Educational Factors Predicting Middle-Income Trap in Southeast Asia

HARA Masatoshi
Japan International Cooperation Center

Abstract: *Overcoming the middle-income trap (MIT) has long been discussed as the most significant social issue, primarily in Southeast Asia. One major problem in addressing the MIT is directly linked to fewer job opportunities and unstable income. Promoting industrialization has been the most efficient way to solve the problem. Little previous research has been conducted on the influence of the enrollment rate in secondary education on the MIT. Thus, this study aims to contribute to overcoming the MIT by clarifying the influence of the enrollment rate in secondary education on the MIT, notably in Southeast Asia. Tran's economic development stage model and the industrial development model were used to examine the predictive relationships between the economic development stage and education levels. Using secondary data compiled between 1999 and 2018 primarily from the World Development Indicators and the UN Comtrade Database, and multiple linear regression modeling, the strength of secondary education predicting the percentage change in R2 variance in the MIT and ICI was evaluated in nine Asian economies. Using the natural data, secondary education alone was not found to be a superior predictor (F [1, 168] = .651, p = .003) for the MIT. Tertiary education was found to be a significant predictor in both models (F [1, 167] = .764, p = .000) and is thus a major factor in escaping the MIT. Positive social change emanates through continued policy support of advancing education as a means to escape the MIT.*

Keywords: *Middle-income Trap, Industrialization, Secondary Education, Southeast Asia*

Introduction

While the world economy has greatly advanced since World War II, a number of economies have struggled for growth, prosperity, and development. Indeed, certain parts of the world have seen higher achievement in growth and prosperity over many decades. Notably, East Asian economies, including Japan, South Korea, Taiwan, and China, have achieved significant development since World War II (Perkins, 2013). Nevertheless, further development, growth, and social welfare need to be promoted elsewhere in Southeast Asia. Gill and Kharas (2007) has paid close attention to the strategy of how to overcome the *middle-income trap* (MIT) in many parts of the world. These two authors have classified all countries in the world into high-, middle-, and low-income groups according to various indicators and proposed the concept of the MIT in 2006. Southeast Asian economies, in particular, including Vietnam, Indonesia, and the Philippines, have been ranked as lower-middle income economies, while China, Thailand, and Malaysia as higher-middle income economies for 10 years or more. Indeed, data for the 1960s reveals 101 middle-income economies in the world, of which only 13 economies and regions achieved the high-income levels in 2008 (World Bank & PRC, 2012). Most countries have thus found it difficult to upgrade national income levels, thus having fallen into the MIT over the past 40 years (Tran, 2016). Also, given the wide range of situations among the middle-income economies, the World Bank (2007) classified them into HMIEs and LMIEs. From this discussion, the urgent question of how to overcome the MIT emerges as a key social problem to be addressed. Remarkably, one of the key issues in addressing the MIT is linked to the opportunity for securing employment and increase the individual income. In linking the problem, what I am going to contribute through this study is to observe the hidden culprits of factoring the MIT, and ultimately informing public-policy changes in escaping the MIT, notably in Southeast Asia.

Summary of the Literature Review

Previous studies by other researchers have shown the MIT to be potentially one of the most significant social problems in the world. Existing research has shown that promoting industrialization would be the best way to escape the MIT (Huang et al., 2018) in securing the opportunity for employment and enhancing the productivity for income increase. In reviewing growth and prosperity among Asian economies since the 1950s, industrialization has clearly contributed to economic development, increasing the productivity of capital while also enhancing human capital development through training and education, especially from the 1960s to the 1980s (Perkins, 2013). During the industrialization process, labor-intensive industries have been replaced by capital-intensive industries, thereby leading to rapid accumulation of labor and capital and increases in income levels (Watanabe, 2012). From this perspective, industrialization can be considered a significant catalyst for promoting economic development and overcoming the MIT in Southeast Asia.

The flying geese pattern of industrialization offers a theoretical framework to explain the catch-up process for the least-developed nations, describing the trajectory in East Asian economies from importing products from overseas, to import substitution, then exporting products (Watanabe, 2012). For this framework to be feasible, Ohno (2009) has stressed that international competitiveness must be enforced cyclically in these industries, leading to catch-up industrialization. For international competitiveness

to be enhanced, improving the skills of the labor force should be a key priority. Promoting secondary education can therefore assist developing countries to increase the number of skilled workers in manufacturing industries, leading to further industrialization, and contributing to economic growth in the developing world by enhancing national international competitiveness through labor skills, especially given the economic history in East Asia (Lewin & Caillods, 2001; Meyer & Hannan, 1979).

To improve the skills of workers and promote industrialization to overcome the MIT, additional educational opportunities should be provided. Schultz (1971) analyzed the impact of education on economic development in developing countries. Psachalopouros (1985) made the more specific assertion that middle-income economies need to create opportunities for secondary education to develop skilled workers through their studies. Indeed, most middle-income economies have reached the highest levels of enrollment in East Asia. Reviewing the trends of enrollment and completion rates at primary, secondary, and higher education levels in several Asian economies in 2015 shown in Table 1 below, the six LMIEs and HMIEs have achieved 90% net enrollment at the primary level. On the other hand, further improvement is needed in the proportion of secondary education in the five economies other than China, despite the higher completion rate at the secondary level with the figure of 85% to 100%. Finally, as for the enrollment of higher education, these economies have recorded approximately 25% to 45%. Given the insufficient resources currently allocated to education, including both budgetary and the human resources (UNESCO, 2020), promoting educational opportunities needs to be made a higher priority both in HMIEs and LMIEs (Kuroda & Yokozeki, 2005).

Table 1. Educational Indicators in East and Southeast Asian Economies in 2015

Countries in East Asia	Enrollment Rate in Primary Education in 2015 (Net, %)	Enrollment rate in secondary education in 2015 (Net, %)	Completion Rate of Secondary Education in 2015 (Net, %)	Enrollment Rate of Tertiary Education in 2015 (Net, %)
Indonesia (LM)	90.9	76.8	98.5	27.9
Philippines (LM)	95.7	65.9	86.5	35.3
Vietnam (LM)	98.0	77.8	90.0	28.3
China (HM)	100.0	100.0	100.0	45.4
Malaysia (HM)	99.5	73.4	87.0	42.4
Thailand (HM)	98.0	77.3	79.6	45.9
South Korea (H)	100.0	100.0	100.0	93.3

Note. "LM" does for Lower-middle Income, and "HM" for Higher-middle Income. From "WV1. World Development Indicators: Size of the Economy," by World Bank, 2020 (http://wdi.worldbank.org/tables) in the public domain.

Based on the scholastic disciplines and observations, the role of expanding

secondary education in promoting industrialization and contributing to economic progress should evidently be clarified. Previously, Lewin and Caillods (2001) have stressed the strong connection between investment in secondary education and development in East Asian economies from the 1970s to the 1980s, with the use of technology on behalf of the human capital investment to set the preconditions for export-oriented development. These authors emphasized the importance of investing in secondary education, as the skills of abstract thinking and adaptability contribute to the formation of the skilled labor that is increasingly essential in both industrial production and the service sectors. Also, in his paper "The Myth of Asia's Miracle", Krugman (1994) stressed that improvements in the educational level of the workers, as well as capital growth, were the key contributors for the dramatic growth of certain Asian economies, rather than technological change. Nevertheless, far less research has been undertaken concerning the impact of the secondary education enrollment on the MIT. Despite the other possible factors contributing to the MIT, this educational aspect has not been observed and analyzed in previous studies. Statistical measures of the expanding enrollment rate at the secondary level need to be developed, while the effect of the enrollment rate in secondary education on the MIT in Southeast Asia must also be determined. Therefore, the research gap to address in this study is the impact of the rate of enrollment in secondary education on the MIT.

Research Objective

The purposes of this study are to contribute to overcoming the MIT and to promote further industrialization through an examination of the enrollment rate in secondary education, clarifying the influence of enrollment in secondary education on the MIT, notably in Southeast Asia by using the multiple linear regression analysis of whether the R^2 increase in the dependent variables (DVs) of GNI per capita was significant. While Otsuka (2014) and Lewin and Caillods (2001) have stressed the significance of expanding secondary education in promoting industrialization and leading to economic progress, far less research has been conducted on the impact of secondary enrollment on the MIT. Additional statistical work on enrollment rates in secondary education needs to be carried out, and the effect of secondary enrollment on the MIT has still not been clarified in the context of Southeast Asian development and needs to be clarified.

Theoretical Framework

The theoretical framework refers to a specific theory regarding the perspective of human effort that is useful to the study of events based on previous theories in the existing study that has been examined and justified by other researchers. (Dickson et al., 2018). With this definition, in this study, three theoretical frameworks are employed in helping me signify the two research purposes of this study, show connection among key variables and relation to the research approach and purposes, and contribute to the formulation of my theoretical frameworks as follows:

The three frameworks by Psacharopoulos (1985), Schultz (1971), and Tran (2016) help signify the first research purpose of contributing to escaping the MIT by clarifying the influence of enrollment rates in secondary education on the MIT in East Asia from the perspective of economic development, and interacting with other development issues relevant to MIT as well, including the contribution of labor productivity in manufacturing industries and individual skills development to industrialization with

larger and broader scales. Secondly, the other two frameworks by Ohno (2010) and Tran (2016) help me frame the second research purpose of elucidating the influence of enrollment rates in secondary education on the ICI in the context of industrialization in East Asia. And these frameworks can potentially contribute to enhancing the education policy for industrialization in practice from the aspect of human capital development in the middle-income economies in the long run.

Relating to the purpose of this research, to clarify the influence of enrollment rates in secondary education on the MIT, the three frameworks help frame the quantitative research design in clarifying the significance of pursuing the relationship between the MIT and the enrollment rate in secondary education. Representatively, the human capital development model elaborated by Schultz (1971), the return to investment in education by income-level as suggested by Psacharopoulos (1985), and the stages of economic development set out by Tran (2016), are each highly relevant. Specifically, the essential prepositions of these frameworks, which are the significance of human capital development for economic growth through education in the developing countries, the implication of further investment in secondary education for individual and social return, and the conceptual clarification of the MIT under economic development stages, can help me justify the significance of elucidating the relationship between the MIT and the enrollment rate in secondary education through the quantitative analysis, and thus grounding this study. Therefore, the three frameworks help me see the connection of the key variables of enrollment rate in secondary education with the MIT. In this way, this study engages these three models as it follows an econometric approach to quantitatively analyze the relationship between secondary enrollment rates and the MIT by achieving the first research purpose.

Also, these three frameworks will impact this study to interpret the significance of overcoming the MIT by enhancing the enrollment rates at the secondary level. Thus, these frameworks will enable this study to examine the influence of the secondary enrollment rate on the MIT by using nice Southeast Asian economies as cases, ranging from LMIEs to HMIEs. These frameworks can ultimately assert a relationship between stages of economic development and the education levels that should be attained to achieve income growth conceptually, according to theory. For workers to enhance the productivity and the quality of their labor, primary education is no longer sufficient for industrial requirements; thus, the importance of secondary education. Specifically, the LMIT might be overcome through expanded lower secondary education. Meanwhile, for the HMIT, the promotion of science and technology and of innovation (Tran, 2016) may require enhanced secondary education, notably upper secondary education. This may be essential to reaching the high-income level that Lewis (1954) had suggested might be the “turning point” toward modernization (industrialization). The framework developed from these perspectives thus plays a significant role in reflecting the importance of improving educational opportunities to accompany increases in national income. These three frameworks demonstrate the relationship to the first research question regarding the impact of the enrollment rate in secondary education on MIT.

In addition, these three frameworks can interact with other development issues relevant to MIT as well, including the contribution of labor productivity in manufacturing industries and individual skills development to industrialization. Indeed, Tregenna (2011) has shed light on the pathways to industrialization in some developing countries by gaining insight into labor productivity in manufacturing. The author

offered support for robust industrial policies to create more opportunities for employee training from a human resource management perspective (Tregenna, 2011). Also, UNESCO (2012) reported the importance of educational opportunities to promote skills development, improve job performance and strengthen overall organizational behavior in developing countries (UNESCO, 2012). Thus, these frameworks have potential impact that may be transferred to more specific industrial policy initiatives.

More importantly, the three frameworks help me build a theoretical framework that visually demonstrates the relationship between economic development stages and education levels, primarily with the use of the economic development stage model formed by Tran (2016). Figure 1 below represents the relationship between the economic development stage and education levels by income levels, which was primarily applied by the model by Tran (2016). Specifically, Line AB stands for the low-income stage; the countries in the stage need to expand primary education in Figure 1. Then, the secondary education should further be promoted for overcoming the LMIT (Line BC and CC'). Also, under the line C-D and DD' with the need for the promotion of science and technology and the innovation (Tran, 2016), the secondary education as well as the higher education, should further be promoted for finally achieving E and thus escaping the HMIT. This theorization can play a role in making the relationship between education and economic development more evident. This framework is composed of the essence of income stages and educational levels to be achieved for further development in the developing countries. It can show the connection of the critical variables of the Gross National Income (GNI) per capita (Atlas Method, US$) used for the MIT and the enrollment rate in secondary education in this study. With the primary variables, the quantitative approach, the first research purpose, and the research question are linked to the theoretical framework, notably in observing the impact of enrollment rate in secondary education on MIT. Thereby, the framework can be generalized by traditional models.

Research Question and Hypothesis

Based on the study gap and purpose, here are the research question (RQ) and the hypothesis as follows:

RQ: Will enrollment rates in secondary education predict a statistically significant percent change in R2 variance in Southeast Asian Middle-income Trap composite scores more than primary and tertiary education when controlling for governance, industrialization, labor market, and infrastructure composite values?

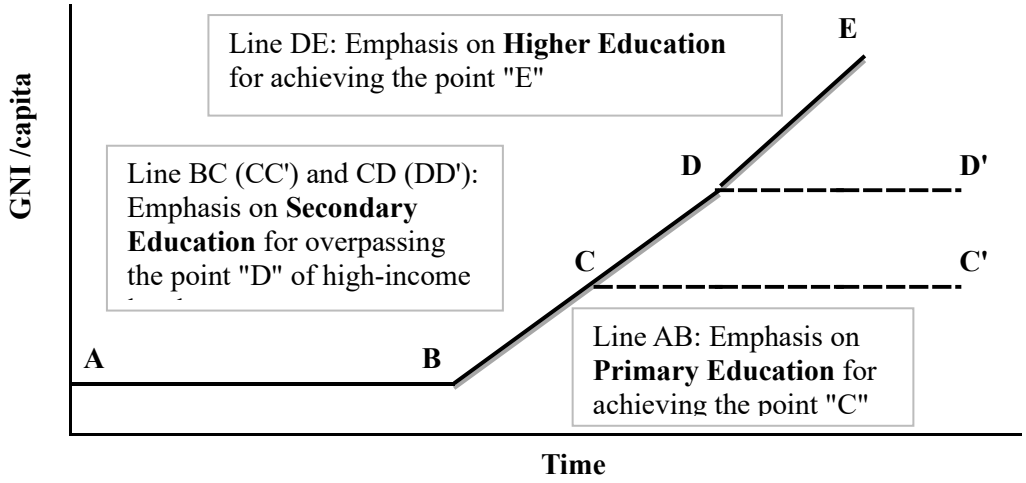
H_0- There is no statistically significant contribution of enrollment rate in secondary education to the percent change of R2 variance in Southeast Asian Middle-income Trap composite scores more than primary and tertiary education when controlling for governance, industrialization, labor market, and infrastructure composite values.

H_1- There is statistically significant contribution of enrollment rate in secondary education to the percent change of R2 variance in Southeast Asian Middle-income Trap composite scores more than primary and tertiary education

when controlling for governance, industrialization, labor market, and infrastructure composite values.

Figure 1.

A Theoretical Framework of Development Stages of an Economy and Education Level



Note. Hara (2021) originally reprinted from "Emerging Economies and the Middle-Income Trap in Asian Perspective," *The Japan Society of International Economics, 67*, by Tran Van Tho, 2016, p. 78. Copyright 2015 by the Japan Society of International Economics.

Key Variables of the Study

1. Independent Variables (IVs):

Net enrollment rates in primary and secondary education, and gross enrollment rate of tertiary education were employed as continuous variable.

*** Net Enrollment Rate: The rate of students under the designated age enrolled at primary and secondary education per (%) from World Development Indicators (2020)

*** Gross Enrollment Rate: The rate of students regardless of the designated age enrolled at tertiary education per (%) from World Development Indicators (2020)

2. Dependent Variable (DV):

Middle-income Trap: Gross National Income (GNI) per capita (Atlas Method, US$) from World Development Indicators (2020) was employed as continuous variable.

3. Controlled Variables (CVs):

a) *Governance*: The index of governance indicators including transparency in policymaking, efficiency in administration service, investment environment, and rent seeking from World Governance Indicators (2020) were employed as continuous variable.

b) *Industrialization*: Value added of manufacturing (% of GDP) from World Development Indicators (2020) was employed as continuous variable.

c) *Labor Market:* Labor force participation rate (aged 15-24, %) from World Development Indicators (2020) was employed as continuous variable.
d) *Infrastructure*: Logistics performance index: Quality of trade and transport-related infrastructure (1=low to 5=high) from World Development Indicators (2020) was employed as continuous variable.

Methodology

I employed the multiple-linear regression analysis this time. One reason for this is that I primarily observed the effect of the enrollment rate of secondary education on the GNI per capita in Southeast Asian economies, especially by gaining insight into the figures of R^2 variance as coefficients of determination. The multiple-linear regression analysis allows me to use the DVs' general values and the interval ratios of the IVs to be measured. In this regard, using the multiple-linear regression model allowed me to answer the research questions using the values of R^2 increase. The original formula for the multiple linear regression is shown as follows:

$$Y = \beta 0 + \beta 1X1 + \ldots + \beta nXn + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

For a brief explanation of each code, "Y" means the predicted value of the dependent variable, "β0" stands for the y-intercept (value of y when all other parameters are arranged to 0), "$\beta 1X1$" represents the regression coefficient ($\beta 1$) of the first independent variable ($X1$). It is worth describing how increasing the figure of the independent variable has on the predicted y value (Bevans, 2020). Then, "βnXn" demonstrates the regression coefficient of the last independent variable. Finally, "ε" represents model error. For example, how much variation there is in our estimate of "Y" needs to be considered. In applying the official formula (1) above to this study, I made the formula for the RQ as (2) below:

$$Y_{gni/ici} = \beta 0 + \beta 1X1_{oth.facs} + \beta 2X2_{edu.pri} + \beta 3X3_{edu.sec} + \beta 4X4_{edu.ter} + \varepsilon \quad \ldots\ldots\ldots \quad (2)$$

For simplicity, I made each code per RQ specific, e.g.) the code "$_{gni/ici}$" represents GNI per capita for RQ1 and the ICI for RQ2 as DVs. Also, the code "$_{oth.facs}$" means the alternative factors, including Governance, Industrialization, Labor Market, Employment, and Infrastructure fixed as the CVs. Finally, the codes "$_{edu.pri}$," "$_{edu.sec}$," and "$_{edu.ter}$" stand for the enrollment rates in primary, secondary, and tertiary education as the IVs.

From these points of view, it is necessary to appropriately adjust the methodology to appropriately approach the research questions. The basis of the multiple linear regression model using interval-ratio level data allows relevant interpretation of these data. Thus, I switched to the multiple-linear regression model this time.

Data Collection Procedures

The data is primarily gained through the publicly open websites from the World Bank and the United Nations in 1999 to 2018 with nine economies in Southeast Asia

(Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, Timor-Leste, and Vietnam). In this section, I will discuss the review of the results of the sampling procedure, the methods of the missing data, and the characteristics of the sample.

Specifically, the IVs of three independent variables, including enrollment rate of primary, secondary, and tertiary education, the DV of GNI per capita, and the CVs of *Governance, Industrialization, Labor market, and Infrastructure*, were investigated. Principally, the dataset listed the World Development Indicators of WDI, the World Governance Indicators of GNI, and the UN Comtrade Database (n=180). This figure is assumingly regarded as the maximum number of the sample per each variable. Meanwhile, the samples gained through the publicly accessible data from the international organizations were totally different. Specifically, as for the DV of GNI per capita (Atlas Method, US$), the resultant sample was obtained through the WDI (2020). Secondly, the IVs of the enrollment rate of primary, secondary, and tertiary education had the respective figures of the sampling; n=113 for primary education, n=112 for secondary education, and n=132 tertiary education were gained from the World Governance Indicators, WGI (World Bank, 2020) as well. Finally, as of the CVs, the resultant samples are as follows: firstly, the variable data of Governance was gained through the WDI. It is composed of six elements of voice and Accountability," "Political Stability and Absence of Violence/Terrorism," "Government Effectiveness," "Regulatory Quality," "Rule of Law," and "Control of Corruption" accordingly (WGI, 2020). Between 1999 and 2018, the WGI does not arrange the data in 1999 and 2001 and thus being n=162 per each factor. Secondly, as of Industrialization, I found the value-added rate in manufacturing per GDP with n=178. Thirdly, regarding Labor Market, I chose the variable data of "Labor force participation rate for ages 15+ for a total of both male and female with modeled ILO estimate," and picked up n=180. Finally, as for Infrastructure, I selected the Logistics performance index variable: Quality of trade and transport-related Infrastructure (1=low to 5=high), resulting in only n=49 for the designated 20 years from 1999 to 2018 from the WDI (2020).

In analyzing the data, entirely, some missing data were identified, especially in the IVs of the enrollment rate of primary, secondary, and tertiary education and the CV of *Infrastructure*. As for the required minimum sample size, in quickly reviewing the data-collection from G*Power as a tool for calculating the size, I indicated the figure of $p < .05$, the minimum condition of the alpha level is .05 with power analysis .80 under the appropriate condition of effective size f^2 of .15 to be at a significant level with the three IVs of enrollment rate of primary, secondary, and tertiary education vis-à-vis one dependent variable for observing the R^2 increase. With these conditions, the minimum required sample size should be 78 in using linear regression with a fixed-effect model. From this point of view, the number of the logistics performance index item: Quality of trade and transport-related infrastructure (1=low to 5=high) does not seem to be sufficient in sample size.

Furthermore, admittedly, the number of resultant samples of the enrollment rate in primary and secondary education exceeds the minimum size of 78. However, several critical lacking data were identified; Firstly, there was no data from Vietnam entirely between 1999 to 2018. Also, several countries, notably Cambodia and the Philippines, do not have enough data in the WDI. While the highest volume of the data within the IVs is the tertiary education (n=132), the size of the enrollment rate in primary and

secondary education should be equivalent to the number in tertiary education as the primary parameter in this study. I used the other existing data relevant to the enrollment rate in primary and secondary education from WDI (2020) to cover as much lacking data as possible. The specific methods of the secondary data are below:

Firstly, as for the enrollment rate in secondary education, I used the similar variable of "Adjusted net enrolment rate, lower secondary, both sexes (%)" from WDI (2020), and thus adding up eight more resultant samples of Cambodia and the Philippines in 2010 to 2017. Moreover, as for the enrollment rate in primary and secondary education in Vietnam, I looked for the secondary data from the official government website, called the General Statistics Office of Vietnam (GSOV, 2020). It is also officially allowed to use this statistic as publicly accessible data retrieved directly through the website. I chose the item of "Pupil of Lower-Secondary Education" from the category of "Number of classes, direct teaching teachers and pupils of general education as of 30 September" (GSOV, 2020) for sampling. It is justifiable to use the Lower secondary education data since secondary education refers to completing the provision of primary education that started at the basic level (WDI, 2020). For this notion, the enrollment rate in secondary education should be equivalent to the one in lower-secondary education. Consequently, I employed 20 more resultant samples from 1999 to 2018 at this time. As a result, the total number of sampling data of the enrollment rate in primary education is 133, while secondary education is 140.

Secondly, regarding the logistics performance index: Quality of trade and transport-related infrastructure (1=low to 5=high), as previously described, I did not obtain a sufficient number of samples (n=49). WDI (2020) covers the data only for six years of 2007, 2010, 2012, 2014, 2016, and 2018. Since the sample size is substantially smaller than the minimum size of 78 through the power analysis, I looked for another item relevant to infrastructure, resulting in the identification of "Transport services (% of commercial service exports)," instead. This item covers all transport services, including ship, air, land, internal waterway, space, and pipeline, which residents of one economy perform for those of another (WDI, 2020). Currently, infrastructure is composed of energy, telecommunication, transports (airport, ports, rail, and road), and water (GIH, 2020). Among the components, transports are the representative factor affecting the lives of people. In this regard, this indicator can demonstrate one country's infrastructure level and involve the carriage of passengers and the movement of goods, which can be interpreted as equivalent to trade and transport-related infrastructure. I, therefore, employed this item as secondary data (n=153).

Finally, one more way of handling the missing data is to employ the multiple imputation method. I used SPSS ver. 25 for statistical analysis this time, and it is beneficial that it has the function of imputation that is the process of automatically replacing the missing data with estimated figures (StatsGuild, 2020). On behalf of this approach, it was not necessary to omit the lost data. Though the replaced missing value is returned based on statistical algorithms from the present values (Enders, 2010), the multiple-imputation method would not sound incomplete.

Overall, in considering several approaches to handling the insufficient data, it would be defensible for me to take the missing data by employing the imputation with the SPSS ver. 25 this time, which can maximize the sample size (n=180) and keep the analysis unbiased.

Study Results

As the procedure for analysis to answering the RQ, a multiple linear regression model was employed. The multiple-linear regression model allowed me to estimate the relationship between two or more independent variables and one dependent variable. With the several matched conditions of the assumption testing, including homoscedasticity, normality, independence of errors, and linearity, the multiple linear regression analysis was executed using SPSS ver. 25. The dependent variable is GNI per capita (DV1_GNI), while IVs are the enrollment rates in primary education (IV1_Ed_Pri), secondary education (IV2_Ed_Sec), and tertiary education (IV3_Ed_Ter). Also, I used eight CVs, including Governance (CV1_GV_1 to CV_GV_6), Manufacturing rate (CV2_Indust_1), Labor force participation rate (CV3_Labor), and Transport service for infrastructure (CV4_Infra).

In handling the dataset with the SPSS ver. 25 technically, these CVs were placed together in model 1, and then the other three IVs for which I am not holding "control" will then be entered one at a time as I progress through the models. All CVs will then be entered into the "Independents" box first. Once I have those CVs entered, since the "Next" button became available, I put the enrollment rate in primary education (IV1_Ed_Pri) in the box. After that, I clicked that "Next" button for placing the enrollment rate in secondary education (IV1_Ed_Sec) secondly. Finally, I entered the enrollment rate in tertiary education (IV1_Ed_Ter). That is how I put the DV, IVs, and CVs in running the regression model. Besides, before running the regression model, it was necessary to choose the "exclude case pairwise" in this option field for appropriately handling the missing data available in my dataset.

Table 2 shows the results of the most appropriate models executed. The summary of the output was generated from the SPSS with the imputed data. In paying close attention to the items of “R Square (R^2),” “Adjusted R Square (Adjusted R^2),” and “R Square Change (R^2 Change),” accordingly, Model 1 had the figure .809 in R, while R^2 .655 with adjusted R^2 .636, respectively. With these outcomes, the R^2 change had the value of .655 with Significance in F change .000 eventually. Model 2 is the case of putting the enrollment rate in primary education (IV1_Ed_Pri) with the figure of the R^2 was .655 with adjustment .635, while R^2 change had the value of .000, which is a deduction from the R^2 in Model 1. Then, Model 3 is the case of entering the variable of the enrollment rate in Secondary Education (IV2_Ed_Sec) as well as the one in primary education (IV1_Ed_Pri) with the figure of the R^2 was .673 with adjustment .651. Simultaneously, R^2 change had the value of .018, which is deducted from the R^2 in Model 2. Finally, Model 4 is the case of putting all the IVs, including the enrollment rate in Tertiary Education (IV1_Ed_Ter), with the figure of the R^2 was .780 with adjustment .764. Then, the R^2 change had the value of .107 deducted from the R^2 in Model 3.

Further, in paying attention to the item of “Sig. F Change,” the figures are .657 in Model 2, not significant ($p > .05$). Moving to Model 3 and Model 4, the figures of .003 and .000 illustrated significance. In a word, I can see the significance in the transition of Model 3 with the missing data imputed based on reported data means. To further investigate these significant outputs, I evaluated the regression model ANOVA outputs for the RQ. All ANOVA Models 1 to 4 were significant ($p < .000$) illustrating a significant fit of data (see Field, 2018). With the Durbin-Watson figure computed less than 1.00, I remain cautious in assuming my IVs are acting independently in the

overall models.

Examining Model 4 as the final model, the "Adjusted R^2" was 0.764; approximately 76.4% of all the IVs (primary, secondary, and tertiary education) account for the primary predictor variables of GNI per capita in Southeast Asia. In a word, an individual's income is strongly influenced by the accumulated effects of all three educational levels. A remaining 23.6% of the predictive influencers remain unmeasured or otherwise unidentified.

Table 2. ***The Result of Multiple-Linear Regression Model***

Model Summary [e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Model Summary				
					R Square change	F Change	df1	df2	Sig. F Change
1	.809[a]	0.655	0.636	1442.024	0.655	35.816	9	170	0.000
2	.809[b]	0.655	0.635	1445.438	0.000	0.198	1	169	0.657
3	.820[c]	0.673	0.651	1411.889	0.018	9.127	1	168	0.003
4	.883[d]	0.780	0.764	1161.754	0.107	81.131	1	167	0.000

a. Predictors: (Constant), CV4_Infra, CV1_GV_2, CV3_Labor, CV1_GV_3, CV1_GV_1, CV2_Indust_1, CV1_GV_6, CV1_GV_4, CV1_GV_5
b. Predictors: (Constant), CV4_Infra, CV1_GV_2, CV3_Labor, CV1_GV_3, CV1_GV_1, CV2_Indust_1, CV1_GV_6, CV1_GV_4, CV1_GV_5, IV1_Ed_Pri_LG1
c. Predictors: (Constant), CV4_Infra, CV1_GV_2, CV3_Labor, CV1_GV_3, CV1_GV_1, CV2_Indust_1, CV1_GV_6, CV1_GV_4, CV1_GV_5, IV1_Ed_Pri_LG1, IV2_Ed_Sec_LG1
d. Predictors: (Constant), CV4_Infra, CV1_GV_2, CV3_Labor, CV1_GV_3, CV1_GV_1, CV2_Indust_1, CV1_GV_6, CV1_GV_4, CV1_GV_5, IV1_Ed_Pri_LG1, IV2_Ed_Sec_LG1, IV3_Ed_Ter_LG1
e. Dependent Variable: DV1_GNI
Durbin-Watson value = 0.498.
Note. Hara (2021) adapted from SPSS output

Based on these perspectives for testing the RQ hypothesis, however, the alternative hypothesis (H_1) states that there is statistically significant contribution of enrollment rate in secondary education to the percent change of R^2 variance in Southeast Asian Middle-income Trap composite scores more than primary and tertiary education. Despite the confirmation of significance of "Sig F Change" and the higher figure of "Adjusted R^2" in Model 4, because I did not see greater significance of the enrollment rate in secondary education than that of primary and tertiary education at least in Table 2, it was difficult to be in favor of the H_1 at least from the statistical result. Consequently, for this RQ, I retained the null hypothesis (H_0).

Interpretations of the Study Result and the Theoretical Framework

In setting-up the research question, I have identified other researchers' works, papers,

and articles relevant to the MIT, industrialization, and secondary education, primarily in Southeast Asian economies. Through the review of literature, as previously described, it is necessary to assume that the other factors might also have some other contributions to the MIT and the ICI, including *Infrastructure, Industrialization, Governance, and Labor market*, as well as the enrollment rate in secondary education. Indeed, the ADB (2011) demonstrated some other factors, including "low level of economic diversification," "insufficiently advanced infrastructure" "weak institutions," "inefficient labor market," etc. (ADB, 2011, pp. 18-19), contributing to the DV of the MIT (GNI per capita). In this way, I had expected a smaller effect of education on the DV. Nevertheless, it was worth analyzing the educational factors predicting the GNI per capita since there is much less literature review.

Furthermore, it is worth sharing the other important outcomes of the analysis through the SPSS, despite the indirect impact on the dependent variable of the GNI per capita. The other study factors of the enrollment rates in tertiary education had a more substantial influence on the GNI per capita rather than the one in secondary education, despite its higher value than that in primary education. Promoting tertiary education, as well as secondary education, has allowed the nine Southeast Asian economies to be further developed, notably in technological development. The industrial revolution in the United Kingdom and Western European countries led to the expansion of employment and productivity in the manufacturing industry since the 1700s from a historical perspective (Allen, 2012). In Southeast Asian economies, Tran (2016) also stressed the significance of accelerating higher education for enhancing technological advancement, especially in HMIEs, including Thailand, Malaysia, and China. On the other hand, there are higher enrollment rates in primary education both in LMIEs and HMIEs in Southeast Asia as the fundamentals, especially improving the literacy and numeracy in youth, which are indispensable for obtaining the jobs.

Furthermore, in confining to the case of accepting the results of the analysis shown in Table 1, this theoretical framework as can be seen in Figure 1 above would hypothetically be available as long as the R^2 increase in Model 4 to be significant when controlling the other factors. Straightforwardly, this framework can be workable with the broader interpretation of being used as one hypothetical milestone by categorically visualizing the relationship between education stage and income levels in developing countries. Indeed, from the historical perspective, the educational factors affecting the income increase in the 1970s to 1980s in East Asia, including Japan, Taiwan, and South Korea, these countries experienced the upgrade of people's education levels and wages along with the progress of industrialization (Otsuka and Kurosaki, 2003).

In these ways, it was easier to expect that the null hypothesis could be retained from the individual cases relevant to the education and income increase in each country of Southeast Asia when relying on the results in Table 9. In this way, there can still be an impact on the enrollment rate in secondary education in these developing countries.

Limitations of the Study

There should be several notes for describing this study's limitation as follows: Firstly, a potential limitation is that this study focused on the impact of the enrollment rate in secondary education on the MIT on condition that increasing the quantity of education is prioritized. Thus, the quality of education, including the way to enhance teaching performance, teaching methods for improving students' grades, will not be centered on

this research discussion. Nonetheless, I emphasized the importance of increasing educational opportunities through quantitative expansion in developing countries to overcome MIT's further development in Southeast Asia. In this respect, enhancing the quality of education is not centered in this study. Secondly, since this study focused on MIT in Southeast Asia, the other economies in the other regions, including Eastern Europe, South America, Middle East, and sub-Saharan Africa, might have different results in examining the same analysis. Namely, there might potentially be other culprits of the MIT in these regions, including demographic factors, entrepreneurship, and external institutional anchors studied by Gill and Kharas (2017), aside from the enrollment rate in secondary education. In this regard, the availability of this study's results might be limited in examining the MIT in the other areas with the different cultural, historical, and social norms and backgrounds as potential biases to be considered. Finally, one more thing to be reported through the actual study here is that the imputed data I employed has several weaknesses in the study results for the RQ. Notably, I can see it in the way that the imputed data did not change the facts that Model 3 in Table 1 relevant to the primary variable of secondary education shown, were all significant in the actual data. In this regard, further investigation in future studies on how to handle the missing data for analysis will be made.

Implications

This study aims to contribute to overcoming the MIT and to promoting further industrialization by clarifying the influence of the enrollment rate in secondary education on the MIT, notably in Southeast Asia for economic progress and human capital development. I used the multiple-linear regression model for testing assumptions and hypotheses, resulting in the null hypotheses' rejection for both research questions due to R^2 increase and Sig. F Change found to be significant. Based on the results, several implications of this study to theory, practice, and further development in the developing world can finally be shared for wrap-up as follows:

Firstly, the potential contribution to the crystallization of a theoretical foundation is to capture the whole picture of the relationship between national income stages and education stages, primarily by gaining insight into the middle-income trap and the enrollment rate of the secondary education as seen in Figure 1. In the current study, far less research of MIT's causes from human capital development was identified, thus being considered a significant research problem. Through this study's quantitative analysis, despite the lower figure of R^2 increase for the enrollment rate in secondary education is lower than the ones for primary and tertiary education, this framework would be workable with the broader interpretation of being used as one hypothetical milestone by categorically visualizing the relationship between education stage and income levels in developing countries based on the previous studies. In this regard, this research problem can be a significant catalyst for creating a framework that theoretically describes the causality between income levels and education levels.

Similarly, contribution to promoting the education policy by improving the enrollment of the secondary education in Southeast Asia, leading to the successful escape from the MIT in Southeast Asia in the longer-term. In practice, emphasizing the enhancement of the enrollment rate in secondary education for public policy can potentially be made. As previously described, investing in human capital development is invisible, thus taking longer for the governments to see the investment outputs.

Nevertheless, there is a more significant potential for maximizing human capital development in overcoming the MIT, notably in Southeast Asian economies via this study. Therefore, addressing the necessity to enhance the enrollment rate in secondary education for practice, notably in the context of overcoming the MIT, can be expected.

Finally, this study can have the implication for further development in addressing the most significant development issue of economic progress and education in the undeveloped world. Primarily, it gains insight into the most fundamental phenomenon of the MIT facing, especially in Southeast Asia, from impacting secondary education. Since this perspective has still not been addressed in the existing study, the research can be a significant catalyst for further development in the region. Overall, despite the common recognition of the importance of education as a driver for economic development in many parts of the world, it is often pointed out that education is not considered as the mainstream in international development. Several reasons can be possible; As previously described, unlike the alternative development factors, including infrastructure, governance, employment, labor market, and industrialization, education is an invisible investment, despite the long-term process. Therefore, out-of-school children and people have still not yet been eradicated in many parts of the world. Thus, on a larger scale, this study can have a potential to help other researchers, students, and practitioners for international development and cooperation re-realize the significance of further investment in education.

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