannot mention one by one, thank you very much for all your support, prayers, and assistance. May all the kindness you have shown be rewarded by Allah SWT

17. Last but not least, to myself who has fought tirelessly, thank you for persevering amid all limitations, for not giving up despite often feeling tired, and for continuing to move forward even when the road felt heavy. Thank you for believing in the process, for strengthening myself in difficult times, and for keeping my dreams alive until I reached this point. May this step be the beginning of a more meaningful journey.

May Allah SWT bless their kindness and services with His mercy and the best of His goodness. The author realizes that this thesis is far from perfect, therefore, with an open heart, the author welcomes constructive criticism and suggestions, hoping that this thesis will be useful for those who read and study it.

Yogyakarta, 20 Agustus 2025

Author



Moh Arifal Abror

## TABLE OF CONTENTS

<b>THESIS RATIFICATION PAGE .....</b>	<b>ii</b>
<b>THESIS APPROVAL PAGE .....</b>	<b>iii</b>
<b>AUTHENTICITY STATEMENT PAGE.....</b>	<b>iv</b>
<b>PUBLICATION APPROVAL PAGE FOR ACADEMIC PURPOSES.....</b>	<b>v</b>
<b>MOTTO .....</b>	<b>vi</b>
<b>DEDICATION PAGE .....</b>	<b>vii</b>
<b>ARABIC LATIN TRANSLITERATION GUIDELINES .....</b>	<b>viii</b>
<b>PREFACE.....</b>	<b>xii</b>
<b>TABLE OF CONTENTS .....</b>	<b>xvi</b>
<b>TABLE OF TABLES.....</b>	<b>xviii</b>
<b>TABLE OF FIGURES .....</b>	<b>xix</b>
<b>ABSTRACT.....</b>	<b>xx</b>
<b>CHAPTER I INTRODUCTION .....</b>	<b>1</b>
A. Background.....	1
B. Research Question.....	11
C. Research Purposes.....	11
D. Benefits of Research.....	12
E. Research Structure .....	13
<b>CHAPTER II LITERATURE REVIEW.....</b>	<b>15</b>
A. Theoretical Framework .....	15
B. Literature Review.....	23
C. Hypothesis.....	33
D. Research Framework.....	37
<b>CHAPTER III RESEARCH METHODOLOGY .....</b>	<b>40</b>
A. Type of Research.....	40
B. Types and Sources of Data.....	40
C. Variable Operational Definition .....	41
D. Analytical Method.....	43
<b>CHAPTER IV RESULTS AND DISCUSSION.....</b>	<b>49</b>
A. Research Data Analysis.....	49
B. Discussion .....	67

<b>CHAPTER V CONCLUSION.....</b>	<b>73</b>
A. Conclusion .....	73
B. Suggestion.....	75
<b>REFERENCES.....</b>	<b>77</b>
<b>APPENDIX.....</b>	<b>84</b>
<b>CURRICULUM VITAE.....</b>	<b>93</b>



## TABLE OF TABLES

Table 2. 1 Previous Research .....	23
Table 3. 1 Variables and Data Sources .....	40
Table 4. 1 Descriptive Analysis Test Results .....	49
Table 4. 2 Unit Root Test Results at Level .....	51
Table 4. 3 Unit Root Test Results at Level First Difference .....	52
Table 4. 4 Results of the Lag Length Test on Data .....	53
Table 4. 5 Granger Causality Test Results .....	54
Table 4. 6 VAR Stability Test Results.....	56
Table 4. 7 Cointegration Test results .....	57
Table 4. 8 Long-Term VECM Model Estimation Test.....	58
Table 4. 9 Short-Term VECM Model Estimation Test.....	61
Table 4. 10 Variance Decomposition Test .....	66



## TABLE OF FIGURES

Picture 1. 1 Indonesia's Economic Growth (1990-2023).....	2
Picture 2. 1 Research Framework.....	39
Picture 4. 1 Impulse Response Test.....	63



## ABSTRACT

Economic growth is a key indicator reflecting a country's development performance. In the context of globalization and the digital era, factors such as digitalization, technology-based economic growth, and human capital quality are considered crucial drivers of economic performance. This study aims to analyze the effects of *Digitalization Development* (measured by the percentage of individuals using the Internet), *Technological Economic Growth* (measured by the percentage of medium- and high-tech exports to total manufactured exports), and the *Human Development Index* (HDI) on Indonesia's economic growth. The study employs annual time series data from 1990 to 2023 sourced from the World Bank, and UNDP. The analytical method used is the *Vector Error Correction Model* (VECM) to examine both the long-run and short-run relationships among variables. The results show that in the long run, *Digitalization Development* has a negative and significant effect on Indonesia's economic growth, while *Technological Economic Growth* and the *Human Development Index* have a positive and significant effect. In the short run, none of the three variables show a significant effect, indicating that the impacts of digitalization, high-technology exports, and human capital improvement require time to translate into tangible economic growth. These findings highlight the importance of strategic policies to accelerate digital adoption in a way that optimally benefits the economy, strengthen high-tech industries, and improve human capital to foster sustainable economic growth.

**Keywords:** Economic Growth, Digitalization Development, Technological Economic Growth, Human Development Index, VECM.

STATE ISLAMIC UNIVERSITY  
SUNAN KALIJAGA  
YOGYAKARTA

# CHAPTER I

## INTRODUCTION

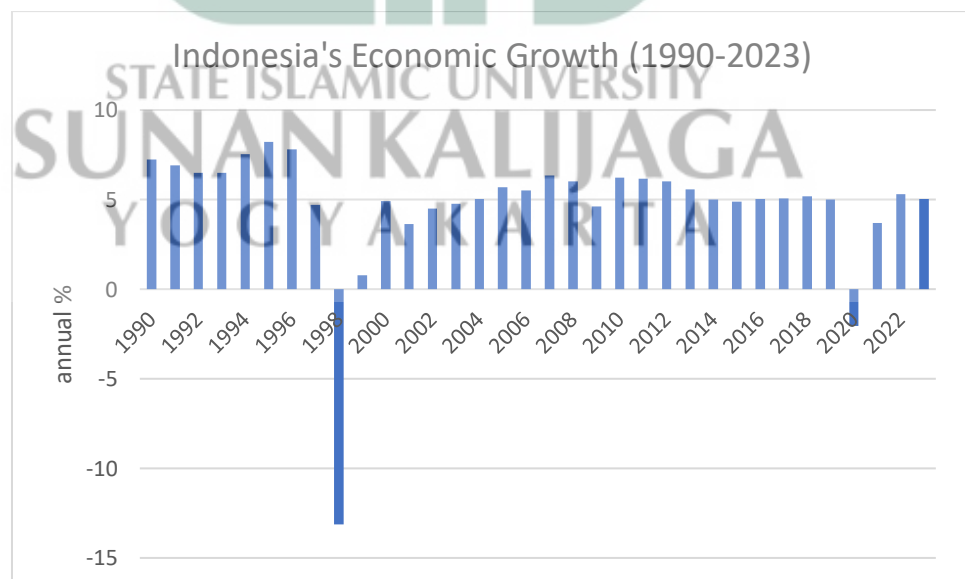
### A. Background

Economic growth is the main indicator used to measure a country's performance and progress in improving the welfare of its people. In the context of increasingly complex globalization, economic development is not only required to grow quantitatively, but also qualitatively and sustainably. Economic growth provides governments with broader fiscal space to make strategic investments in various sectors, including infrastructure, health, and education (Singh et al., 2025). Economic growth is a long-term economic issue for a country, aiming to achieve a better state over a certain period of time. It can also be associated with an increase in the production capacity of an economy, manifested in the form of an increase in national income (Aktug et al., 2025). Economic growth is also a driver of structural transformation. In many cases, GDP growth is closely correlated with improvements in a country's innovation capacity, competitiveness, and global connectivity. Countries with high economic growth tend to be more active in developing digital infrastructure, expanding access to education, and improving governance efficiency (Temasek, 2024).

Indonesia, as a developing country with a vision of becoming a developed nation, places economic growth as a fundamental prerequisite for long-term social and economic transformation. Economic growth is not only viewed as an increase in gross domestic product (GDP) but also as a broader



process that encompasses productivity enhancement, sectoral diversification, and institutional reforms (Prasetyo & Kistanti, 2020). Indonesia's growth aspirations are strongly tied to its role as the largest economy in Southeast Asia and a member of the G20, where consistent growth performance is expected to strengthen its global competitiveness. In this context, the transformation of human capital and higher education becomes critical to ensure competitiveness and adaptability to global market dynamics (Kudus et al., 2025). To achieve this vision, Indonesia must be able to direct its growth to be inclusive, ensuring that the benefits are equitably distributed across regions and social groups, while at the same time enhancing competitiveness in the face of accelerating technological changes and digital transformation (Anggraini & Anindyntha, 2025). The following is a graph showing Indonesia's economic growth from 1990 to 2023.



**Picture 1. 1 Indonesia's Economic Growth (1990-2023)**

Data Source: *World Bank*, 2025

As shown in Picture 1.1, Indonesia's economic growth trend from 1990 to 2023 reflects structural dynamics that are closely related to the challenges and opportunities in long-term economic development. In the early 1990s, Indonesia recorded high and stable economic growth, averaging above 7%, reflecting strong national development momentum. However, the 1998 Asian financial crisis marked a turning point, leading to a sharp contraction of -13.1%, indicating vulnerability to external shocks due to the weak macroeconomic structure at the time. Following economic reforms and institutional strengthening, growth stabilized within the 5–6% range over the next two decades. The COVID-19 pandemic in 2020 once again tested the resilience of the national economy, with a contraction of -2.1%, before eventually recovering to 5.3% in 2022 and remaining positive at 5.0% in 2023. This data clearly shows that Indonesia's economic growth is not solely dependent on quantitative expansion but is also determined by structural adaptability and responses to global changes.

Next, Referring to endogenous growth (Romer, 1990) long-term growth is greatly influenced by the accumulation of human capital and technological advances, including digitalization. In this context, stable economic growth post-2020 can be linked to the acceleration of national digital transformation, which has become a new driver of productivity and efficiency across sectors. Therefore, understanding the historical dynamics of Indonesia's economic growth and linking it to the adoption of digital technology is important in formulating inclusive, sustainable, and

competitive development policies in the era of digital globalization. Endogenous economic growth theory also explains that technological progress and human capital accumulation play an important role in determining a country's long-term output (Romer, 1990). This means that aspects such as digitization, human resource quality, and innovation capabilities are determinants of economic development success (Awode & Oduola, 2025). In a global landscape dominated by digital disruption, countries that fail to adapt will fall behind competitively.

Over the past two decades, the world has entered an era of digital revolution. Digital transformation has changed the way people work, transact, innovate, and access public services. According to the e-Conomy SEA Report (Temasek, 2024), the digital economy in Southeast Asia is growing rapidly, with Indonesia as the largest contributor. Digitalization has become a driver of national productivity and cross-sector efficiency. This era presents significant opportunities to drive more inclusive and faster economic growth based on technological innovation.

Empirical evidence indicates that digital transformation and the implementation of advanced technologies contribute positively to economic productivity and operational efficiency (Zhao et al., 2022). Member countries of the Belt and Road Initiative (BRI) that have undergone accelerated digitalization have recorded higher and more sustainable economic growth. These findings reinforce the urgency of digitalization as a strategic determinant in national development. Therefore, accelerating

digitalization has become one of the core pillars of Indonesia's economic development strategy, APJII (2023) reports that the country's internet penetration rate has reached 78.19%, marking a notable increase from the previous year. This figure reflects the substantial potential of digitalization as a catalyst for economic transformation across the industrial, trade, and public service sectors.

Digitalization also creates a fundamental shift in economic structure. Economic activity is now moving from the physical sector to the digital sector. In Indonesia, this transformation is evident in the rapid development of the e-commerce sector, digital financial services, online transportation, and internet-based media (Marketresearchindonesia, 2025). As a result, conventional business models have experienced major disruption, while businesses and governments are being encouraged to adapt to a new, increasingly digitized ecosystem. Digital transformation has opened up new opportunities in international trade, particularly in the form of exports of high value-added products. Countries that promote integrated digitalization with export activities have recorded more competitive GDP growth (Shcherban et al., 2025). Digitalization facilitates access to global markets, logistics efficiency, and production automation.

Unfortunately, Indonesia's contribution to high-tech product exports remains very limited. According to UNCTAD data, Indonesia's high-tech exports account for only around 6% of total manufacturing exports. This figure lags far behind Malaysia (41%) and Thailand (30%). This reflects

Indonesia's significant untapped potential to boost its economy through technology-based exports. This situation indicates that Indonesia is still in the early stages of digital transformation, which directly impacts its export structure. However, if maximized, high-tech exports could become the primary driver in accelerating economic growth while also increasing the value added of domestic products

Relevant study conducted by Maha Mohamed Alsebai (2025), reveals both short-term and long-term cointegration between the digital economy and economic growth. The findings indicate that internet usage positively influences economic growth, whereas trade openness exerts a negative effect in the short run but turns positive over the long run. Another study by Faris Alshubiri and Amina Ahmed Almaashani (2023) affirms that digitalization and the export of medium- and high-technology products continue to exert a significant impact on productivity and the monetary system in Oman. The findings strengthen the view that digitalization and high-tech exports hold substantial potential for fostering economic stability and driving growth. Meanwhile, Ariadna Aleksandrova et al. (2022) highlight that the benefits of digitalization for economic growth can only be maximized when the economic environment is prepared to embrace such a transformation. This preparedness encompasses the rate of economic growth, the state of digital readiness, and the resilience of the environment to technological change.

On the other hand, the quality of human capital remains a key element in reinforcing the foundation of the national economy. The Human Development Index (HDI), as a comprehensive measure, captures development outcomes in health, education, and income. The relationship between HDI and economic growth is becoming increasingly relevant in the digital era. Indonesia recorded an HDI of 73.6 in 2023, an increase from previous years (UNDP, 2025). However, there are still disparities in HDI between regions, as well as fundamental issues in education quality, health access, and income inequality. This presents a significant challenge for Indonesia in catching up with other Asian countries. Numerous studies have verified the positive association between HDI and economic growth. Malik et al. (2024) state that improvements in HDI significantly contribute to national output by enhancing labor productivity. Similarly, Djunaedi (2021) shows that strengthening digitalization and human capital can reinforce the sustainability of economic growth.

The selection of the Human Development Index (HDI) as the dependent variable in this study is based on theoretical and empirical considerations that human development is the main foundation of long-term economic growth. Although the HDI is conceptually different from the variables of digitalization and high-tech exports, which better represent the technological and structural aspects of the economy, in the framework of endogenous growth theory (Romer, 1990) (Lucas, 1988), the quality of human resources through education, health, and living standards is an



endogenous factor that determines innovation capacity, labor productivity, and a country's ability to absorb and utilize technological advances. Thus, digitalization and high-tech exports will not contribute maximally to economic growth if they are not supported by adequate human resource quality. Empirically, many studies show that HDI has a positive correlation with economic growth because improvements in human capacity drive competitiveness and sustainable development( Singh et al., 2025) (Djunaedi, 2021). Therefore, although HDI differs from Digitalization Development and Technological Economic Growth, its presence complements the analytical framework of this study to explain Indonesia's economic growth more comprehensively, emphasizing that the success of digital and technological transformation cannot be separated from human development.

Although there have been various studies discussing the relationship between digitization, human resource quality, and economic growth, most previous studies have been partial and sectoral in nature. Valeriani and Sah's (2024), research, for example, focuses solely on the impact of digitalization on economic growth, without incorporating high-tech exports and HDI as variables. The study by Imsar et al. (2023) does attempt to integrate aspects of the digital economy and HDI, but its approach emphasizes an Islamic perspective and does not focus on high-tech exports as a strategic variable in national economic development. From a theoretical gap perspective,



many studies have only emphasized the role of technology or human quality separately, while the simultaneous interrelationship between digitization, high-tech exports, and HDI within the endogenous growth theory framework has not been widely explained in the Indonesian context. From a methodological perspective, most previous studies have used OLS, panel data, or simple linear regression approaches, which tend to overlook both long-term and short-term dynamics. Research such as Rizal & Hidayatullah (2024) and Imsar et al., (2023) uses linear regression or panel data, which is less capable of explaining dynamic causality. In fact, the relationship between economic variables is short-term and long-term, requiring a VAR/VECM approach. However, interactions between economic variables are dynamic and require models such as VAR/VECM to capture causal relationships and cointegration. From an empirical gap perspective, previous studies seperti Okolo et al. (2025), Niranga et al., (2022) and Ferdy Firmansyah et al., (2021) have mostly been conducted at the cross-country level or focused on a single dominant variable (digitalization or HDI), while studies examining all three variables simultaneously in relation to Indonesia's economic growth using time-series data (1990–2023) remain very limited. Thus, this study seeks to fill this gap through an integrative analysis that not only explains the theoretical relationship but also provides empirical evidence based on a more comprehensive methodology.

Testing of these three variables is important to answer key questions in national development: how to create inclusive, innovative, and

sustainable economic growth in the digital age. In addition to its theoretical contribution, this study is expected to offer practical policy insights for the government. By understanding the relationship between variables empirically, policymakers can design more accurate and targeted economic development strategies. Where the Indonesian government has already introduced various initiatives, such as the Indonesia Digital Roadmap 2021–2024 and Making Indonesia 4.0, aimed at accelerating digital transformation, enhancing human resource capabilities, and reinforcing the national industrial structure. However, the effectiveness of the policy's implementation in driving economic growth still needs empirical proof. Has digital transformation really contributed significantly to the national GDP through increased technology exports and strengthened HDI? Moreover, Indonesia is striving to meet an ambitious goal of breaking free from the middle-income trap and attaining developed nation status by 2045. The “Indonesia Emas 2045” vision places the strengthening of the digital economy and human resources as the main foundation (Maryanti et al., 2023).

This study employs a quantitative approach using the VAR/VECM model to test the simultaneous effects of digitalization (measured through internet penetration), high-tech exports (as a percentage of total manufacturing exports), and HDI on Indonesia's GDP during the period 1990-2023.

## **B. Research Question**

Based on what has been described in the background above, the research questions or issues raised in this study are:

1. How does the development of digitalization (measured by the percentage of internet users relative to the population) affect Indonesia's economic growth during the period 1990–2023?
2. To what extent does the growth of high-tech exports (measured by exports of medium- and high-tech products) influence Indonesia's Gross Domestic Product (GDP) growth?
3. Does the Human Development Index (HDI) as an indicator of human resource quality have a significant impact on Indonesia's economic growth?
4. Do digitalization, high-tech export growth, and HDI simultaneously affect Indonesia's economic growth??

## **C. Research Purposes**

In line with the research objectives, this study seeks to:

1. Examine the effect of digitalization on Indonesia's economic growth.
2. Assess the influence of high-tech export growth on Indonesia's economic growth.
3. Analyze the impact of the Human Development Index (HDI) on Indonesia's economic growth.

4. To simultaneously examine the short-term and long-term impacts of digitalization, high-tech exports, and HDI on Indonesia's economic growth.

#### **D. Benefits of Research**

This study is anticipated to offer benefits to several parties, including.

1. For the author

To broaden their insight and knowledge, particularly regarding the influence of digitalization development (using the internet (% of population), technological economic growth, assessed through the share of medium- and high-tech exports in total manufactured exports, and the Human Development Index on economic growth, represented by Gross Domestic Product (GDP) in Indonesia.

2. For Academics

To provide insights and references for further research on digitalization development (using the internet (% of population), technological economic growth, represented by the share of medium- and high-tech exports in total manufactured exports, and the Human Development Index in relation to economic growth, as measured by Gross Domestic Product (GDP) in Indonesia.

### 3. For Future Researchers

This study is intended to provide input and supplementary information for the government in developing regulations or policies related to economic growth.

## E. Research Structure

In this study, the systematic discussion consists of five chapters that are interrelated. This systematic approach provides an overview and logical thinking in the study. Each description can be explained as follows:

### **CHAPTER I INTRODUCTION**

This chapter discusses the background of the study, which includes the phenomenon of the object of study, theoretical basis (summary), and supporting data. Additionally, the first chapter includes the research questions raised by the author, as well as the objectives and benefits of this research. It concludes with a comprehensive discussion to provide an overview of the research objectives.

### **CHAPTER II LITERATURE REVIEW/THEORETICAL BASIS**

This chapter provides the theoretical basis for the research and includes a literature review of previous studies. It also presents the conceptual framework and hypothesis development.

### **CHAPTER III RESEARCH METHODOLOGY**

This chapter discusses the research methodology employed. It covers the type of research, sources and types of data, determination of the

population and sample, operational definitions, and the data analysis techniques used.

#### **CHAPTER IV RESEARCH FINDINGS AND DISCUSSION**

This chapter explains the research results, including descriptive analysis and the implementation of processed data. This explanation addresses the research questions posed in the first chapter.

#### **CHAPTER V CONCLUSION**

This section contains the final conclusions of the research, which address the research questions. It also includes recommendations for practitioners, academics, policymakers, and future researchers to improve performance and enhance research development.



## **CHAPTER V**

### **CONCLUSION**

#### **A. Conclusion**

Based on the results of testing and analysis presented in the previous chapter regarding the influence of Digitalisation Development, Technological Economic Growth, and Human Development Index on economic growth in Indonesia using the Vector Error Correction Model (VECM) method, the following conclusions were obtained.

The Digitalisation Development variable, measured by the percentage of the population using the internet (% of population), has a negative and significant impact on economic growth in Indonesia in the long term. Based on the IRF test results, the GDP response to shocks from digitalisation development is negative in the early to middle periods, before approaching zero in the final period. These results are also supported by the significant VECM test because the t-statistic value of digitalisation development is greater in absolute terms than the t-table value. This indicates that the increase in internet penetration has not been fully utilised for productive activities that can drive economic growth, but is still mostly directed towards consumptive activities.

The Technological Economic Growth variable, measured by the proportion of medium and high-tech manufactured exports (% manufactured exports), has a positive and significant effect on economic growth in Indonesia. The IRF test results show that GDP responds positively to shocks from technological economic growth and remains positive until



the end of the period, although with a downward trend over time. This is also consistent with the significant VECM test results, as the t-statistic value for technological economic growth is greater than the t-table value. These findings prove that increasing technology-based exports can strengthen industrial competitiveness, increase productivity, and make a real contribution to GDP growth.

The Human Development Index (HDI) variable has a positive and significant effect on economic growth in Indonesia. Based on the IRF test results, the response of GDP to shocks from the HDI was positive in the early period, but tended to decline towards zero, and even became slightly negative in the final period. These results are also supported by the significant VECM test, as the HDI t-statistic value is greater than the t-table value. This indicates that improving human development quality through education, health, and income can drive economic growth, but the benefits will diminish if not accompanied by increased productivity and optimal labour absorption.

Thus, it can be concluded that the three independent variables analysed have a significant effect on Indonesia's economic growth, although the direction and magnitude of the effect differ. Increasing technology-based exports and the quality of human development are driving factors for growth, while digitalisation needs to be directed towards more productive uses in order to have a positive impact on the economy in a sustainable manner.

## B. Suggestion

Based on the results of this study, there are several recommendations that can be considered by policymakers and future researchers. The researchers' recommendations for relevant parties are as follows:

1. **For the government** as a policy maker, the results of the study indicate that Digitalisation Development has a negative and significant impact on economic growth, indicating the need for strategies to direct the use of digital technology to productive sectors. The government needs to strengthen equitable digital infrastructure, improve digital literacy among the public, and encourage the adoption of technology in value-added economic activities such as the creative industry, e-commerce, digital MSMEs, and technology-based exports. Additionally, the positive and significant impact of Technological Economic Growth on economic growth must be sustained through policies that promote export product diversification, investment in medium-to-high-tech sectors, and research and development (R&D) to enhance global competitiveness. Improvements in the Human Development Index must also be accompanied by the creation of quality jobs and technology-based skill training programmes to ensure that human capital quality can optimally contribute to long-term economic growth.
2. **For future research**, it is hoped that the study can be expanded by adding other relevant variables, such as foreign direct investment (FDI) levels, innovation indices, or institutional quality, which may also influence the relationship between digitalisation, technological growth,

human development, and economic growth. Future research could also use data covering a longer time period or different analytical methods, such as Panel VECM or GMM, to obtain more robust results. In addition, separate analyses could be conducted based on economic sector to determine which sectors benefit most from the development of digitalisation and technology exports in Indonesia.



## REFERENCES

- AKTUG, M., POLAT, S., & BASOGLU, A. (2025). Fiscal Policy as a Driver of Economic Complexity: Evidence from Selected OECD Countries. In *Journal of the Knowledge Economy* (Issue February). <https://doi.org/10.1007/s13132-024-02551-2>
- Aleksandrova, A., Truntsevsky, Y., & Polutova, M. (2022). Digitalization and its impact on economic growth. *Brazilian Journal of Political Economy*, 42(2), 424–441. <https://doi.org/10.1590/0101-31572022-3306>
- Alsebai, M. M. (2025). The relationship between the digital economy and economic growth in Egypt: in a post-COVID-19 world. *African Journal of Economic and Management Studies*. <https://doi.org/10.1108/AJEMS-02-2024-0100>
- ALshubiri, F., ALmaashani, A. A., & Thuaar, S. M. (2023). The impact of the digital economy paradigm on the productivity and monetary system of Oman. *Journal of Science and Technology Policy Management*, 14(5), 830–858. <https://doi.org/10.1108/JSTPM-07-2021-0097>
- Ameyaw, B., Oppong, A., Abruquah, L. A., & Ashalley, E. (2017). Causality Nexus of Electricity Consumption and Economic Growth: An Empirical Evidence from Ghana. *Open Journal of Business and Management*, 05(01), 1–10. <https://doi.org/10.4236/ojbm.2017.51001>
- Anggraini, R., & Anindynta, F. A. (2025). Driving Growth: The Role of Digitalization in Indonesia's Economy. *Jurnal Samudra Ekonomi Dan Bisnis*, 16(2), 469–483. <https://doi.org/10.33059/jseb.v16i2.11372>
- Awode, S. S., & Oduola, M. O. (2025). The interplay between technological

- innovation and human capital development in driving industrial productivity and competitiveness in Africa. *Journal of Economics and Development*, 27(1), 56–71. <https://doi.org/10.1108/JED-03-2024-0079>
- Cetulean, M., & Tănase, L.-M. (2024). Unveiling the Economic Impact of Technology Trade in Leading Global Economies. *Proceedings of the International Conference on Business Excellence*, 18(1), 2706–2718. <https://doi.org/10.2478/picbe-2024-0226>
- Djunaedi, A. Z. (2021). Digitalization Impact on Growth & Human Capital: Indonesia Broadband Plan Case Study. *Review of Business, Accounting, & Finance*, 1(3), 299–309. <https://fortunepublishing.org/index.php/rbaf/article/view/31>
- El Amine, Y., & Benboubker, M. (2025). Assessing the transmission of global market volatility to Moroccan food prices: a VECM-based analysis with forecast error variance decomposition. *Journal of Agribusiness in Developing and Emerging Economies*. <https://doi.org/10.1108/JADEE-09-2024-0308>
- Ferdy Firmansyah, M., Ihsaan Rizqulloh, M., & Zulian Maulana, H. (2021). Study of Information Communication Technology and Economic Growth Performance in Southeast Asian Countries. *International Journal of Engineering, Science and Information Technology*, 1(2), 104–113. <https://doi.org/10.52088/ijesty.v1i2.121>
- Góes, C. (2024). *Trade, Growth, and Product Innovation*. 1–74. <http://arxiv.org/abs/2406.08727>
- Google, Temasek, and B. & C. (2024). *Indonesia's Digital Economy Still on*

*Growth Track.* Business Indonesia.Org. [https://business-indonesia.org/news/indonesia-s-digital-economy-still-on-growth-track?utm\\_source=](https://business-indonesia.org/news/indonesia-s-digital-economy-still-on-growth-track?utm_source=)

Imsar, Nurhayati, & Harahap, I. (2023). Analysis of Digital Education Interactions , Education Openness , Islamic Human Development Index ( I-HDI ) and Indonesia ' s GDE Growth. *Edukasi Islami: Jurnal Pendidikan Islam*, 12(01), 753–772. <https://doi.org/10.30868/ei.v12i01.4265>

Kitov, I. O., Kitov, O. I., & Dolinskaya, S. A. (2009). Modelling real GDP per capita in the USA: Cointegration tests. *Journal of Applied Economic Sciences*, 4(1), 80–96. <https://doi.org/10.2139/ssrn.969975>

Krugman, P. R. (1980). Scale economies, product and the pattern of trade. *American Economic Review*, 70(5), 950–959.

Kudus, I., Nurasa, H., Widianingsih, I., Karlina, N., & Jawan, J. A. (2025). “Learning from the past, to improve the future”: content analysis of the transition of the higher education system in Indonesia. *Cogent Education*, 12(1). <https://doi.org/10.1080/2331186X.2025.2474292>

Lucas, R. E. J. (1988). On the mechanics of economic development. *Journal of Monetary Economics*,. [https://www.scribd.com/document/696799919/34-On-the-mechanics-of-economic-development?utm\\_source](https://www.scribd.com/document/696799919/34-On-the-mechanics-of-economic-development?utm_source=)

Malik, A., Novelia, A., Moh Mukri, & Baharuddin, S. A. (2024). The Influence of Digital Economic Growth and Productive Work Force Toward Human Development Index in Indonesia Viewed from a Maqashid Sharia Perspective. *International Journal of Islamic Economics*, 6(02), 188–201.

<https://doi.org/10.32332/ijie.v6i2.9639>

Marketresearchindonesia. (2025). *Massive Momentum in Indonesia Digital Economy Growth*. Marketresearchindonesia.Com.

[https://marketresearchindonesia.com/insights/articles/indonesia-digital-economy-growth-momentum?utm\\_source](https://marketresearchindonesia.com/insights/articles/indonesia-digital-economy-growth-momentum?utm_source)

Maryanti, S., Widayat, P., & Lubis, N. (2023). Economic Transformation To Get Out of the Middle Income Trap Condition To Reach Indonesia Gold 2045. *ADPEBI International Journal of Business and Social Science*, 3(1), 63–78. <https://doi.org/10.54099/aijbs.v3i1.356>

N. GREGORY MANKIW, DAVID ROMER, D. N. W. (2013). A contribution to the empirics of welfare growth. *B.E. Journal of Macroeconomics*, 13(1), 213–244. <https://doi.org/10.1515/bejm-2012-0042>

Niranga, M., Sedera, D., & Sorwar, G. (2022). Does IT Matter (Now)? A Global Panel Data Analysis of 7 Regions from 2018-2020 on Digitalization and Its Impact on Economic Growth. *ACIS 2022 - Australasian Conference on Information Systems, Proceedings*, 1–12.

Okolo, C. V., Susaeta, A., & Okorie, D. I. (2025). On the relationship between internet usage and technological innovation: Insight from world panel data. *Sustainable Futures*, 9(December 2024), 100403. <https://doi.org/10.1016/j.sftr.2024.100403>

Prasetyo, P. E., & Kistanti, N. R. (2020). Human capital, institutional economics and entrepreneurship as a driver for quality & sustainable economic growth. *Entrepreneurship and Sustainability Issues*, 7(4), 2575–2589.



[https://doi.org/10.9770/jesi.2020.7.4\(1\)](https://doi.org/10.9770/jesi.2020.7.4(1))

Ricardo, D. (1817). *On the Principles of Political Economy and Taxation*. John

Murray, Project Gutenberg. <https://www.gutenberg.org/ebooks/33310>

Rizal, J., & Akbar, S. (2015). *Perbandingan Uji Stasioner Data Time Series antara Metode: Control Chart, Correlogram, Uji Unit Root Dickey-Fuller, dan Derajat*.

Rizal, M. R., & Hidayatullah, R. (2024). Boosting GDP through Technology: Exploring the Impact of Digital Inclusion in Indonesia. *Sinergi International Journal of Economics*, 4(2), 191–206.

Romer, P. M. (1990). Cambio Tecnológico Endógeno. *Journal of Political Economy*, 98(5), 71–102. <http://www.journals.uchicago.edu/t-and-c>

Salamh, M., & Wang, L. (2021). Second-order least squares estimation in nonlinear time series models with arch errors. *Econometrics*, 9(4), 1–17. <https://doi.org/10.3390/econometrics9040041>

Schumpeter, J. A. (1942). *The Theory of Economic Development : An Inquiry into Profits , Capital , Credit , Interest and the Business Cycle* , translated from the German by Redvers Opie , New Brunswick ( U . *Journal of Comparative Research in Anthropology and Sociology*, 3(2), 137–148.

Sen, A. (1999). *Development as Freedom*. Alfred A. Knopf & Oxford University Press.

Shcherban, T., Hoblyk, V., Chernychko, T., Pigosh, V., & Kozyk, I. (2025). Assessment of the digital transformation of Ukraine's economy: Challenges, opportunities, and strategic prospects. *Scientific Bulletin of Mukachevo State*

- University. Series Economics*, 12(1), 159–168. <https://doi.org/10.52566/msu-econ1.2025.159>
- Singh, K., Cheemalapati, S., RamiReddy, S. R., Kurian, G., Muzumdar, P., & Muley, A. (2025). Determinants of Human Development Index (HDI): A Regression Analysis of Economic and Social Indicators. *Asian Journal of Economics, Business and Accounting*, 25(1), 26–34. <https://doi.org/10.9734/ajeaba/2025/v25i11630>
- Solow, R. M. (1956). A Contribution to the Theory of Economic Growth Author (s): Robert M. Solow Source. *The Quarterly Journal of Economics*, 70(1), 65–94. <http://www.jstor.org/stable/1884513>
- Solow, R. M. (2013). Technical Change And The Aggregate Production Function\*. *Real Business Cycles: A Reader*, 39(3), 543–551. <https://doi.org/10.4324/9780203070710-38>
- Sukirno, S. (2011). *Makro ekonomi teori pengantar edisi ketiga*. Rajawali Pers.
- Thakur, Y., Sai Sumedha, A., Goalla, K., Kumar Burra, P., & Kumar Depuru, B. (2025). Forecasting Apparel Sales Using Time Series Models and Machine Learning Techniques for Cost-Effective Procurement. *International Journal of Innovative Science and Research Technology*, 10(6), 825–839. <https://doi.org/10.38124/ijisrt/25jun757>
- Todaro, M. P., & Smith, S. C. (2011). *Pembangunan Ekonomi di Dunia Ketiga (Economic Development in the Third World)* (Kesepuluh). Erlangga.
- UNDP. (2025). *Human Development Report*. Undp. <https://hdr.undp.org/data-center/human-development-index#/indicies/HDI>

- Valeriani, D., & Sah, T. (2024). Digitalization and Economic Growth in Indonesia: Insights from Short and Long-Run Perspective. *E3S Web of Conferences*, 594, 1–16. <https://doi.org/10.1051/e3sconf/202459407004>
- Widarjono, A. (2013). *Ekonometrika: Pengantar dan Aplikasinya Disertai Panduan EViews* (ke-4). UPP STIM YKPN.
- Wijono, Wiloejo, W. (2005). Mengungkap Sumber-Sumber Pertumbuhan Ekonomi Indonesia Dalam Lima Tahun Terakhir. *Jurnal Manajemen Dan Fiskal*.
- Yati, R. (2023). *Survei APJII: Pengguna Internet di Indonesia Tembus 215 Juta Orang*. Bisnis Tekno. <https://teknologi.bisnis.com/read/20230308/101/1635219/survei-apjii-pengguna-internet-di-indonesia-tembus-215-juta-orang>
- Zhao, S., Zhang, Y., Iftikhar, H., Ullah, A., Mao, J., & Wang, T. (2022). Dynamic Influence of Digital and Technological Advancement on Sustainable Economic Growth in Belt and Road Initiative (BRI) Countries. *Sustainability (Switzerland)*, 14(23). <https://doi.org/10.3390/su142315782>