

# Digital Readiness and Telecommunication Equipment Imports: Evidence from China-Indonesia Trade Activity

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**Abstract:** This study examines the important impact of digital technology development in Indonesia towards its import value of Chinese telecommunication equipment over the 20 years period, from 2004 to 2023. With the Comparative Advantage Theory and Technology Gap Theory as the theoretical base, this study explore on how the digital readiness is influencing the trade patterns between China and Indonesia, especially with the technological advancement in China for its telecommunication sector. The annual time series data are obtained from the UN Comtrade database, World Bank, and national sources from Indonesian government sites. These data are analyzed with the OLS regression model with Newey-West HAC standard errors. The results indicates that mobile cellular subscriptions and broadband internet penetration have positive and statistically significant effects on the import value of telecommunication equipment import to Indonesia, which suggest that improvement in the digital readiness increase the demand of imported telecommunication equipment. In contrast, the digital patent activity in Indonesia shows a negative and significant relationship towards the import value, which indicating that there is a substitution effect for the imported products as the domestic innovation improves. The findings of this research contribute towards the digital trade literature by examining the multidimensional effects from the digital technology advancement towards the imports relating to technological products.

**Keywords:** China-Indonesia Trade, Digital Infrastructure, Digital Readiness, Digital Technology Development, Import Dependence, Import Value, OLS Regression, Telecommunication Equipment.

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## I. INTRODUCTION

### 1.1 Research Background

In the last few decades, electronic device has played a significant role in the human activities, especially the telecommunication devices. Nowadays it is rare to see people without telecommunication device in their lives. The increase of telecommunication device usage has brought many countries to seek more electronic device into their countries, which also include Indonesia. Indonesia has made electronic device as one of the major importing activities in their country, especially from China as stated by The Observatory of Economic Complexity (OEC) in the year of 2022. In the year 2023, it has been stated that the amount of telecommunication equipment from China to Indonesia with the HS code 8517, which include telephone sets are amounting to \$2.5 billion USD which is being recorded as the second biggest export commodities following machinery (UN Comtrade, 2024).

China has become the “world’s factory” since the launched of ‘Made in China 2025’ policy in 2015 which transformed China from an agrarian economy to become a superpower manufacturing country (Agarwala & Chaudhary, 2021). This

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transformation is possible because of the adoption of technology into China, including the digital technology. With the advancement of digital technology in China, it helps China to broaden their market to the other countries which eventually leads to many trade agreements between China and other countries. The newest trade agreement from China is the Regional Comprehensive Economic Partnership (RCEP), a trade pact including 15 nations and over 30% of the world GDP. Thus, this chapter will examine China's use of digital technology in export processes and the role of the Regional Comprehensive Economic Partnership (RCEP) in promoting commerce between China and Indonesia.

As digital technology keeps on improving, the innovation in each sector of the industries is also improving which also include the telecommunication industries. Some examples of the digital technology for the telecommunication devices includes advanced performance, 5G connection and the connectivity cable for the electronic device. These improvement with the digital technologies adds more towards the functionality and attractiveness for an telecommunication device specially in a developing country, like Indonesia. In a developing country, the adoption and usage of telecommunication device are more desirable which make Indonesia to be a great market for exporting telecommunication devices. Therefore, in this research it will be focusing on the effects of Chinese digital technology on export of telecommunication devices to Indonesia under RCEP implementation.

**1.2 Problem Statement**

With the innovation of digital technology, it makes an improvement towards the electronic device, especially the telecommunication devices that can be used by the industry and people. Chinese digital technology companies like ZTE and Huawei have grown to be significant telecom equipment exporters. Indonesia, a major market in Southeast Asia with a rapidly growing economy, has become increasingly reliant on Chinese telecom equipment to support its digital transformation and infrastructural expansion. Therefore, this research aims to analyze the improvement of digital technology in telecommunication device has a significant impact on the volume and trend of imports from China to Indonesia. This topic needs to be addressed in order to understand the long-term impacts of Indonesia's interaction with Chinese technology and to inform future trade trends for the telecommunication devices.

**1.3 Research Objective**

To identify whether digital technology improvement in Indonesia affecting the import value of telecommunication devices from China to Indonesia.

**1.4 Research Question**

How the digital technology improvement in Indonesia affecting the import value of telecommunication devices from China to Indonesia?

**1.5 Significance of The Paper**

This research is essential for a variety reasons. First, by providing informative data regarding the relationship between digital technological innovations and import performance, it contributes to the knowledge currently accessible on the topic of digital technology and international trade. Second, the findings of this study can assist policymakers and business leaders in China and Indonesia in comprehending the benefits and challenges associated with technologies into export protocols. In conclusion, the study highlights the significance of technology advancements in promoting technological adoption and enhancing trade efficiency. These factors are critical in sustaining economic growth within the Asia-Pacific region.

**II. LITERATURE REVIEW**

The global trade activities have been changing its pattern since rapid advancement of the digital technologies, especially in the telecommunication sector. With China has been expanding its technological capabilities, such as the digital innovation sustainability, smart manufacturing innovation, and supply chain efficiency which are making China to received its position as a major global exporter of the telecommunication devices (Chen et al., 2023; Kamasa & Wahab, 2021). The help of digital technology has helped China to supply a wide range of telecommunication equipment, starting from a smartphone to the network infrastructures for developing countries such as Indonesia. The reliance towards the Chinese technology has been increased since Indonesia's digital ecosystem has been expanding.

This study will be using the Comparative Advantage Theory and Technology Gap Theory. In which these two theories will provide a strong conceptual foundation for understanding the trade relationship between China and Indonesia. Ricardo (1817) has introduced Comparative Advantage Theory, in which explained countries will export goods when the countries have production efficiency advantages. This theoretical baseline has become the support for China's cost-efficient production for the telecommunication equipment (Berger & Martin, 2013; Booth, 2011). The differences in the technological capabilities between countries has been the driver for the trade flows, which is being explained by the Technological Gap Theory thus it further suggests that countries with advanced technology will be exporting high-value goods to the countries with lower technology innovation capabilities (Chiu et al., 2018). In the case between China and Indonesia, the technological growth of China which can be seen by its digital innovation, patent activity increasement, and technological focused policies, such as Made in China 2025 (Kania, 2019) has shown the relationship between the two countries based on the technology gap between them.

The existing literature has been showed that the improvement in the digital connectivity has been one of the effects that is affecting the demand level of the telecommunication devices (Czernich et al., 2011; Kefela, 2011). As in Indonesia, the increasing digital consumption, especially within the younger generation has been increasing the demand inside the country itself for advanced network infrastructure and modern devices (Halim et al., 2021; Gong et al., 2020). These trend ins Indonesia also being supported by the international findings which showed that digital innovation is not only affecting the improvement of technology, but also affecting the international trade activities (Jin et al., 2022; Das et al., 2025).

The strong export performance of China in the telecommunication industries has been looked at as the result for its industrial transformation, that is being shown as its development in digital patent, AI advancement, and 5G deployment inside the country itself (Ceci & Rubin, 2022; Haleem et al., 2022). Huawei and ZTE has been shown to play an important role for shaping the digital ecosystem in the Southeast Asia region, which include Indonesia (Booth, 2011). China's major telecommunication companies influence not only influence Southeast Asia with their telecommunication hardware, but also extends beyond it, including the network governance and digital infrastructure that leads towards the technological interdependence between countries.

The previous study not only highlight the expansion of Indonesia digital infrastructure, but also served as a warning for Indonesia for its growing dependence towards the foreign digital technologies. Previous study such as Breslin & Mattlin (2025) and (Chi, 2025) showed the strategic and economic risks that relate to the foreign digital dependences, which include the limited domestic manufacturing capability, geopolitical influences, and the vulnerability towards the external shocks. The concerns that came from these previous studies has emphasized on the need to understand what is the driver of Indonesia's import reliance towards the Chinese telecommunication equipment.

With much studies and researches have been focused on the expansion of China's export and Indonesia's import, there is a notable empirical gap, which is that there is only a few studies that examine on how Indonesia's digital readiness has been directly affecting the import for Chinese telecommunication devices for Indonesia. Most of the previous studies more focused towards the economic factors that are affecting China's export to Indonesia for the telecommunication equipment which include factors such as purchasing power, GDP growth, inflation, and tariff rates (Barro, 2013; Cakra & Batubara, 2022; Susilo et al., 2023).

Hence, this study will address the gaps from the previous study by developing a comprehensive empirical model which links China's advancement in the technology, Indonesia's development for its digital, and the macroeconomic conditions towards the trade relationship of telecommunication devices between China and Indonesia. With the prior understanding from the previous study, this study will be used as a tool to gain understanding on how the digital technology combined by the economic conditions are shaping the import patterns.

In conclusion, the literature from the previous study emphasized on the upgrading of China's technology, digital demand increasement in Indonesia, and global telecommunication trends have jointly defined the outcomes of the bilateral trade between China and Indonesia. However, there are still limited knowledge on the direct effect of digital technology towards Indonesia's import value, especially in telecommunication devices. With using the macroeconomic variables and digital indicators, this study plans to support the previous study with a new insight relating China's telecommunication import performance to Indonesia in regards oof the trade patterns that is being driven by the technology.

### III. METHODOLOGY

This study will be using the quantitative research method for examining the relationship between the digital technology development and Indonesia's import performance of the telecommunication equipment to Indonesia. The data that will be using in this study will come from annual data with the period of 20 years, ranging from 2004 towards 2023. With the usage of 20 years data, it will be useful to capture the short-term and long-term trends and fluctuations of the trade relationship between China and Indonesia that is affecting by the digital technology.

To support the quantitative research methodologies, this study will rely on the secondary data set that obtained from several reliable sources. The data will consist of trade data and macroeconomic data, which trade data will be sourced from UN Comtrade databases for HS Code 8517 that covers for smartphones, modems, routers, and other telecommunication devices. While the macroeconomics data will obtain from several international recognized source such as World Bank, International Monetary Fund (IMF), and Indonesia's Ministry of Communication and Informatics (Kominfo). All of these sources ensure that the data that is being used in this research are consistent, reliable, and internationally accepted.

The data sample will consist of the annual trade data between China and Indonesia with the period of 20 years, counting from 2004 towards 2023. Across these 20 years period, there are several major structural changes in both China and Indonesia, making the selected year period to be a reasonable period for this study to be used in this study. Some of the major structural changes are including, China implementation of Made in China 2025, global financial crisis in 2007, post Covid-19 pandemic digital acceleration, and Indonesia digital roadmap 2021-2025. As this study will be focusing on a single product code from the UN Comtrade database, which is HS 8517, this will help the study to have focused oriented towards telecommunication equipment and avoid certain bias from other unrelated electronic products.

The variable that will be used in this study will consist of:

1. Dependent Variable: Import value of Indonesia for Chinese telecommunication equipment for HS Code 8517 in USD.
2. Independent Variable: Consist of three independent variables, which are mobile cellular subscription, broadband internet penetration, and digital patent activity in Indonesia.
3. Control Variable: Consist of several macroeconomic and policy variables, which includes exchange rate (IDR/CNY), inflation rate (CPI-based), GDP growth, tariffs rate, and purchasing power. All of this control variables are based of Indonesia's macroeconomics data.

To process the variables data, this study will be using Ordinary Least Square (OLS) regression for analyze the relationship between digital technology improvement with the import performance of Indonesia towards Chinese telecommunication devices. With the risk of time-series data suffer from a heteroskedasticity and autocorrelation, the model will be enhanced with the Newey-West robust standard errors to improve the reliability of the result estimation. Therefore, the baseline specification will be as follow:

$$\ln(IM_t) = \beta_0 + \beta_1 \ln(MOB_t) + \beta_2 \ln(BROAD_t) + \beta_3 \ln(1 + PAT_t) + \gamma'X_t + \epsilon_t$$

The combination of international datasets and established econometric technique that are being used in this study will enhance the validity and reliability of this study itself.

### IV. RESULTS AND DISCUSSIONS

table 1 shows the results from the baseline OLS regression model with Newey West HAC standard errors. The model is being estimated with using annual time series data of 20 years period, from 2004 to 2023. The dependent variable is the natural logarithm of the import value with the independent variable, which will work as the explanatory variables include mobile cellular subscription, broadband penetration, and patent activity in Indonesia. Several control variables also being used in this regression for showed broaden economic conditions which affecting import demand in Indonesia for telecommunication devices. The overall results showed that the regression model resulted in a strong explanatory power.

**Table 1: OLS Regression with Newey-West HAC Standard Errors**

Variables	Coefficient	Std. Error	t-Statistic	P-Value
<b>Mobile Cellular Subscription</b>	2.210 <sup>***</sup>	0.518	4.27	0.001
<b>Broadband Penetration</b>	0.416 <sup>**</sup>	0.468	0.89	0.039
<b>Patent Activity</b>	-1.789 <sup>**</sup>	0.676	-2.65	0.023
<b>Exchange Rate</b>	-0.283	0.657	-0.43	0.675
<b>Inflation Rate</b>	0.045	0.036	1.26	0.232
<b>GDP Growth</b>	0.048	0.027	1.74	0.109
<b>Tariffs Rate</b>	0.489 <sup>**</sup>	0.197	2.48	0.031
<b>Purchasing Power</b>	0.595	1.258	0.47	0.646
<b>Constant</b>	20.531	15.705	1.31	0.218

Note: Standard errors in parentheses. \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

According to Table 1, mobile cellular subscriptions showed as a strong determinant towards the import performance. With the coefficient for the logarithm of mobile subscriptions showed a positive and statistically significant at the 1 percent level. The results of the regressions showed that a one percent increase in the mobile cellular subscriptions resulting in a 2.21 percent increase for the imports of telecommunication devices in Indonesia. This result helps to showed that the higher mobile penetration in Indonesia, more access towards information in Indonesia and thus, more people will likely to have telecommunication devices, especially handphones. In other words, with the expansion of the mobile networks in the country it will also increase the demand for the related telecommunication devices. With higher mobile cellular penetration in the country, the consumer demands for upgraded and high-tech telecommunication devices will increase which lead towards imported telecommunication equipment. This result showed that the mobile broadband penetration has a critical role for shaping the trade flows, especially in a goods that is related to technology.

The next independent variable, which is the broadband penetration showed a positive and statistically significant relationship with import value of telecommunication devices from China to Indonesia. The coefficient from Table 1 shows for the broadband penetration amount from 0.416 at the significance of 5 percent level. This can be implied that a one percent increasement in broadband penetration will be resulting in a 0.42 percent increasement of the import activity for telecommunication devices from China to Indonesia. With higher broadband penetrations, it means that network operators and internet service providers most likely is expanding their area of services and their current network infrastructure. Components such as transmission equipment, routers, and switches will play a significant role for expanding the services for network operators. In which this will serve as the driver for an increasement of telecommunication devices under HS code 8517 from China to Indonesia.

Moving towards the third independent variable, the digital patent activity showed negative and statistically significant at the 5 percent level. This result could be indicating that the increasement towards the domestic digital innovation resulted in a lower import for the telecommunication equipment in Indonesia. The result might come from a substitution of import mechanism where if the domestic technology capabilities is increasing in the country, the country itself will reduce its reliance towards foreign telecommunication devices supplier. With the upgraded knowledge and capacity relating the digital and innovation for the telecommunication industry, local and domestic firms might upgrade their positions to produce more advanced telecommunication equipment domestically which resulted in decrease the import demand for the related goods. With this finding from the baseline regressions model, it showed that digital readiness in Indonesia has dual role, in which it can increase the import value with the connectivity related variables, and decrease the import value through the technological sufficiency inside the country.

Moving towards the macroeconomics variables as the control variables, first ly is the exchange rate. According to the base line regression results, exchange rate show that the variables is insignificant towards the import value of the telecommunication device from China to Indonesia. The coefficient of exchange rate variable is negative which consistent with the expectations of depreciation in the currency will increase the import goods costs. However, the lack of significance with the variable itself shows that the fluctuations in the exchange rate might be less important than the digital technology index for affecting the telecommunication devices import from China to Indonesia.

Similar with the exchange rate, both inflation rate and GDP growth are statistically not significant according to the regressions results. In which these results show that macroeconomic conditions with short-term period does not possess a strong influence independently towards the import value of telecommunication devices from China to Indonesia. Thus, this show that the demand for Chinese telecommunication equipment in Indonesia is mainly driven by technological upgrading and transformation of telecommunication structure rather than the macroeconomics factors that is fluctuate over time.

Despite the insignificant control variables, there is one control variable with a positive and statistically significant coefficient at the 5 percent level, which is tariffs rate. Despite in theory that higher the tariffs rate the lower the imports are, the positive relation in this regression results might be reflecting the policy endogeneity of the telecommunication equipment. The import tariffs related to the HS code 8517 might be adjusted based on the level of import volumes rather than served as an effective barrier. Not to mention that telecommunication equipment might be categorized as a major instrument for economic development and digital transformation in a country. By this logic, it makes the tariffs rate for telecommunication devices to be inelastic towards the tariffs changes for the international trade.

Last control variables for this study are the purchasing power, which show insignificant effects towards the import value for telecommunication device from China to Indonesia. The result from the regression model suggests that income effects are mainly mediated by the digital adoption instead of influence directly towards the import demand in Indonesia. Once the mobile penetration and digital innovation are in the picture, purchasing power does not hold a significant or play a major role for shaping the import of telecommunication equipment from HS code 8517 in Indonesia.

In conclusion, the digital readiness in Indonesia play a strong role towards the imports of telecommunication equipment from China, especially with the mobile subscription penetration and broadband subscription penetration that both of the independent variables are increasing the import value. Meanwhile the other independent variable, digital patent activity, might reduce the import dependence according to the substitutions effect. These findings contribute towards literature on the digital trade by showing the dimensions difference from the digitalization have opposing influences towards the trade relationship for technological goods. With using Newey-West standard errors, it helps to ensure the robustness towards serial correlation and heteroskedasticity. In which this help to strengthen the estimated relationship between the dependent and independent variables.

## V. CONCLUSIONS AND RECOMMENDATIONS

This study aims to explain how the technology readiness in Indonesia is influencing the import value of telecommunication devices from China, especially with the technology advancement on the Chinese telecommunication devices. With using the annual data from 20 periods, from 2004 to 2023 and with the econometric models OLS regressions with the Newey-West HAC standard errors. The result from the baseline econometric model finds several important conclusions in regards for the digital readiness, technological capabilities, and the related policy factors for shaping the bilateral trade flows between China and Indonesia.

The empirical results have confirmed that the digital technology development in Indonesia is a key driver for import value of the Chinese telecommunication equipment. The digital connectivity indicator that is being used in this study, such as mobile cellular subscription and broadband penetration show a positive and statistically significant effects of the import value of Chinese telecommunication equipment to Indonesia. With the result of the empirical results, the result suggests that with the expansion of Indonesia digital technology readiness, the demand for telecommunication devices and related equipment, such as the modem and routers are correspondently increasing. The higher demand was not only caused by the end product user, such as smartphones but it caused also by the routers, switches, and transmission equipment that is supporting the telecommunication infrastructure in Indonesia. This high demand was driven by the expansion of mobile networks and broadband services. Thus, resulting in Indonesia to seek out Chinese telecommunication devices since China got the comparative advantage in cost efficiency and technology advance manufacturing. Therefore, this finding will also support with the Comparative Advantage Theory and Technology Gap Theory. Which these two theories explain the theories that countries with stronger capabilities production and advanced technology tends to dominate the global market for the high technology products.

The study also finds one of the independent variables, which is digital patent activity in Indonesia resulted in a negative and statistically significant relationship towards the import value for Chinese telecommunication equipment in Indonesia. With

this result, it might indicate a substitution effect of the import for Chinese telecommunication equipment. The substitution effect could be caused by the improvement in domestic innovation and improvement in technological capabilities makes Indonesia to reduce its dependence on the imported telecommunication equipment. Local and domestic firms might increase their technological and innovation capabilities for producing telecommunication equipment, such as routers and modem, or assembling certain telecommunication equipment, such as assembling smartphones domestically. Therefore, this study manages to catch the dual effect of the digital readiness in Indonesia does not uniformly increase import, but rather some of the digital readiness could have an opposing impact for the trade of telecommunication equipment between Indonesia and China.

As for the macroeconomic control variables, most of the control variable, which include exchange rate, inflation, GDP growth, and purchasing power are not showing a statistically significant effects on the import value of Chinese telecommunication equipment in Indonesia. This result suggests that telecommunication equipment import does not affect by the short-term macroeconomic situations, but rather heavily driven by the technological factor inside the country. However, tariffs rate is one of the macroeconomic variables that shows a positive and significant coefficient. The different result from the other macroeconomic variables, could come from the endogeneity of the policy of the nature of the telecommunication equipment itself, in which telecommunication equipment classifies as the essential part for the nation digital transformation. Thus, making the demand of telecommunication equipment inelastic towards the tariff's changes.

With the conclusions, there are several recommendations that can be proposed in this study. The first recommendation is for Indonesian government and policymakers. Indonesian government and policymakers need to continue their investment towards the expansion of the digital infrastructure inside the country. It is because with more advanced technology and expansion on the innovation inside the country could lead to improved connectivity for supporting economic modernization. However, the expansion and improvement on the digital technology infrastructure also need to be complemented by the policy. The related policy could be used as a tool to strengthen the capacity of the domestic innovation that support research and development, transfer of technology, and digital patent activity in Indonesia. With the balanced approach on improving the digital technology together with a supportive policy, it will help Indonesia to benefit from the imported technology which lead to a reduction in dependence towards import technology product in the long run period.

Second, policies for industrial and trade should be aligned with the active trade agreement between the two countries, such as the RCEP framework. With the aligned policies, it could lead to a more efficient and supportive trade activity for telecommunication equipment between Indonesia and China. Instead of focusing towards the tariffs as a barrier for the trade activities, policymaker may want to focus on the strategic partnership, initiatives to develop skill, and joint venture together with foreign firms to boost the domestic capabilities in Indonesia.

The final recommendation is for the future research that could extend this analysis by incorporating data from the firm level in Indonesia or a comparative study with the other ASEAN countries. With the extension on this study, it could help to deepen the insight on how technology transformation in the country could reshape the trade activity between the developing economies and the developed economies. In conclusion, this study shows that digital technology development and readiness in Indonesia have a major role in shaping the trade activities for telecommunication equipment under HS 8517 with China. In which, this study also offers few important implications for the trade policy, digital improvement strategy, and sustainable economic growth.

#### REFERENCES

- [1] Agarwala, N., & Chaudhary, R. D. (2021). 'Made in China 2025': Poised for success? *India Quarterly a Journal of International Affairs*, 77(3), 424–461. <https://doi.org/10.1177/09749284211027250>
- [2] Barro, R. (2013). Inflation and economic growth. *Annals of Economics and Finance*, 14(1), 121–144.
- [3] Berger, B., & Martin, R. F. (2013). The Chinese Export Boom: An examination of the detailed trade data. *China & World Economy*, 21(1), 64–90. <https://doi.org/10.1111/j.1749-124x.2013.12009.x>
- [4] Booth, A. (2011). China's Economic Relations with Indonesia: Threats and Opportunities. *Journal of Current Southeast Asian Affairs*, 30(2), 141–160. <https://doi.org/10.1177/186810341103000207>

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 Vol. 12, Issue 3, pp: (39-46), Month: September - December 2025, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [5] Breslin, S., & Mattlin, M. (2025). Bundling Threats: Why dominant perceptions of China changed in Europe. *The Chinese Journal of International Politics*, 18(2), 196–219. <https://doi.org/10.1093/cjip/poaf003>
- [6] Cakra, F. A., & Batubara, I. (2022). Indonesia introduces changes to import duty, stamp duty, prohibited goods and telecommunications. *International Tax Review*, 1(1).
- [7] Ceci, M. V., & Rubin, L. (2022). China's 5G networks: A tool for advancing digital authoritarianism abroad? *Orbis*, 66(2), 270–288. <https://doi.org/10.1016/j.orbis.2022.02.013>
- [8] Chen, L., Ramli, K., Hastiadi, F. F., & Suryanegara, M. (2023). Accelerating Digital Transformation Indonesia: Technology, Market, and Policy. In Economic Research Institute for ASEAN and East Asia (ERIA). Economic Research Institute for ASEAN and East Asia (ERIA).
- [9] Chi, Z. (2025). Charting the Technology Cold War: the balance of loss, U.S. containment strategies and China's countermeasures. *China International Strategy Review*, 7(1), 47–69. <https://doi.org/10.1007/s42533-025-00180-1>
- [10] Chiu, C., Lin, C., & Yang, C. (2018). Technological catching-up between two ASEAN members and China: A metafrontier approach. *China Economic Review*, 54, 12–25. <https://doi.org/10.1016/j.chieco.2018.09.012>
- [11] Czernich, N., Falck, O., Kretschmer, T., & Woessmann, L. (2011). Broadband infrastructure and economic growth. *The Economic Journal*, 121(552), 505–532. <https://doi.org/10.1111/j.1468-0297.2011.02420.x>
- [12] Das, B. R., Hasan, S. R., Sabuj, S. R., Hossain, M. A., & Ray, S. K. (2025). A comprehensive survey on emerging AI technologies for 6G communications: research direction, trends, challenges, and opportunities. *International Journal of Intelligent Networks*. <https://doi.org/10.1016/j.ijin.2025.06.001>
- [13] Gong, Y., Zhu, L., & Zhu, J. (2020). Research on Marketing Strategy of Chinese Mobile Phone Brands in Southeast Asia. 4th International Symposium on Business Corporation and Development in South-East and South Asia Under B&R Initiative. <https://doi.org/10.2991/aebmr.k.200708.062>
- [14] Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- [15] Halim, S., Gan, S.-S., & Oentoro, J. M. (2021). Identifying factors that influence customers' interest in buying refurbished smartphones: an Indonesian context. *Asia-Pacific Journal of Science and Technology*, 27(27).
- [16] Jin, P., Mangla, S. K., & Song, M. (2022). The power of innovation diffusion: How patent transfer affects urban innovation quality. *Journal of Business Research*, 145, 414–425. <https://doi.org/10.1016/j.jbusres.2022.03.025>
- [17] Kamasa, F., & Wahab, R. A. (2021). China Technological Transformation: A case study of telecommunications equipment industry. *Buletin Pos Dan Telekomunikasi*, 59–80. <https://doi.org/10.17933/bpostel.2021.190105>
- [18] Kania, E. B. (2019, February 1). Made in China 2025, Explained. *The Diplomat*. Retrieved September 1, 2025, from <https://thediplomat.com/2019/02/made-in-china-2025-explained/>
- [19] Kefela, G. T. (2011). The impact of mobile phone and economic growth in developing countries. *AFRICAN JOURNAL OF BUSINESS MANAGEMENT*, 5(2), 269–275.
- [20] Ricardo, D. (1817). *On the Principles of Political Economy, and Taxation* (1st ed.). John Murray. <https://doi.org/10.1017/cbo9781107589421>
- [21] Susilo, I. B. F. D., Sukarso, A., Putri, I. S., & Lestari, D. (2023). Comparative Advantage Analysis of Electrical and Electronic Equipments (HS 85) in ASEAN+6. In *Advances in economics, business and management research/Advances in Economics, Business and Management Research* (pp. 35–46). [https://doi.org/10.2991/978-94-6463-160-9\\_5](https://doi.org/10.2991/978-94-6463-160-9_5)
- [22] UN Comtrade. (2024). UN Comtrade Database. UN Comtrade Database. Retrieved November 12, 2024, from <https://comtradeplus.un.org/TradeFlow?Frequency=M&Flows=X&CommodityCodes=8517&Partners=360&Reporters=156&period=202201&AggregateBy=none&BreakdownMode=plus>