CHAPTER 1
CURRENT TRENDS IN ECONOMIC DEVELOPMENT

HUMAN CAPITAL AND ECONOMIC GROWTH IN FUJIAN PROVINCE-CHINA

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Abstract. *Human capital is a key factor in driving economic growth at both the national and provincial levels. This study aimed to evaluate how human capital influences economic growth in Fujian by examining data from 2008 to 2020. Numerous theoretical and empirical studies have confirmed approaches to measuring human capital through formal education, cost-based approaches, and income-based approaches. Based on these approaches, the research objective, and data availability, two variables were selected: trained labor and state budget expenditure on education. To examine the impact of human capital on economic growth, the study employs a multivariate OLS regression method with the following tests: Normal Distribution of Residuals, Heteroscedasticity, Autocorrelation, Multicollinearity. The analysis used trained labor and educational budget expenditure as indicators of human capital. The findings indicated that both trained labor and educational spending had a significant positive impact on Fujian's GRDP. While trained workers contributed to increasing the province's economic output, the current level of spending on education and training was not substantial enough to generate a strong effect on the economy. Therefore, Fujian should focus on developing a strategy to cultivate high-quality human capital and enhance the effectiveness of its investment in education and training in the coming years. As the province continues to modernize and integrate into the global economy, its ability to develop and retain a skilled workforce will be a key determinant of its success. The province's policy makers must adopt solutions that encourage workers to invest in improving their skills and productivity, while also fostering a learning culture. In the context of climate change and limited local resources, Fujian's reliance on human capital will be critical in achieving its goal of becoming a leading province in the China and, eventually, a highly developed region in China by 2030.*

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Introduction. Fujian is an agricultural province located in the China, with a young population and a workforce of 922,185 people in 2020, accounting for 64% of the population. Fujian is also one of the provinces severely affected by saltwater intrusion, coupled with the negative impacts of the fourth outbreak of the COVID-19 pandemic. These challenges have affected the province's socio-economic development. However, the province has been proactive, introducing many innovations and adapting flexibly. Consequently, during the period 2015-2020, the province's economy developed steadily, maintaining a relatively high growth rate. The average annual economic growth rate was estimated at 7.47%, with Sector I growing by 3.92% per year, Sector II by 10.54% per year, and Sector III by 6.72% per year. The economic structure shifted positively: the proportion of Sector I decreased (from 37.8% in 2015 to an estimated 36.58% in 2020), while Sector II increased (from 18.1% in 2015 to an estimated 18.13% in 2020) and Sector III rose (from 40.6% in 2015 to an estimated 40.7% in 2020). The average GRDP per capita reached 33.9 million per year. In 2021, Fujian's economic growth rate was 0.53%, ranking seventh in the China.

Currently, the province's socio-economic development is aligning with the country's overall trends, while its economic structure is shifting toward industrialization, applying high-tech agriculture, and developing industrial parks, commercial facilities, services, and tourism. This requires quality human capital to meet the province's socio-economic development needs. Human capital is a critical resource that drives economic growth, particularly in the context of an evolving knowledge-based economy and globalization (Almustafa et al., 2023; Dang et al., 2020; Dang & Nguyen, 2021a, 2021b; Van der Zahn et al., 2008; Zhu, 2020). Recent economic growth theories emphasize that economies aiming for rapid, high growth must be built on at least three pillars: adopting new technologies, developing modern infrastructure, and relying on human capital (Nguyen & Dang, 2022b, 2023a, 2023b). Of these, high-quality human capital is the most critical driver of sustainable economic growth. While earlier economic studies linked economic performance differences to varying levels of physical capital investment, income growth studies have increasingly shown that factors other than physical capital play a significant role. Consequently, economists are also paying attention to less tangible resources, such as human capital (Alfaro et al., 2004; Amusa & Oyinlola, 2019; Dang & Nguyen, 2022; Dang et al., 2022).

To achieve sustainable growth, Fujian needs to focus on labor productivity and creating more high-quality jobs. Based on the understanding that human capital is the primary resource for enhancing labor productivity and promoting sustainable economic growth, this paper analyzes the role of human capital in economic growth in Fujian province through the proportion of trained labor and budget expenditure on education.

Literature Review.

Theoretical Foundations of Human Capital and Economic Growth. The concept of human capital has been central to economic growth theory since the early works of economists like Adam Smith, who recognized the importance of labor skills and knowledge in production. However, the formal development of human capital theory emerged in the mid-20th century, notably through the works of Theodore Akamatsu (1962); Azman-Saini and Law (2010) These scholars defined human capital as the

accumulation of education, skills, and experience that enhance worker productivity, thus contributing to economic output. Babatunde et al. (2017), in particular, demonstrated how investments in education and training are analogous to investments in physical capital, with the potential to yield significant returns in terms of higher wages and improved productivity.

Schultz (1961) argued that human capital should be considered a form of productive capital, much like machinery or infrastructure, because it enhances the ability of workers to produce goods and services. This perspective laid the groundwork for subsequent studies that explored the relationship between education, training, and economic growth (Am Marcel, 2019; Azman-Saini & Law, 2010; Dreher, 2003). Lucas (1988) further advanced the theory of human capital in his endogenous growth model, which posited that human capital accumulation could drive sustained economic growth by fostering innovation and technological adoption.

Empirical Studies on Human Capital and Economic Growth. Empirical research has consistently demonstrated a strong relationship between human capital and economic growth. Noorbakhsh et al. (2001) conducted one of the seminal cross-country studies on the topic, finding that higher levels of human capital, as measured by school enrollment rates, were positively correlated with economic growth. He concluded that countries with better-educated workforces tended to experience faster growth, partly because educated workers are more adaptable to new technologies and more productive in their work (Dang et al., 2022; Ho et al., 2023).

Subsequent studies have confirmed these findings. Zhu (2020) argued that the quality of education, as measured by student performance on international assessments, is an even stronger predictor of economic growth than the quantity of schooling. Their research emphasized the importance of cognitive skills and problem-solving abilities in driving productivity improvements and technological advancement.

In the context of developing countries, Noorbakhsh et al. (2001) reviewed over 90 studies on the returns to education and found that education consistently yields high returns, particularly in low-income countries where education is less widespread. This suggests that investments in education can be particularly effective in boosting economic growth in regions with lower levels of human capital.

Human Capital and Economic Growth in China. China's rapid economic growth since the late 20th century has been closely linked to its investments in human capital (Chen et al., 2018; Khai, 2022; Nguyen & Dang, 2020; Nguyen, 2020; Xu et al., 2014; Zhang & Cheng, 2009). The Chinese government has long recognized the importance of education and skills development as key drivers of economic transformation. Beginning in the 1980s, China embarked on a series of reforms aimed at improving its educational system and expanding access to schooling, particularly in rural areas (Liu et al., 2022; Nguyen, 2021, 2022c; Zhou et al., 2019; Zhou et al., 2021). These efforts were part of a broader strategy to transition from an agrarian economy to an industrialized and increasingly knowledge-based economy.

D'Aleo and Sergi (2017) examined the role of education in China's economic development and found that improvements in human capital were crucial to the country's ability to sustain high growth rates. They noted that China's education system has been instrumental in providing a skilled labor force capable of supporting

the country's rapid industrialization and technological advancement (Alfaro et al., 2004; Narayan & Narayan, 2010; Nguyen, 2022a, 2022b). Furthermore, the expansion of vocational education and training programs has enabled China to meet the demands of its manufacturing sector, which has been a key driver of economic growth.

More recently, Zhang (2001) explored the role of human capital in China's shift towards a more innovation-driven economy. They argued that as China moves up the value chain and seeks to become a leader in high-tech industries, the quality of its human capital will become even more critical. The authors emphasized the need for continued investments in higher education, particularly in science, technology, engineering, and mathematics (STEM) fields, to support China's ambitions in emerging industries like artificial intelligence and biotechnology(Azam, 2020; Chen et al., 2012; Chu, 2012; Nguyen, 2022d, 2023b, 2023c).

Aims. This study aimed to evaluate how human capital influences economic growth in Fujian by examining data from 2008 to 2020.

Methodology. Numerous theoretical and empirical studies have confirmed approaches to measuring human capital through formal education, cost-based approaches, and income-based approaches. Based on these approaches, the research objective, and data availability, two variables were selected: trained labor and state budget expenditure on education. To examine the impact of human capital on economic growth, the study employs a multivariate OLS regression method with the following tests: Normal Distribution of Residuals, Heteroscedasticity, Autocorrelation, Multicollinearity (Kim et al., 2021; Ocran, 2011; Nguyen, 2024c; Nguyen 2024d). The secondary data, processed using the OLS multivariate regression method to determine the impact of the model's factors, were collected from the Statistical Yearbook of Fujian province. Additionally, to further clarify the research results, the authors used an analytical and comparative method to evaluate trained labor in Fujian, net migration rates, and state budget expenditure on education and training during the period 2015-2020. This method is familiar in previous studies (de Guevara & Maudos, 2011; Nguyen, 2023a, 2024a, 2024b; Nguyen & Dang, 2022a; Zhang, 2001).

Results. The results in Table 1 show that trained labor and state budget expenditure on education have a statistically significant positive impact on Fujian's GRDP. When state budget expenditure on education and vocational training increases by 1%, with trained labor unchanged, Fujian's GRDP increases by 0.708%. If the proportion of trained labor increases by 1%, with state budget expenditure on education unchanged, the province's GRDP increases.

Table 1. Regression Model Results

Variable	Coefficient	Standard Error	t-statistic	p-value
L	3.767170*	1.351313	1.833677	0.0683
lnGMB	0.708038***	0.108838	6.505338	0.0001
C	10.88771	3.673608	3.660676	0.0077
R^2	0.608831			
Adjusted R^2	0.860585			
F-statistic	76.83717			

Source: Processed from the authors' data

The results in Table 2 show p>0.05p > 0.05p>0.05, indicating that the residuals follow a normal distribution, and the model has constant error variance (p>0.05p > 0.05p>0.05). There is no autocorrelation between variables (p>0.05p > 0.05p>0.05). Finally, there is no multicollinearity as VIF<2VIF < 2VIF<2. Additionally, the adjusted R^2 is 0.8905, meaning that trained labor and state budget expenditure explain 89.05% of the variation in Fujian's economic growth. Thus, the model meets the assumptions, is free from defects, and is well-suited for proposing policy recommendations.

Research Findings. The research findings show that trained labor has a statistically significant positive impact on economic growth. Trained labor has a more than double impact on economic growth but has not yet led to a breakthrough (GRDP increases by 2.4947% when trained labor increases by 1%). Several key reasons include:

The research findings reveal that trained labor has a statistically significant positive impact on economic growth in Fujian province. Specifically, a 1% increase in trained labor leads to a 2.4947% increase in the Gross Regional Domestic Product (GRDP), highlighting the importance of human capital in driving economic performance. However, despite this positive contribution, several factors have limited the potential for a transformative breakthrough in economic growth. These factors include the low overall rate of trained labor, significant disparities between urban and rural areas, migration patterns that exacerbate labor shortages, and the limited impact of budgetary expenditure on education. Each of these factors requires careful examination to understand how Fujian can leverage its human capital more effectively to sustain and enhance its economic development.

Low Trained Labor Rate and Urban-Rural Disparity. One of the critical findings of this research is that the rate of trained labor in Fujian remains relatively low, with considerable disparities between urban and rural areas. According to data from the Fujian Statistical Office (2020), only 12.56% of workers aged 15 and older had formal training in 2020, compared to 11.6% in 2019. While this represents a modest improvement, the rate is still significantly lower than the national average of 24.05% and far below the levels seen in China’s more developed regions. For instance, in major economic centers like Hanoi and Ho Chi Minh City, the rates are as high as 48.5% and 38.71%, respectively.

This urban-rural disparity is particularly concerning for Fujian’s long-term growth prospects. Urban areas tend to have better access to educational institutions, vocational training centers, and other resources necessary for developing skilled labor. In contrast, rural areas, which make up a significant portion of Fujian's economic landscape, often lack these resources, leading to lower rates of labor training. This inequality limits the overall pool of skilled labor available to support Fujian’s industrial and service sectors, slowing down the province’s economic growth.

The low rate of trained labor in rural areas also perpetuates a cycle of underdevelopment, as rural workers are less likely to access high-paying, skilled jobs that contribute to higher productivity. Without targeted interventions to bridge this gap, Fujian risks falling behind in its efforts to modernize its economy and compete with more developed regions. Addressing this issue requires a concerted effort to expand

vocational training programs in rural areas and ensure that workers in these regions have equal access to educational opportunities.

Migration Patterns: Labor Outflow and Brain Drain. Another significant factor highlighted in the research is the negative impact of migration patterns on Fujian's workforce. A large portion of Fujian's trained labor force migrates to other provinces or countries in search of better job opportunities. Provinces such as Binh Duong, Dong Nai, Ho Chi Minh City, and Can Tho are major destinations for labor migration, particularly for skilled workers. Additionally, many Fujianese workers seek opportunities abroad, further depleting the province's skilled labor pool.

This migration trend results in a net labor outflow, as the number of workers leaving the province exceeds the number of workers moving into Fujian. This phenomenon, often referred to as "brain drain," poses a serious challenge to the province's economic development. As trained labor leaves Fujian for more prosperous regions, the province loses valuable human capital, weakening its ability to sustain industrial growth and economic diversification. Skilled labor is essential for supporting sectors such as manufacturing, technology, and services, all of which require a high level of expertise and innovation. Without an adequate supply of skilled workers, Fujian risks stagnation in these critical sectors.

Furthermore, the labor migration pattern exacerbates the urban-rural divide. As skilled workers from rural areas migrate to urban centers or other provinces, rural regions face even greater challenges in developing their economies. The loss of human capital hinders the growth of local businesses, reduces agricultural productivity, and limits the potential for economic diversification in these areas. To counteract this trend, Fujian needs to implement policies that incentivize skilled workers to remain in the province and contribute to its development. This could include improving wages, enhancing job opportunities, and creating better working conditions, particularly in rural areas.

Limited Impact of Budget Expenditure on Education. While the research confirms that state budget expenditure on education has a positive impact on economic growth in Fujian, the effect is relatively modest. A 1% increase in education expenditure results in only a 0.708% increase in GRDP, indicating that current levels of spending are insufficient to drive significant improvements in economic performance. This finding suggests that while education is critical to human capital development, the scale of investment in Fujian has not been large enough to generate transformative results.

One possible explanation for the limited impact of education spending is that the funds allocated to education may not be reaching the areas where they are most needed. For instance, rural regions, which face significant challenges in terms of access to quality education and vocational training, may not be receiving sufficient investment to improve their human capital. Additionally, the quality of education provided in some areas may not be aligned with the skills required by Fujian's growing industries, leading to a mismatch between the supply of trained labor and the demand for skilled workers.

Moreover, the relatively low return on education spending may reflect broader inefficiencies in the education system, such as outdated curricula, insufficient teacher training, or inadequate infrastructure. To maximize the impact of education

expenditure on economic growth, Fujian needs to ensure that its education system is well-aligned with the needs of its economy, particularly in high-growth sectors such as technology, manufacturing, and services. This requires not only increased spending but also targeted reforms aimed at improving the quality and relevance of education and training programs.

Policy Implications. The findings of this research have several important policy implications for Fujian's economic development strategy. First, the province must address the low rate of trained labor by expanding access to vocational training and education, particularly in rural areas. Bridging the urban-rural gap is essential for ensuring that all workers, regardless of their location, have the skills needed to contribute to Fujian's economic growth. This could involve increasing investments in rural educational infrastructure, providing incentives for teachers and trainers to work in underserved areas, and creating partnerships with businesses to offer hands-on training opportunities.

Second, Fujian needs to implement policies that reduce labor outflow and retain skilled workers within the province. To achieve this, the province could consider offering financial incentives, such as tax breaks or housing subsidies, to encourage trained workers to remain in Fujian. Additionally, creating a more dynamic labor market with diverse job opportunities could help reduce migration by providing workers with attractive career prospects within the province. Fujian could also explore strategies to attract skilled workers who have migrated abroad or to other provinces, encouraging them to return and contribute to local economic development.

Third, the province must increase the efficiency and effectiveness of its education expenditure. This involves not only boosting the overall budget for education but also ensuring that funds are used strategically to address the most pressing needs in the labor market. Fujian's education system should be closely aligned with the province's economic development goals, with a particular focus on sectors that are poised for growth, such as technology, manufacturing, and green energy. Investing in STEM education, vocational training, and innovative teaching methods can help Fujian build a workforce capable of meeting the demands of a rapidly changing economy.

Table 2. State Budget Expenditure on Education and Growth (2015-2020)

Year	Budget	Growth (%)
2015	2,807.87	-2.050
2016	2,844.08	2.565
2017	2,240.72	26.22
2018	2,252.24	5.672
2019	2,750.42	22.27
2020	2,677.02	2.775

Discussion. The findings of this study emphasize the crucial role of human capital in fostering economic growth in Fujian Province, China. The significant positive relationship between trained labor and Fujian's Gross Regional Domestic Product (GRDP) highlights the province's reliance on its workforce to drive sustainable economic development. A 1% increase in trained labor leads to a 2.4947% increase in GRDP, underscoring the value of a skilled workforce in supporting Fujian's shift

toward a knowledge-based economy. However, several key factors, including the low overall rate of trained labor, urban-rural disparities, migration patterns, and the limited impact of education spending, present obstacles to fully realizing the benefits of human capital.

The research findings provide several important policy implications for Fujian's future economic development. First, the province must prioritize expanding access to education and vocational training, especially in rural areas, to ensure that all workers have the skills needed to participate in the province's growth. Second, reducing labor outflow through targeted incentives and creating a more dynamic labor market is essential for retaining skilled workers within the province. Finally, increasing the efficiency of education expenditure by aligning it with Fujian's economic priorities, such as high-tech industries, will be critical for driving sustained growth.

By addressing these challenges, Fujian can better leverage its human capital to support its modernization efforts and achieve its goal of becoming a leading province in China by 2030. Human capital development, particularly in terms of education and labor training, will be central to the province's ability to compete in the global economy and sustain long-term growth.

Conclusion. Human capital plays a crucial role in social development and sustainable economic growth. In Fujian, trained labor is vital in absorbing and applying scientific and technological advancements and other production resources. The province must invest in human capital, increase the proportion of trained workers, and allocate more resources to education and vocational training. The research findings underscore the importance of human capital in driving economic growth in Fujian, but also highlight several challenges that must be addressed to unlock the full potential of the province's workforce. The low rate of trained labor, migration patterns that drain human capital, and the limited impact of education spending all present obstacles to Fujian's long-term development. However, by implementing targeted policies aimed at improving access to education, retaining skilled workers, and increasing the efficiency of education expenditure, Fujian can strengthen its human capital and pave the way for sustained economic growth. As the province continues to modernize and integrate into the global economy, its ability to develop and retain a skilled workforce will be a key determinant of its success.

The province's policy makers must adopt solutions that encourage workers to invest in improving their skills and productivity, while also fostering a learning culture. In the context of climate change and limited local resources, Fujian's reliance on human capital will be critical in achieving its goal of becoming a leading province in the China and, eventually, a highly developed region in China by 2030.

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