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เส้นทางความสัมพันธ์ของการลงทุนในทุนมนุษย์ด้านการศึกษาและการดูแลสุขภาพ สู่การพัฒนาเศรษฐกิจสังคมของประเทศไทย

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บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อ 1) สำรวจรูปแบบความสัมพันธ์เชิงเหตุผลระหว่างการลงทุนในทุนมนุษย์ ตัวแปรทางเศรษฐกิจสังคมที่เกี่ยวข้อง และการพัฒนาเศรษฐกิจของไทย และ 2) วิเคราะห์เปรียบเทียบผลของการลงทุนด้านศึกษาและการดูแลสุขภาพต่อการพัฒนาเศรษฐกิจ ใช้เทคนิคการวิเคราะห์เส้นทาง ข้อมูลระหว่างปี 2001-2012 ผลการศึกษาพบว่า 1) การลงทุนด้านการศึกษาและการดูแลสุขภาพเป็นปัจจัยที่สามารถกำหนดผลิตภัณฑ์มวลรวมภายในประเทศต่อหัวและการอยู่ดีมีสุขของไทยผ่านตัวแปรทางสังคม 4 ตัวแปร และปัจจัยทางเศรษฐกิจ 3 ตัวแปร ดังนั้นทุนมนุษย์ทั้งด้านความรู้และที่ไม่ใช่ความรู้จึงถือเป็นแหล่งของการพัฒนาเศรษฐกิจของไทย 2) การลงทุนด้านการดูแลสุขภาพส่งผลกระทบต่อผลิตภัณฑ์มวลรวมภายในประเทศต่อหัวมากกว่าการลงทุนด้านการศึกษา แต่ส่งผลกระทบต่อการอยู่ดีมีสุขน้อยกว่าการลงทุนด้านการศึกษา นอกจากนี้ยังพบว่า อายุขัยของแรงงานและโอกาสทางการศึกษาในระดับมัธยมศึกษาเป็นตัวแปรขั้นกลางที่สำคัญในการส่งผ่านทุนมนุษย์ไปยังการพัฒนาเศรษฐกิจของไทย ดังนั้นการส่งเสริมให้เกิดการสะสมทุนมนุษย์เพื่อบรรลุเป้าหมายด้านเศรษฐกิจ ภาครัฐควรเพิ่มงบประมาณด้านสุขภาพพร้อมกับส่งเสริมให้ประชาชนดูแลสุขภาพ ส่วนการส่งเสริมการพัฒนาเศรษฐกิจผ่านการศึกษา ควรให้ความสำคัญกับคุณภาพการศึกษา โดยเฉพาะทักษะที่ตลาดแรงงานต้องการควรถูกกำหนดไว้เป็นผลการเรียนรู้ที่คาดหวัง

คำสำคัญ: ทุนมนุษย์, การลงทุนด้านการศึกษา, การลงทุนด้านการดูแลสุขภาพ, การพัฒนาเศรษฐกิจ, การอยู่ดีมีสุข

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The Path of Education and Healthcare Investment in Human Capital via the Socioeconomic Development of Thailand

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Abstract

This research aims to 1) investigate the pattern of causal relationships among human capital investment, related socioeconomic factors, and economic development in Thailand; and 2) analyse and compare the effect of educational and healthcare investment on economic development. The path analysis approach is employed using data from 2001–2012. The findings show that 1) education and healthcare investment indirectly determine GDP per capita and Thai well-being through four social variables and three economic variables. Therefore, both cognitive and non-cognitive human capital can be sources of economic development. For the result of objective 2), the total effects show that healthcare investment has a comparatively greater effect on GDP per capita than educational investment. However, healthcare has a lesser effect on well-being than educational investment. Thus, educational investment is still important for Thailand's economic development. Besides, the longevity of labour and educational access opportunities at secondary level were found to be significant intermediate socioeconomic factors for the transmission of human capital to the economic development of Thailand. The policy choices for fostering human capital accumulation and economic success are to increase the government's health budget and encourage people to take care of themselves. From the educational aspect, in order to increase the potential for economic development, the quality of education should be concentrated. Acquisition of the requisite labour skills should be the expected educational outcome.

Keywords: Human capital, Educational investment, Healthcare investment, Economic development, Well-being

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1. Introduction

Human capital is an essential source of economic development. It was first recognised by Schultz, who proposed that expenditure on education is an investment rather than a consumption cost due to the resulting increase in GDP per capita [1]. Human capital also affects various socioeconomic factors. For instance, when human capital increases, there are more healthy people, resulting in improved overall well-being [2]. Economists [3], [4] agree that human capital equates to the wealth of an individual or household. Such wealth not only helps people to be more productive and receive greater returns over their lifetime but also fosters economic development in the long run. Human capital is classified as a person's cognitive and non-cognitive ability [5]. Education and training are often represented as cognitive abilities whereas healthcare is non-cognitive. Recently, Li and Liang [6] concluded that, in East Asian countries, health has a greater positive impact on economic growth than education. This may be because the cost of healthcare is low, according to Preston [7] who studied the effect of healthcare investment on economic growth in developing countries. However, Maitra and Mukhopadhyay [8] found that in some countries of Asia and the Pacific, the impacts of education and healthcare expenditure on economic growth are not always positive. Therefore, the effect of educational and healthcare investment is still ambiguous.

In Thailand, human capital has also been recognised as an important strategic factor under the concept of sustainability and regarded as a central driving force in the National Economic and Social Development Plan No. 8–11 (B.E. 2540–2559). Since the inception of the National Education Act 1999, the Thai government has offered nine years of compulsory schooling free of charge. In 2009, the supported period covered twelve years of basic education. From 2001–2012, Thailand's annual educational expenditure occupied approximately 20% of the government's budget (4% of GDP). In addition, the Thai government released "the Universal Health Coverage Program" in 2002. The average healthcare expenditure of Thailand from 2001–2012 was 18% of the government's budget. It sounds like a large amount because the world's average educational and healthcare investment is only 14% and 15%, respectively [9]. However, when considered as a percentage of GDP, healthcare investment in Thailand (4.4%) is less than that of the world (9.9%). Nonetheless, the returns on human capital investment have not yet been finalised. The results of current studies vary depending on the proxies of human capital, analysis methods, and timing [10]. Therefore, the extent to which human capital (education or healthcare) actually affects the Thai economy is still an interesting issue. If such investment has no effect, then any intervention to increase expenditure will not necessarily make any difference. Moreover, current studies analyse the relationship between human capital investment and economic development without focusing on other socioeconomic factors. Thus, it is necessary to investigate the relationship among human capital investment, related socioeconomic factors, and economic development in order to understand the effect of human capital to economic development more clearly.

In this study, the objective are: 1) investigate the pattern of causal relationships among human capital investment, socioeconomic factors, and economic development in Thailand; and 2) analyse and compare the effect of educational and healthcare investment on economic development using data from 2001–2012. The results will provide useful information

for allocating appropriated investment in human capital to achieve economic and social success. Especially, policy makers can use this result to construct a human capital strategy in order to properly develop the education and healthcare.

2. Theoretical and Empirical Review

Economists [11], [2], [12] used various proxies of human capital to study its return to the economy and society. There are no clear answers as to which one represents the best measurement, but each can be viewed as a system; input, output, and impact. This idea is coherent with that of Adolf Stroombergen et al., [4]. These researchers suggested that the three issues are directly and indirectly related to cause and effect. In this section, human capital input, output, and impact (Figure.1) in the scope of education (cognitive) and healthcare (non-cognitive) are reviewed to hypothesise their relationship pattern.

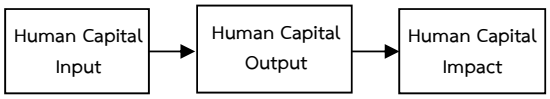


Figure 1 Input-output-impact of human capital [4]

2.1 Human Capital Input

Educational Expenditure as an Input

The principal theoretical links to education and economic growth are shown in the endogenous growth models by Solow [13], Lucas [14] and Romer [11]. There are currently many studies available on educational expenditure as a source of growth. For example, Mercan [15] indicated that educational expenditure in Turkey had a positive effect on economic growth but no inverse relationship existed. This is in line with the findings by Mallick et al. [16] on 14 major Asian countries. They found a positive and significant statistical impact from educational expenditure on the economic development of all 14 countries.

Healthcare Expenditure as an Input

Health is known as one type of human capital. Healthcare and nutrition in children are determinants of chronic diseases in adults [17]. Grossman [18] indicated that the cost of ill health is represented by a loss in labour time. Therefore, healthcare expenditure is essential input for a healthy population and labour productivity.

2.2 Human Capital Output

School Enrolment as an Educational Opportunity

Even though there is no apparent link in the relationship between human capital cost and the quality of labour, such expenditure can present an educational opportunity, often indicated by the school enrolment rate. Kiani [19] found that primary and secondary school enrolment as a ratio of the total employed labour force is positively related to the real GDP growth rate in Pakistan. Similarly, Barro [20] demonstrated that primary school enrolment brings about economic growth. Thus, school enrolment is important output of educational investment.

The Effect of School Enrolment on Employed Labour

An increased opportunity for educational enrolment may bring about further attainment and reduce unemployment. Bils and Klenow [21] and Barro et al. [22] underlined in their findings that greater school enrolment is consistent with educational attainment. From labour market viewpoint, educational attainment can be indicated by employability [4], [23]. The OECD [24] found that education attainment corresponds to employment. Individuals without an upper secondary education are more likely to be unemployed. It is logical to say that higher of school enrolment will improve the employed labour.

The Relationship among the Employed, Labour Productivity, and R&D Expenditure

According to the Standard Classification of Education (ISCED97), employed persons classified by educational attainment are general graduates —receiving an academic qualification at upper secondary to higher level (bachelor, master, doctorate, and post-doctorate degrees), and vocational graduates—receiving a diploma, undergraduate diploma, or equivalent, including short-term vocational training. In combination, they ultimately generate goods and services for the country [11]. Enhancing growth via labour productivity is explained by "fundamental identity" (labour productivity = output/ employment). When the output growth rate is relatively more than that of employment, labour productivity increases, and vice versa. Therefore, if human capital is sufficient it can raise the productivity of all types of labour. More employed, more productivity is possible. Besides, an increase in the employed with master, doctorate, and post-doctorate degrees is likely to improve innovative activity, then R&D expenditure will rise as a consequence.

The Effect of R&D Expenditure on Labour Productivity

According to endogenous growth theory, R&D is a source of both a country's innovation and workforce technology transfer via the knowledge spillover effect [11], [14]. In the empirical study, Griffith et al. [25] concluded that R&D has a positive impact through workforce technology transfer. This is in line with the findings on 22 OECD countries for the period 1991–2003. The finding showed that R&D expenditure had positive long-run elasticity in respect to labour productivity growth [26].

The Effect of Labour Productivity on Wages

Economic theory advocates a strong connection between labour productivity and wages. When output of labour increases but wages are unchanged, this will increase labour demand due to the expanding production scale for profit maximisation. In the short run, a constant supply increases labour demand which in turn causes higher wages, thus reaching marginal labour productivity (MP_L) at equilibrium. However, substitution effects may exist in the long run as firms can accept a trade-off between labour and capital costs in their production system [27]. However, if the period of study is not long, the scale effect may be greater than that of substitution. Therefore, labour productivity directly affect wage is logically hypothesised.

Population Health

Good health, both physical and mental, is an indicator of Thailand's development goal. It is rational to expect a positive relationship between health expenditure and population health since health expenditure brings about better health services and good health for the population. As a result, investment in health increases the longevity of the population [2]. Economists found a positive correlation between national income and the level of life expectancy in the country [7]. Thus, at the macro level, researchers use life expectancy to measure health capital [28], [29], while few use survival rates [30], [31]. However, Hassan, Cooray, and Holmes [32] found that life expectancy, adult mortality, and survival rate are highly collinear (> 0.9).

The Relationship among Population Health, Labour Force Participation, Labour Productivity and Wages

A healthy population leads to increased labour participation and working time. Eggleston and Fuchs [33] supported that life expectancy, i.e., the measurement of longevity is the cause of a higher proportion of each cohort living long enough to participate in the output market. However, their study found that in the case of

high-income countries facing longevity transition, the expected working time as a percentage of life expectancy is declining. In Australia, four groups in the labour market, namely males aged 15–49 and 50–64, and females aged 15–49 and 50–60 were compared. The results illustrated that better health increases the probability of labour force participation in all groups [34]. Healthy workers can spend longer at work and operate more consistently than unhealthy. Moreover, good health leads to efficiency at work. Then, they also receive higher wages. Thus, better health leads to economic growth through increased labour force participation, productivity, and wages.

2.2 Human Capital Impacts

Economic Growth and Well-being as Impacts

Countries with similar average incomes can be different in terms of the population's quality of life. Thus, countries tend to focus on both economic growth and the well-being of the population in their economic development goals. Thailand's economic development goal is managed by the National Economic and Development Board (NESDB). Economic growth is measured by GDP per capita. The index indicating overall well-being of Thai people is influenced by the Sufficiency Economy Philosophy of His Majesty King Bhumibol Adulyadej (Rama IX) and now called the Green and Happiness Index (GHI). This index consists of six dimensions: health (physical, mental, and intelligence), a warm and loving family, community empowerment, economic strength and equity, surroundings and ecological systems, and a democratic society with good governance).

The Effect of R&D Expenditure on Economic Growth

Solow [13], states that technological progress is important for encouraging economic growth. The new growth theory fully supports this too. In practice, R&D expenditure is often used as an agent for technological progress [35]. An examination of the causal relationship among R&D expenditure, innovation, and economic growth by Guloglu & Tekin [36] revealed that they were all positively significant. This imply that R&D is able to enhance economic growth. However, Nkwoma Inekwe [35] tested the effect of R&D expenditure on the economic growth of 66 developing economies from 2000 to 2009 and found a positive effect on upper middle-income economies, while it was insignificant for lower income economies.

The Effect of Wages on Economic Growth

Under the concept of increasing returns and flexible prices, higher wages have a favourable consequence on economic growth through the rising aggregate demand for consumption and prices. Although firms are faced with higher marginal costs, increased product prices induce production expansion. As long as human capital still enhances labour productivity and keeps up with technological progress, the demand for labour will not decrease and wages have a positive effect on growth. The International Labour Organisation (ILO) has therefore called for a wage-led regime [37].

The Effect of Wages on Well-being

The utility theory holds that people's satisfaction is relative to income. Higher wages create more consumer choice and better living standards. Krassa and Radcliff [38] explored the relationship between wages and the well-being of people in 24 industrial democracies around the world. The regression results showed that both rose together and had a strong relationship, significant at the 0.001 level. However, the cohesiveness of the relationship may depend on the level of economic progress. Diener and Seligman [39], state that economic factors are meaningful for indicating the status of well-being in the early stages of economic development,

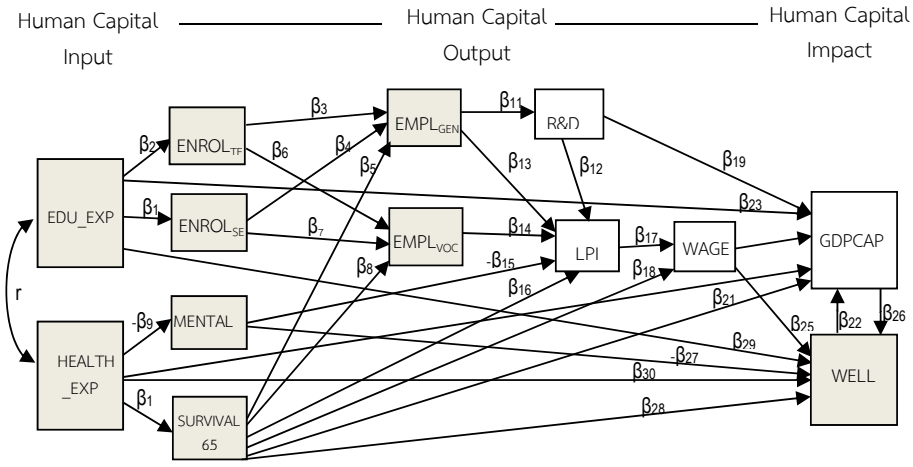
and thus wages and well-being are rationally hypothesised as having a positive relationship.

Good Health and Economic Growth

The health of the labour force creates high national income through three channels, the first of which is productivity. The second is the effect of health on learning ability and supports the first channel. The third is the effect of health on savings. A prospective longer lifespan can motivate people to save for retirement [28]. These savings can be turned into capital stock, which is also a source of GDP growth [40].

Good Health and Well-being

Most researchers believe that the source of well-being is multi-dimensional [41]. Good health is one such source. In Thailand, the average life expectancy at birth, percentage of the population with chronic illnesses or diseases, and rate of suicides per one hundred thousand populations have been applied as indicators for measuring national well-being in the health dimension. Besides, the survival rate to a specific year is also represents the health of the population as well.



Remark: ▭ Shadowed boxes are social variables. ▭ White boxes are economic variables.

Figure 2 The path diagram of human capita

3. Methodology and Framework Data Collection

According to the input-output-impact view of human capital [4], the previous literature review provides the relationship between human capital investment (education & healthcare expenditure) and socioeconomic factors. The certain human capital indicators of Thailand were selected, using five criteria: 1) indicators must be in line with the theoretical and empirical evidence reviewed; 2) indicators must be representative; 3) indicators must vary; 4) indicators must not be contained in the components of well-being; and 5) Thailand must have an adequate collection of time series data. Ultimately, there were thirteen selected indicators from 2001 (the first year of Thailand's well-being index formation) to 2012[A]. The hypotheses of their relationship in the form of path diagram are shown in Figure 2**.**

The path diagram of human capital in Figure 2 is the conceptual framework of the study. These thirteen variable agents in the diagram can be classified into three groups: human capital input, human capital output, and human capital impact. There are two for input, nine for output, and two for impact. The diagram describes how

[A] See appendix.

human capital input: exogenous variables represented by the consumption expenditure on education at 1988 prices (EDU_EXP), and the consumption expenditure on healthcare at 1988 prices (HEALTH_EXP), impact on economic development. Gross Domestic Product per capita at 1988 prices (GDPCAP) and the Green and Happiness Index as a representation of Thailand's well-being (WELL) were used as indicators. Human capital output is the linkage of social and economic variables, intervening human capital input, and economic development, represented by nine indicators: 1) gross school enrolment ratio at secondary level (ENROLSEC); 2) gross school enrolment ratio at tertiary level ($ENROL_{TER}$); 3) percentage of generally educated employed in the labour force ($EMPL_{GEN}$); 4) percentage of vocationally educated employed in the labour force ($EMPL_{VOC}$); 5) percentage cohort of newborn infants likely to survive to age 65 (SURVIVAL65); 6) number of psychiatric illnesses and suicides per hundred thousand population (MENTAL); 7) percentage of government and private expenditure on R&D in GDP; 8) labour productivity index at 1988 prices (LPI); and 9) wages and salaries per employed at 1988 prices (WAGE), where r is correlation and $\beta_1 - \beta_{30}$ are path coefficients. Again, their relationship pattern is hypothesised from previous section.

Data Analysis

The path analysis approach is employed in this study. According to the path analysis method, all variables are transformed into a standardised format. The hypotheses among selected variables presented in Figure 2 are then tested at a statistically significant level of 0.1, 0.05, and 0.01 level. There are two steps to finding out the actual relationship. The first step tests towards significance among their relationships, only variables with significance on the path of human capital will be employed for the next step. In the second step, significant variables are reformed as the final structural equation. The standardised coefficients (β) can reflect the magnitude of predetermined variables which influence dependent variables and, then be obtained to calculate the subsequent direct, indirect, and total effect.

4. Results/Finding

4.1 Descriptive Statistics

Variable	Min.	Max.	Mean	S.D.
Input				
EDU_EXP	159,667.93	305,145.32	219,647.55	45,764.60
HEALTH_EXP	132,309.00	271,275.55	200,738.12	40,711.61
Output				
$ENROL_{SEC}$	62.79	87.44	74.83	8.83
$ENROL_{TER}$	39.01	52.75	45.79	4.73
SURVIVAL65	63.38	72.55	69.38	3.45
MENTAL	1,323.56	1,873.00	1,471.21	178.05
$EMPL_{GEN}$	11.33	21.04	16.14	3.15
$EMPL_{VOC}$	6.51	8.51	7.53	0.7
LPI	301.9	569.13	427.68	86.65
R&D	0.41	0.6	0.47	0.06
WAGE	28,494.25	37,705.73	32,620.36	2,521.53
Impact				
GDPCAP	62,836.00	67,912.00	65,640.75	1,687.57
WELL	63.51	71.68	66.48	2.67

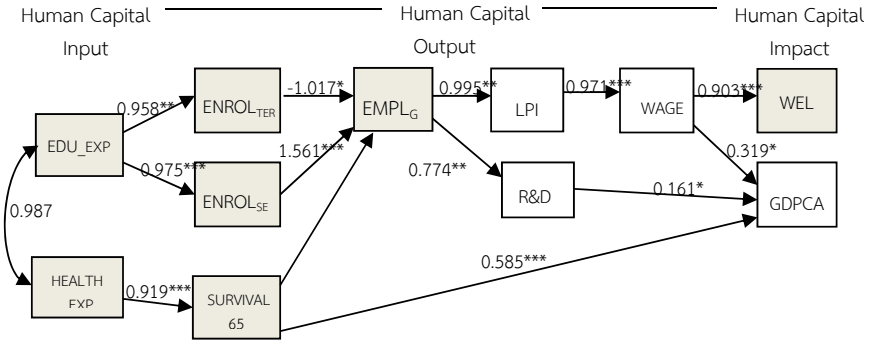
Source: Author's own calculation

4.2 The Pattern of Causal Relationships between Human Capital Investment and Socioeconomic Factors

The results from the path analysis as shown in Figure 3, which fulfil the first objective, show that expenditure on both education and healthcare determinants of GDP per capita and well-being through four social and three economic human capital outputs. The preliminary variable affected by education expenditure (EDU_EXP) is educational opportunity in secondary ($ENROL_{SEC}$) (β = 0.975) and tertiary ($ENROL_{TER}$) (β = 0.958). Subsequently, improving the enrolment at secondary level greatly affects the percentage of general educational employed in the labour force (EMPLGEN) (β = 1.561). However, enrolment at tertiary level gives a negative beta coefficient (β = -1.017). These imply that only educational access opportunities at secondary level lead to educational attainment from the labour market

viewpoint, while, at tertiary level are facing the problem. According to Labour Force Survey (LFS) in 2016, approximately 150,000 unemployed persons completed tertiary education, more than unemployed persons at other educational levels. This empirical evidence indicates that there may be a mismatch between tertiary schooling and the demand for labour in the market.

The health expenditure (HEALTH_EXP) affects the labour market through the percentage cohort of newborn infants surviving to age 65 (SURVIVAL65) (β = 0.910). Besides, the coefficient between SURVIVAL65 and $EMPL_{GEN}$ is 0.360. This finding is in line with Eggleston and Fuchs [33], who suggested that the longevity of people has an influence on the working period. The given beta coefficient between the percentage of general educational employed in the labour force ($EMPL_{GEN}$) and labour productivity (LPI) is 0.995. This indicates that human capital accumulated in the employed is still able to enhance labour productivity. The average wage of a worker (WAGE) is influenced by labour productivity (β = 0.971). The generally employed are also the cause of changes in R&D expenditure (β = 0.774). This may be the result of the generally employed in higher education. Aghion and Cohen [42] suggested that the number of employed with master, doctorate, and post-doctorate degrees increases by investing in higher education and tends to improve innovation activity. Finally, the variance of GDP per capita is directly explained by the percentage cohort of newborn infants surviving to age 65, Wage, and R&D expenditure. For well-being, wages are important for the well-being of Thai people. In this regard, Diener and Seligman [31] state that the importance level of economic factors depends on the level of economic progress.



Remark: *** p < 0.01 (2-tailed). ** p < 0.05 (2-tailed). *p < 0.1 (2-tailed).

Figure 3 The pattern of causal relationships among human capital investment, related socioeconomic factors, and economic development in Thailand

The results in the form of structural equations are showed in equations (1) – (9).

$ENROL_{SEC}$ = 0.975EDU_EXP (1)

$ENROLL_{TER}$ = 0.958 EDU_EXP (2)

$EMPL_{GEN}$ = -1.017 $ENROLL_{TER}$ + 1.561 $ENROLL_{SEC}$ + 0.360 SURVIVAL65 (3)

R&D = 0.774 $EMPL_{GEN}$ (4)

LPI = 0.995 $EMPL_{GEN}$ (5)

WAGE = 0.971 LPI (6)

SURVIVAL65 = 0.919 HEALTH_EXP (7)

GDPCAP = 0.161 R&D + 0.319 WAGE + 0.585 SURVIVAL65 (8)

WELL = 0.903 WAGE (9)

4.3 Comparing the Effects of Educational and Healthcare Investment on Economic Development

Table 2 Direct and indirect effects of human capital on economic growth and well-being

		GDP per capita			Well-Being		
	Proxies	Indirect Effect	Direct Effect	Total Effect	Indirect Effect*	Direct Effect	Total Effect*
Human Capital Input	EDU_EXP	0.237		0.237	0.478		0.478
	HEALTH_EXP	0.681		0.681	0.289		0.289
Human Capital Output	SURVIVAL65**	0.156	0.585	0.741	0.315		0.315
	$ENROL_{TER}$	-0.439		-0.439	-0.887		-0.887
	$ENROL_{SEC}$***	0.674		0.674	1.362		1.362
	$EMPL_{GEN}$	0.432		0.432	0.873		0.873
	R&D		0.161	0.161			0.000
	LPI	0.309		0.309	0.877		0.877
	WAGE		0.319	0.319		0.903	0.903

Remark: * Total effect (direct + indirect) is computed from standardized coefficient using Sewell Wright's multiplication rule.

** The variable giving the greatest total effect on GDP per capita

*** The variable giving the greatest total effect on well-being

Source: Author's own study

In Tables 2, the direct, indirect, and total effects of educational and healthcare expenditure, including their outputs on growth and well-being are shown.

Considering GDP per capita as the human capital impact in the economic dimension, the magnitude of the total effect for healthcare expenditure (HEALTH_EXP) is 0.681, greater than that of educational expenditure (EDU_EXP), which equals 0.237. Thus, healthcare expenditure has a greater influence on the GDP per capita of Thailand than educational expenditure.

Considering the well-being dimension, the magnitude of the total effect of educational expenditure is 0.478, greater than that of healthcare, which equals 0.289.

Both educational and healthcare expenditure affect GDP per capita and well-being indirectly via human capital outputs. Among all outputs, the longevity of labour is likely to be the most important intermediate source of economic growth, since it produces the maximum total effect. It not only has a direct but also an indirect effect on GDP per capita. On the other hand, most human capital outputs, except longevity of labour (SURVIVAL65) and R&D, are likely to be important for overall Thai well-being due to the large size of total effect at around 0.873-1.362. Educational opportunity at secondary level, indicated by the gross school enrolment ratio (ENROLSEC), had the greatest effect on well-being.

Table 3 Comparison of the effects of education & healthcare on economic development

Human Capital Input	**Economic Development Indicators**	
	GDP per Capita	**Well-being Index**
Education Exp.	0.237	0.478
Healthcare Exp.	0.681	0.289

Source: Author's own study

In comparison, table 3 shows that the effects of cognitive human capital investment (education) and non-cognitive (healthcare) on the economic growth and well-being of Thailand during the period of this study are dissimilar. Educational expenditure is shown to have a slight effect on GDP per capita (0.237), but even so, it contributes more to well-being (0.478). On the other hand, healthcare expenditure affects GDP per capita and well-being at about 0.681 and 0.289,

respectively. Thus, educational expenditure is shown to be closely related to well-being, while healthcare expenditure is closely related to economic growth.

5. Conclusion and Discussion

The initial question posed in this paper is: to what extent does human capital (education or healthcare) actually affect the Thai economy? There were two objectives: 1) investigate the pattern of causal relationships among human capital investment, related socioeconomic factors, and economic development in Thailand; and 2) analyse and compare the effect of educational and healthcare investment on economic development. Obtainable data for Thailand from 2001–2012 was used in the analysis.

The first main finding shows that both cognitive (education) and non-cognitive (healthcare) investment can be sources of economic development, as indicated by GDP per capita and Thai well-being. Their effect passes through four social and three economic intermediate factors. The longevity of labour and educational opportunity at secondary level are likely to be important factors since these have more magnitude than the others. Therefore, these two factors should be treated as intermediate targets in human capital strategy.

Comparing the magnitude of cognitive and non-cognitive effects, healthcare investment was found to have more impact on GDP per capita than educational investment. It seems that this finding is in line with Preston [7], who indicated that healthcare investment costs are low for improving population health in developing countries. For instance, only disease prevention and vaccination can assist developing countries towards economic growth. Although this paper involves an empirical study of the Thai economy, the findings are consistent with nearby regions as well. Li and Liang [6] studied the impact of health and education stock on economic growth in East Asian countries and found that health has a stronger impact than education.

It is noteworthy that although the educational expenditure in Thailand has a good effect on educational opportunity (enrolment ratio), the total effect on the economy is diminished by a negative side effect of enrolment in tertiary education on the employed. Currently, an unemployment problem exists concerning the labour force and tertiary education. This may confirm that a mismatch exists between tertiary education and the demand for labour in the market. Besides, the Thai labour market has been facing a shortage of technicians. The percentage of vocationally educated employed in the labour force is only 6.51 – 8.51%. Meanwhile, the percentage of generally educated employed in the labour force, especially at secondary level, has increased from 11.33% in 2001 to 21.04% in 2012 [43]. However, educational investment is still significant for Thailand's economic development, since it has a greater impact on well-being than healthcare investment. Increased educational opportunities lead to economic and social benefits, and subsequently to overall well-being.

Thus, the policy implication for fostering human capital accumulation and economic success is to increase the government budget for health and encourage people to take care of themselves. From the education aspect, the requisite labour skill should be studied and established as the expected learning outcome in order to meet market needs. Besides, cooperative education should be supported too.

6. References

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Appendix Table. Selected social and economic indicators used in this study

Abbreviation	Indicators	Meaning	Source
ED_EXP	Consumption expenditure on education at 1988 prices	Education investment as the representative of cognitive dimension.	National Accounts, NESDB
HEALTH_EXP	Consumption expenditure on health at 1988 prices	Health investment as the representative of non-cognitive dimension.	National Accounts, NESDB
$ENROLL_{SEC}$	Gross school enrolment ratio at secondary level	Education opportunity in secondary level as the representative of primary output from education expenditure in secondary.	World Development Index (WDI), World Bank
$ENROLL_{TER}$	Gross school enrolment ratio at tertiary level	Education opportunity in tertiary level as the representative of primary output from education expenditure in tertiary.	WDI, World Bank
$EMPL_{GEN}$	Percentage of general educational employed in the labour force	General skill in labour market as output of human capital in labour market.	Labor Force Survey (LFS), National Statistical Office
$EMPL_{VOC}$	Percentage of vocational educational employed in the labour force	Technical skill in labour market as output of human capital in labour market.	LFS, National Statistical Office
MENTAL	Number of psychiatric illnesses and suicides per hundred thousand population	Mental health of people as output from healthcare investment.	Strategic Development Indicators , NESDB.
SURVIVAL65	Percentage of the cohort of newborn infants surviving to age 65	Physical health of people as output from healthcare investment.	WDI, World Bank
LPI	Labour Productivity Index, calculated by $(GDP_t/GDP_0)/(L_t/L_0)$	Labour productivity	Calculated by $(GDP_t/GDP_0)/(L_t/L_0)$
R&D	Percentage of government and private expenditure on research and development in GDP	R&D activity of tertiary graduated employed	STI
WAGE	Wage and salaries per employed at 1988 prices	Average wage of Labour force	NESDB
GDPCAP	Gross National Product per capita at 1988 prices	Economic growth	NESDB
WELL	Green and Happiness Index as the index of Thai well-being	Well-being of Thai people	NESDB