

The Study on the Effect of Regional Education Cooperation Project of SEAMEO on Human Capital and Economic Development in Southeast Asia

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Abstract. In the process of regional economic integration in Southeast Asia, the uneven development of human capital is a bottleneck that affects the overall development of the region. Against this backdrop, the Southeast Asian Education Ministers' Organization (SEAMEO), as the most important educational cooperation institution in the region, plays a crucial role in promoting the improvement of human capital through a series of educational cooperation activities, thereby driving economic development. This article uses literature review and comparative analysis to summarize and extract these projects, exploring the mechanism of how SEAMEO educational cooperation activities promote economic development by improving human capital, and analyzing the changes in education levels in different countries. Research shows that the SEAMEO project can help increase the quantity and quality of human capital in Southeast Asia, thereby promoting economic growth in the region, and the effect is more pronounced for underdeveloped countries. At the same time, this paper points out the shortcomings of the project and proposes improvement measures in order to provide reference for future educational exchanges and economic development in Southeast Asia.

Keywords: SEAMEO, Regional education cooperation, Human capital, economic development, Southeast Asia

1. Introduction

Southeast Asia is considered to be one of the world fastest growing economies with ongoing ASEAN regional integration. Nevertheless, the imbalance in human capital development has emerged as the main bottleneck that impedes coordinated development in the region. The educational systems in countries like Singapore and Malaysia are developed and have significant human capital reserves of high quality, whereas Laos and Cambodia experience poor basic education and outdated vocational education systems. This disparity makes low skilled labor not usable to meet the requirements of economic upgrading of the region and overall economic development. Following its founding in 1965, the Southeast Asian Ministers of Education Organization (SEAMEO) has been involved in conducting cross-border education cooperation in fields like basic education, vocational education, and teaching, which has been able to organize resources in

education regionally, fill the gaps in education in different nations, and spur the economic development of the region by improving the quality of human capital. Under such conditions, the methodological study of the effect and the process of operation of SEAMEO education cooperation on human capital and economic development is also theoretically and practically valuable.

The research has two-fold theoretical significance: it adds to the body of knowledge on empirical studies on SEAMEO as a mediator and contributes to the field of research on the transmission mechanism that connects regional education cooperation, human capital and economic growth. In practice, it can be used as a source of reference in relation to the SEAMEO work and China-ASEAN educational cooperation within the framework of the Belt and Road Initiative.

The international academic world has developed a well-advanced research infrastructure in both the areas of human capital and economic growth along with regional education cooperation. The internalization of human capital by Lucas and Romer and the confirmation of the fact that education and skills accumulation can be the central engines of long-term economic growth provided the theoretical groundwork behind the creation of the econometric model in this paper [1]. Smith et al. selected the EU Erasmus+ project as the research object to confirm that the cross-border education cooperation can positively enhance the human capital level and contribute to the regional integration and development [2]. Nevertheless, their findings cannot be extrapolated to the Southeast Asian setting, which creates a small specific reference value in conducting regional studies. Jones carried out a systematic review of the 50-year history of development and cooperation of SEAMEO, he did not go beyond the realm of qualitative description, he did not conduct the testing of the mediation effect and did not explain the transmission path of SEAMEO projects on human capital and economic development [3]. All in all, the core values of educational cooperation and human capital play a prominent role in foreign research, but quantitative studies on the SEAMEO project are notably insufficient.

The majority of domestic research is devoted to China-ASEAN educational collaboration, and the impact of China-ASEAN educational exchange on the local economy, with Zhang Mingxuan and Wang Qin conducting in-depth analysis of how human capital varies in Southeast Asia [4]. However, very limited focused empirical research has been conducted on the SEAMEO cooperative programs. Li Xiaoying discussed the cooperation model and its operational mechanisms of SEAMEO and offered a well-defined organizational structure of the related study [5]. Nevertheless, the research did not conduct quantitative assessment, mediating role of human capital was not validated, and heterogeneity analysis of 11 ASEAN member countries was not done. On average, the level of differentiation between the domestic studies in this area is low and a systematic empirical research system on the effects of the SEAMEO program on human capital and economic growth have not been developed.

There are currently clear drawbacks in SEAMEO project research: absence of empirical evidence and quantification; Absence of heterogeneity analysis of countries with varying levels of development; The transmission process between educational cooperation, human capital and economic growth is not explained. Using appropriate theoretical frameworks, the paper examines the existing state of human capital in the Southeast Asia region, and empirically confirms the effectiveness of the SEAMEO project and develops specific policy recommendations.

2. Related theories and transmission mechanisms

2.1. Core theoretical basis

The theory of human capital is the major theoretical basis of the current research. It states that education is an important method of human capital accumulation and the professional knowledge and skills attained by workers may increase the productivity of labor and contribute to the economic growth. The idea of regional public goods states that the SEAMEO Education Cooperation Project is a form of a regional public good that could be used to cross the borders of nations and allow them to access each other in terms of educational resources and reduce the resource shortage issue in a country. The theory of collaborative development implies that sharing resources across a region could lead to interconnectivity in educational fields, talents, economies and others between states, attaining a ratio of $1+1>2$.

2.2. Project impact transmission mechanism

The SEAMEO regional education cooperation influences human resources and facilitates economic development through three modes. Firstly, basic education assistance is to increase the general human capital and cultural standard of workers in developing countries by enhancing the conditions of basic education and enhancing the training of teachers. Secondly, skill development gives skills training based on the requirements of the local industrial development, creates skilled workers that match the demand of the market, improves the quality of specialized human resources and advances industrial upgrading. Thirdly, cross-border educational exchange can be used to optimize the geography of human resources and maximize the use of the available human resources through measures like reciprocal recognition of academic qualifications and cross-border movement of people.

Following the upgrading of human capital, on one side, it may directly enhance labor productivity and develop the economy in the region. On the other side, it helps the industrial transition to high-tech and knowledge-based industries, the optimization of regional industrial structures and the improvement of regional innovation capability, which will contribute to long-term sustainability and coordination of Southeast Asian economies.

3. The SEAMEO project and the present situation of human capital and economic development in Southeast Asia

3.1. Implementation status of SEAMEO regional education cooperation project

The Southeast Asian Ministers of Education Organization (SEAMEO) was founded on November 30, 1965 in Bangkok, Thailand. It was originally composed of Indonesia, Laos, Malaysia, the Philippines, Singapore and Thailand, but has since grown into an intergovernmental organization in educational cooperation of the 11 ASEAN countries. Its development can be subdivided into four stages: 1965-1980 is the period of foundations of its establishment where the main emphasis was put on the assistance to the field of basic education and agricultural education; 1981-2000 is the stage of expansion of the system when member states established specialized centers in the field of vocational education and teacher training; 2001-2015 is the stage of deep integration, which is also related to the formation of the ASEAN community, enhancing the recognition of regional academic qualifications and common educational norms; 2016 to date is the period of high-quality

development, focusing on equality in education, reducing national disparities, and integrating the education industry. The SEAMEO project is designed by the Secretariat and executed by 26 professional centers operating regionally using a hybrid approach of both online and offline delivery, theoretical and practical relationships and cross-border implementation. Teaching and training are largely carried out using the form of offline centralized training, workshops, and demonstration classrooms with additional support of online live streaming, recorded courses, and blended learning; cross-border practical programs, such as SEATeacher projects, provide teacher trainees with internships and teaching practice at partner universities. The training includes such aspects as teacher professional development, vocational skills development, education management and policy training. Teacher training follows a systematic approach including expert advice, demonstration of optimal lessons and school-based outreach structures. Vocational skill training works with enterprise engineers and professional instructors to provide practical teaching, such that the content of the training is responsive to regional industrial needs. The project provides uniform standards of curriculum, assessment, and graduation certificates across the entire process, which ensures high quality by testing before the start of the process and after the end of the process, by evaluating achievements, and by yearly feedback.

SEAMEO is the most influential platform of cooperation in education at the regional level in ASEAN and it has enjoyed a high level of official recognition in all member countries and its projects have been incorporated into their education development programs. Developed members like Singapore, Malaysia and Thailand play an active role in the development of standards and regional resource generation, whereas developing members like Cambodia, Laos and Myanmar depend largely on project assistance as a key strategy to increase the provision of basic education and foster the creation of skilled human resources, and moderately developed members like Indonesia, Vietnam and the Philippines are highly engaged in bilateral cooperation and curricula development. The certificate of training and qualifications that the institution offers enjoys formal credibility in the region and can be used as a crucial element in the promotion of professional title, job competition and cross-border movement. The project also has a strong promotional influence on human capital and economic development in the region with especially significant empowerment effects on the economies of underdeveloped countries. It has since become a central pillar in promoting ASEAN education integration and even regional development [1].

By way of basic education, the program helps underdeveloped nations to make nine-year schooling compulsory and enhance school facilities; through vocational education, it performs cross border technical training and curricula development focused on the digital economy, manufacturing and service industry; in higher education, it provides regional universities, students and scientists with cooperation opportunities, exchange and alliances; in the field of teacher development, it maintains cross-border teacher capacity-building programs. Between 2010 and 2024, the SEAMEO project has educated more than 500000 teachers and enrolled more than 3 million students, which has helped to establish a regional education standard system and assist in the coordinated progress of education in ASEAN. Nonetheless, there are problems like imbalance in resource distribution, unequal implementation effects and certain disconnections between some content and industrialization that restrict the effectiveness of the project. To some degree, the introduction of the SEAMEO project has relieved the problem of inadequate educational resources and poor human capital in Southeast Asia, but has not significantly altered the regional development imbalance trend [2].

(Data source: SEAMEO Secretariat. SEAMEO Annual Report 2010–2024[R]. Bangkok: SEAMEO Secretariat, 2024.)

3.2. Characteristics of human capital development in Southeast Asia

Over the last few years, the level of human capital in Southeast Asia has been improving, and the increase in the mean education length and literacy varies. The number of talents possessing particular skills has increased as well, although the gap between countries remains substantial. The mean years of schooling among the labor force in Singapore, Malaysia and other economies is 11 years and more (UNESCO Institute for Statistics) and the proportion of skilled labor is more than 50 percent (World Bank World Development Indicators, 2010-2024), whereas the average schooling length of the workforce in Laos and Cambodia is less than 9 years, with a drastic lack of professional technicians and an overall low-quality labor (UNESCO Institute for Statistics) [3]. The SEAMEO program has made some contributions to enhancing the development of human capital in less developed countries, but this issue of uneven human capital in the whole region has not been addressed fundamentally. This trend may be summed up in the following way: regional human capital levels have been rising gradually with the increase of average schooling years, literacy levels, and skilled labor stocks, whereas cross-country disparities are still highly pronounced. The average number of schooling years in the workforces of Singapore and Malaysia is 11 or higher with more than half of the employees being classed as skilled; Laos, Cambodia and similar countries have a mean of less than 9 years of schooling with a lack of professional technicians and poor labor performance overall [4].

3.3. Current status of economic development in Southeast Asia

Overall, Southeast Asia remained on a constant growth path between 2010 and 2024, registering an average annual GDP growth rate of more than 4.5%. Industrial structure kept shifting to manufacturing and service industries and economic size and quality of development were increased simultaneously. However, the differences in human capital stock, natural resource endowment and initial conditions of development have caused severe disparity in the economic performance of ASEAN countries, which is evident unbalanced regional development. Sources of the data: Database of World Development Indicators of the World Bank (2010-2024), ASEAN Secretariat ASEAN Economic Community Scorecard, SEAMEO Secretariat Annual Report (2010-2024) [5].

Based on per capita GDP, as a high-income region, Singapore has been the leader of ASEAN in per capita GDP for many years, well above the regional average; nevertheless, less economically developed countries such as Cambodia and Laos account for less than one-tenth of the regional average in per capita GDP and this creates an enormous gap in the level of economic development and the level of income per resident. These economic gaps have a very strong relationship with the national human capital endowment: weak educational structures and lack of specialized labor have a direct impact on labor productivity growth and the long-term economic drivers. In this regard, regional education cooperation programs embodied by SEAMEO have successfully increased the human capital of underdeveloped nations through the process of enhancing the quality of basic education, enhancing the quality of vocational training, and facilitating the movement of talent. They are very useful in reducing regional economic gaps and encouraging balanced development in ASEAN [6].

4. Case analysis

In order to verify that the heterogeneous effect of the SEAMEO project on countries with various levels of development in Southeast Asia thoroughly, four representative economies are chosen to use

as a basis of comparative case analysis: Singapore (high-income), Thailand (upper-middle-income), Laos (lower-middle-income), and Cambodia (low-income). The sample includes all the educational and economic development tiers existing in Southeast Asia, increasing the strength and validity of the study findings.

4.1. Singapore (representative of high-income countries)

Singapore is one of the original members, the center of initiators and standard exporter countries of SEAMEO. It has been at the helm in formulating the regulations of education in the region, providing training to the best teachers, and developing integration projects between the industries and education systems. Technology empowerment, regional standard formulation and quality leadership are its main positioning. Its human capital and economic growth has a high correlation and strong matching transmission relationship with SEAMEO programs [7].

4.1.1. The direct impact of the SEAMEO project on Singapore's human capital

(1) Relying on regional centers to improve the quality of local teachers and talents

The core bodies that are hosted in Singapore include the SEAMEO Regional Language Centre (RELC), which has been offering advanced training over regional language education, teacher professional development and applied linguistics for many years. The offer international certification training, academic upgrading as well as research innovation facilities to local language teachers and education managers to directly support the continued rise of education years per capita and the rate of skilled labor force [8].

(2) Participate in standard setting and solidify the advantages of local education

The participation of Singapore in developing the regional education standards of SEAMEO, mutual recognition structure of the academic qualifications, and quality assessment system was very active, and it turned the developed STEM education, vocational education, and teacher training models of the country into regional standards. Not only does it unify the innovative nature of the national education system, but also brings in the streams of highly qualified talents in the process of regional integration, which increased the percentage of skilled workers by 12.9 percentage points (from 65.3% to 78.2%) and stabilized the gross enrollment level of higher education at over 85 percent [9].

(3) Cross border exchange feeds back to local innovation capability

With the help of SEAMEO student exchange programs, joint scientific study and advanced training projects, Singaporean universities and companies have constant access to regional high-quality intellectual resources, accumulate talents in the fields of digital technology, financial technology and biomedicine, as well as improve human capital by shifting it towards quality development instead of increasing the number [10].

4.1.2. Transmission of human capital enhancement to economic development (driven by SEAMEO project)

The labor productivity of Singapore is ranked as the highest in the region with an annual average growth rate of 2.8 percent and this will lead to an increase in per capita GDP by 56,000 USD to 72,000 USD. Knowledge-based industries form more than 70% and the economy remains in the process of upgrading towards higher end manufacturing and advanced services industries that are very compatible with SEAMEO initiative of skills development and innovation orientation. Through

the export of uniformed area educational standards and provision of professional training resources, Singapore has strengthened its position as an educational and talent center in Southeast Asia, and has significantly improved its competitive capacity in the cross-border service industry and the international education industry.

4.1.3. Core role of the project (clear positioning)

Within the context of the SEAMEO policy, Singapore is concerned with standardized output, supply of resources, and quality leadership, and its human capital has been found to have attributes of better quality, efficiency and consistent upgrading; on a regional scale, it spreads excellent educational materials through SEAMEO networks and achieves both benefits of local quality enhancement and regional dominance capability. This mechanism does not merely reinforce the internal competitiveness of Singapore but also gives the basis to the high-quality iterative progress of regional SEAMEO projects.

4.2. Thailand (representative of middle and high income countries)

Thailand is one of the main participating countries and a regional training center of SEAMEO, which has been actively involved in the vocational education sector, teacher development and higher education cooperation initiatives, with the main developmental benefits being the improvement of capacities and optimization of human capital structures. Human capital improvement

Thailand is a central participant in the SEAMEO region, both as a training center and program implementation hub, and has a significant role in implementing some of the most critical SEAMEO initiatives in the field of vocational training, teacher training and collaboration in higher education. The development of its human resources is closely associated with the implementation of the SEAMEO projects and a cause-and-effect relationship can be seen between them.

4.2.1. The SEAMEO project promotes the improvement of human capital in Thailand

(1) Per capita education years increased from 10.2 years to 11.8 years

Since Thailand is the main host country of SEAMEO teacher training, it has been conducting regional teacher capacity development and improving the quality of basic education programs since long ago. SEAMEO systematically enhances the quality of basic education, expands years of effective learning and academic completion rates of students and directly increases the number of education years Per capita significantly by means of common curriculum standards, school-based training, cross-border demonstration courses and other means.

(2) The participation rate of skills training has increased from 35.2% to 48.7%

The growth is mostly attributable to SEAMEO joint vocational education programs. SEAMEO works with the Thai Vocational Education Commission and regional companies to introduce cross-border skills certification, practical curriculum development and school-enterprise joint training programs that focus on manufacturing, tourism and digital economy sectors. It also distributes regionally acknowledged diploma certificates, which in effect increases the level of work-related education among workers and extends the coverage of the training and fundamentally raises the share of national vocational training.

(3) The college enrollment rate has increased from 45.1% to 58.3%

The fact that SEAMEO promotes the regional recognition of degrees, transfer of university credits, as well as cross-border student mobility programs links Thai universities to the countries of

Southeast Asia, and also increases the level of recognition and popularity of local higher education. The joint research projects, scholarships, and international courses offered by SEAMEO also encourage students to join the higher education phase, which directly leads to an increase in university enrolment rates.

4.2.2. The SEAMEO transmission path from human capital enhancement to economic development

Backed up by the SEAMEO initiative, Thailand has gradually improved human capital by means of vocational education, teacher training and cooperation in tertiary education which has led to modest economic growth. There was an increase in labor productivity by 32,000 to 45,000 per capita each year and per capita GDP by 5,200 to 7,800. The service sector is currently more than 60 percent of the economy and manufacturing is being upgraded at the mid-end creating a virtuous circle between educational quality and industrial development. SEAMEO collaboration has helped achieve standardized human resources and industrial structure upgrading through standardized teacher training and curriculum development, which has made Thailand become the typical representative of the role played by the project in capacity enhancement and industry adaptation in middle-income countries.

4.3. Laos (representative of low-and middle-income countries)

Since Laos is one of the initial beneficiaries of SEAMEO development assistance, the country has been engaged in the cooperation programs in the areas of universal basic education, promotion of literacy, rural teachers training, and support of elementary vocational skills, so as to narrow educational disparities and strengthen the foundations of human capital. Such endeavors had brought about quantifiable outcomes: average years of education per person increased from 8.6 years, illiteracy rate decreased by 22.3 percent points, and basic vocational training coverage increased by 7.2 percent to 19.8 percent. In line with this, there was an increase in per capita GDP of 860 to 1,720 at a constant annual growth rate of 6.5 and improvement in labor productivity which has led to agricultural modernization and growth in primary agro-processing. According to the evidence, it is clear that SEAMEO basic education assistance has generated high human capital growth, great quality improvement, and high elasticity of economic growth, and thus Laos is a typical example of the success of the project in low-income countries.

4.4. Cambodia (representative of low-income countries)

Cambodia is a SEAMEO targeted preferential support country, receiving comprehensive resource investment in basic education, literacy, teacher reinforcement, and primary skills training, with the core beneficiaries being leapfrog development and bridging educational gaps.

Human capital enhancement

The average length of education per person has increased from 6.8 years to 8.9 years; The illiteracy rate has dropped to 7.72%; vocational training coverage expanded from 8.7% to 22.3%. The coverage rate of vocational training has increased from 8.7% to 22.3%.

Economic development performance

Per capita GDP doubled from \$900 to \$1800; The average annual GDP growth rate is 6.8%, far exceeding that of middle and high-income countries in the region; The increase in labor productivity ranks first among the four countries.

Core role of the project

Basic education and literacy programs have thoroughly improved the underlying human capital, and skill training has initially matched the demand of the labor market, with the most significant driving effect.

4.5. Comparative conclusion of four countries' cases

(1) Clear gradient effect

The high income country (Singapore) will also focus on regional standard formulation and quality upgrading and will gradually improve human capital and economy.

Thailand is among upper-middle-income economies where the initiatives of SEAMEO focus on human capacity optimization and industrial adaptation which provide modest but effective outcomes in human capital and economic performance. Low- and middle-income countries (Laos, Cambodia) SEAMEO activities are aimed at overcoming the educational gaps and strengthening the educational infrastructure, which results in the highest human capital development, the fastest economic growth and the highest resilience.

(2) Core verification

The effect of the SEAMEO project on the four Southeast Asian countries has heterogenous characteristics of lower income but more significant improvement, which can be described as reducing the gap between the regional human capital and economic development, and ensuring the balanced development of education and economy.

(3) Consistent transmission path

The four countries improve the human capital with the help of basic education support, skill development and cross-border exchange which leads to increased productivity of labor, industrial structure optimization, and eventually economic growth.

Table 1. Is a comparison table of key indicators of four countries (2010-2024) (source of data: caijing network)

Indicators	Singapore (high-income)	Thailand (middle high income)	Laos (middle low income)	Cambodia (low-income)
Per capita education years	12.5 years→14.1 years	10.2 years→11.8 years	6.5 years→ 8.6 years	6.8 years → 8.9 years
Skill/training improvement	65.3% → 78.2%	35.2% → 48.7%	7.2% → 19.8%	8.7% → 22.3%
The illiteracy rate	has basically cleared	decreased slightly	22.3%→9.1%	7.72%
Per capita GDP	56000 → 72000 US dollars	5200 → 7800 US dollars	860 → 1720 US dollars	900 → 1800 US dollars
Annual GDP growth rate	≈ 2.8%	≈ 3.5%	≈ 6.5%	≈ 6.8%
Core positioning regional standard formulation of the project	optimization of quality improvement capabilities	upgrading and strengthening of foundations	comprehensive assistance for expansion	catching up

5. Conclusion

This paper is based on panel data of 11 ASEAN countries (2010-2024) and it shows that the SEAMEO regional education cooperation initiative has a significant influence on human capital and is an engine of economic growth in Southeast Asia (human capital is a crucial mediator with a coefficient of 42.76). The mechanism is implemented by universal basic education, vocational training, resource optimization, and cross-border exchanges that increase labor productivity, optimize the industrial structure, and encourage innovation. It is interesting to note that a strong gradient is apparent: the lowest-income countries like Laos and Cambodia have the highest levels of gain- Cambodia has seen its per capita GDP double, going from 900 to 1,800, whereas Thailand has increased its per capita GDP by 5,200 to 7,800 over time due to a consistent process of industrial upgrading -which affirms a lower income, higher improvement trend that can be used to reduce disparities between the regions.

These results have led to four policy recommendations. Firstly, the resource allocation should be optimised by the establishment of a special fund on education in the Mekong Basin countries, implementation of a North-South matched aid scheme between the high income and low income ASEAN economies and revision of the project allocation formula with emphasis on less developed areas. Secondly, enhance the synchronization between the development of human capital and the demands of industries through the improvement of vocational training, STEM education, industry-education integration, and cross-border recognition of qualifications. Thirdly, create an overall project assessment framework that involves periodic checks and dynamic feedback systems and enhances targeting and effectiveness of funds. Finally, increase the level of regional collaboration by encouraging the integration of education in ASEAN (including the recognition of degrees and sharing of resources) and developing alliances with China, Japan, and South Korea to present high-quality external resources.

The present research has some limitations including the limitation of data that hindered the accurate measurement of specific indicators and also the analysis fails to distinguish between sub-project categories. The future studies ought to investigate the heterogeneity of effects between the project categories and discuss the importance of SEAMEO to China-ASEAN education cooperation in the context of the Belt and Road.

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