Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3, 471-478
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i3.5241

Evaluating labor productivity in manufacturing enterprises in Vietnam

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Abstract: This study aims to explore the factors influencing labor productivity in manufacturing enterprises in Vietnam. The research employs descriptive statistical methods. The results confirm that human resources and the ability to utilize installed technology positively impact labor productivity. These findings align with previous studies. This study provides significant empirical evidence to assist managers and policymakers in formulating appropriate strategies to enhance labor productivity.

Keywords: *Labor productivity, Manufacturing enterprises, Technology.*

1. Introduction

Labor productivity affects not only the prosperity and living standards of an entire nation but also the survival and expansion of enterprises. Today, economic participants, including economists and managers, focus on this concept. Countries worldwide strive to improve labor productivity to escape poverty and transform into modern industrial nations. Given input factors such as capital and land, the need to enhance labor productivity for economic growth is increasing.

Numerous factors influence labor productivity. Identifying and studying these factors is crucial for policymakers, researchers, leaders, and business owners. In the context of international economic integration and intense competition, improving labor productivity is essential for business survival and growth. Productivity is a critical measure reflecting economic efficiency and can be assessed at different levels: national, industrial, organizational, corporate, and individual.

Manufacturing enterprises in Vietnam play a vital role in the national economy, most of which are relatively new. According to the General Statistics Office (GSO), the number of manufacturing enterprises increased significantly from 45,742 in 2010 to 111,077 in 2021 [1]. Although manufacturing enterprises accounted for only 15.4% of all businesses in Vietnam in 2021, their revenue contributed 39.4% to the total business revenue [1]. Furthermore, the workforce in manufacturing enterprises represents a significant share of the labor market. The 2022 annual report on Vietnamese enterprises by the Irwin [2] indicated that the manufacturing sector employed 7.6 million workers, accounting for 51.3% of the business workforce in 2021.

The management capacity of manufacturing enterprises and Vietnamese businesses remains limited. According to the 2019 Global Competitiveness Index by the World Economic Forum, Vietnam ranked 67th out of 141 countries. In a challenging economic environment with managerial capacity constraints, identifying appropriate drivers for sustainable growth to enhance competitiveness is a top concern for businesses, particularly small and medium-sized enterprises (SMEs). Companies must focus on strategy development, investment in marketing, research and development (R&D), modern technology adoption, and labor productivity improvement. These areas receive significant attention and priority. This study explores factors affecting labor productivity in manufacturing enterprises in Vietnam. The research

History: Received: 3 January 2025; Revised: 19 February 2025; Accepted: 20 February 2025; Published: 7 March 2025
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aims to contribute to existing theories on labor productivity while providing empirical insights for Vietnamese managers to enhance productivity within their organizations.

2. Theoretical Framework on Factors Affecting Labor Productivity

Based on Coelli, et al. [3] regarding four factors affecting Total Factor Productivity (TFP) growth, numerous theoretical and empirical studies analyze the determinants of TFP growth. Romer [4] and Lucas Jr [5] developed endogenous growth theory, explaining the origins of technological progress that classical growth theories could not. Endogenous growth theory does not consider technological progress as an exogenous factor but attributes it to influences such as human capital Lucas Jr [5] and investment in research and development [4].

Moreover, trade theory suggests that commerce increases knowledge related to technology, leading to technological advancements and, ultimately, higher total factor productivity. This theory argues that technological knowledge spreads through various channels, including imports of advanced goods and foreign direct investment (FDI) [6].

Institutional approaches emphasize creating an institutional environment that supports markets, such as property rights protection and contract enforcement. Works by Coase [7]; North [8]; Acemoglu and Robinson [9] and Djankov, et al. [10] reflect institutional aspects. According to this theory, institutional environments contribute to productivity by facilitating business operations and directing efforts toward productive activities. Thus, theoretically, labor productivity and technology play crucial roles in corporate.

3. Research Methodology

Various methods exist for measuring labor productivity. This study employs descriptive statistical methods, utilizing firm-level data from the annual surveys of the General Statistics Office (GSO). The dataset is processed to retain essential research indicators, removing unreasonable data such as firms with labor numbers or revenues less than zero and excluding firms with intermittent appearances during the study period. Data collected from 2010 to 2020 is used for calculations, with projections for 2021-2024. The study employs this dataset to compute productivity in Vietnam's manufacturing sector.

4. Results and Discussion

Vietnamese enterprises, particularly SMEs, face capital constraints, limited technological investment, weak production management experience, and low competitiveness. SMEs dominate Vietnam's business landscape, constituting approximately 98% of all enterprises.

Technological advancement in businesses remains outdated, and firms engage minimally in innovation activities. Research indicates that companies engaged in R&D exhibit labor productivity 19.3% higher than those that do not. However, the proportion of firms investing in R&D in Vietnam remains low. Additionally, Vietnamese businesses are not deeply integrated into global supply chains, limiting their ability to leverage knowledge spillovers, technology, and labor productivity from multinational corporations.

The technological level of enterprises remains outdated, and their participation in innovation-related activities is still limited. Research indicates that enterprises engaging in research and development (R&D) activities exhibit labor productivity levels that are 19.3% higher than those of other enterprises. However, the proportion of businesses investing in R&D activities in Vietnam remains low. Additionally, Vietnamese enterprises have yet to deeply integrate into the global supply chain, thereby failing to leverage the spillover effects of knowledge, technology, and labor productivity from multinational corporations to domestic firms.

The results are illustrated in Figure 1, which presents the revenue trends of three technological activity groups (High, Medium, and Low) over time:

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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- High-tech group (Green): Revenue has consistently increased from 2010 to 2020, followed by a sharp rise up to 2024. This group maintains the highest revenue among the three.
- Medium-tech group (Yellow): Revenue growth is slower compared to the other two groups but shows a steady upward trend from 2010 to 2024. Projections indicate continued growth, though it remains significantly lower than the other groups.
- Low-tech group (Red): Revenue has gradually increased over time but was surpassed by the high-tech group in 2016. By 2024, it continues to grow, albeit at a slower pace than the high-tech group.

Thus, the high-tech group demonstrates strong growth potential, likely due to investments in R&D and technological innovation. The medium- and low-tech groups exhibit slower growth rates and require well-defined development strategies to bridge the gap with the high-tech sector.

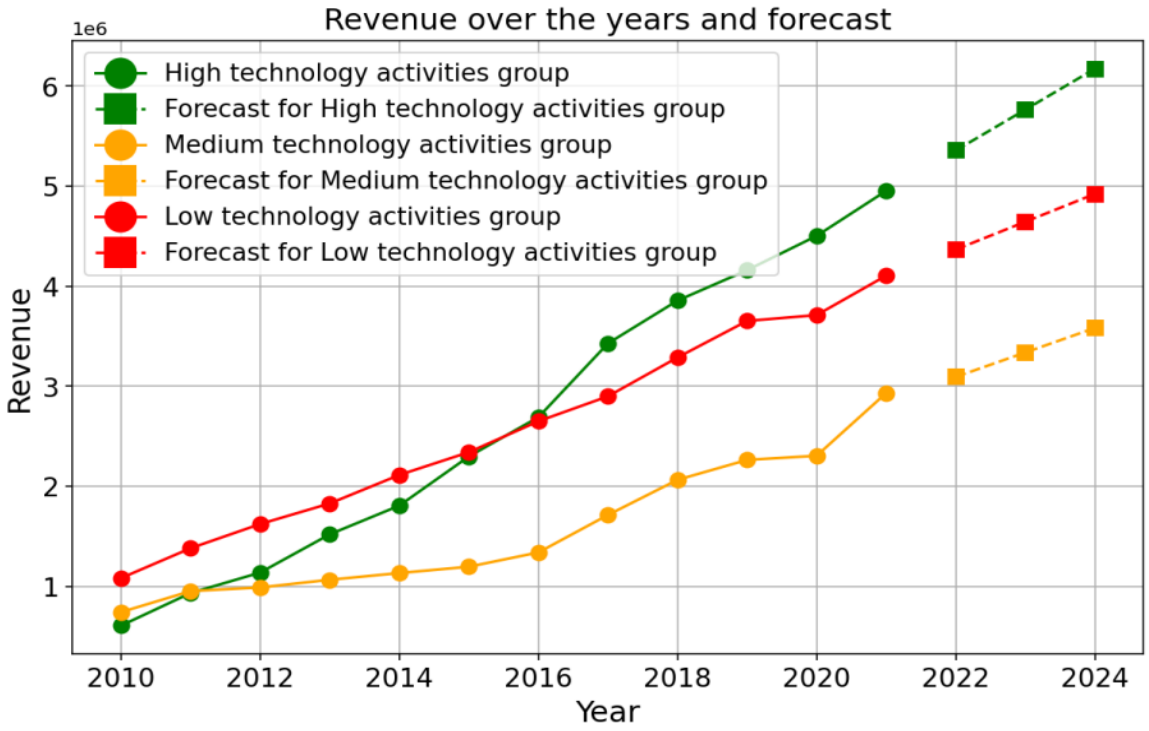

Figure 1.
Descriptive statistical analysis and revenue forecasting by technology level.
Source: Author's calculation from data conducted by GSO from 2010 – 2024.

Here is the scientific English translation of the given passage:

For a nation, GDP growth that relies solely on the expansion of low-skilled employment, low technological levels, and an unskilled workforce is often limited and unsustainable. In contrast, GDP growth driven by increased labor productivity (LP), though posing significant challenges—particularly for a country like Vietnam, where the workforce has a long-standing agricultural mindset and a relatively low proportion of formally trained workers—offers a promising pathway to achieving high, sustainable growth and enhancing economic competitiveness.

Figure 2 illustrates the trend of GDP in the manufacturing sector over time. The sector has experienced strong growth, particularly after 2019. In the initial phase (2010–2014), GDP growth was slow, whereas in the subsequent phase (from 2015 onward), the growth rate accelerated. The breakthrough observed after 2019 suggests that the manufacturing sector may have undergone

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significant transformations in technology, investment capital, or supportive policies. The continued upward trend reflects the sector's positive development trajectory.

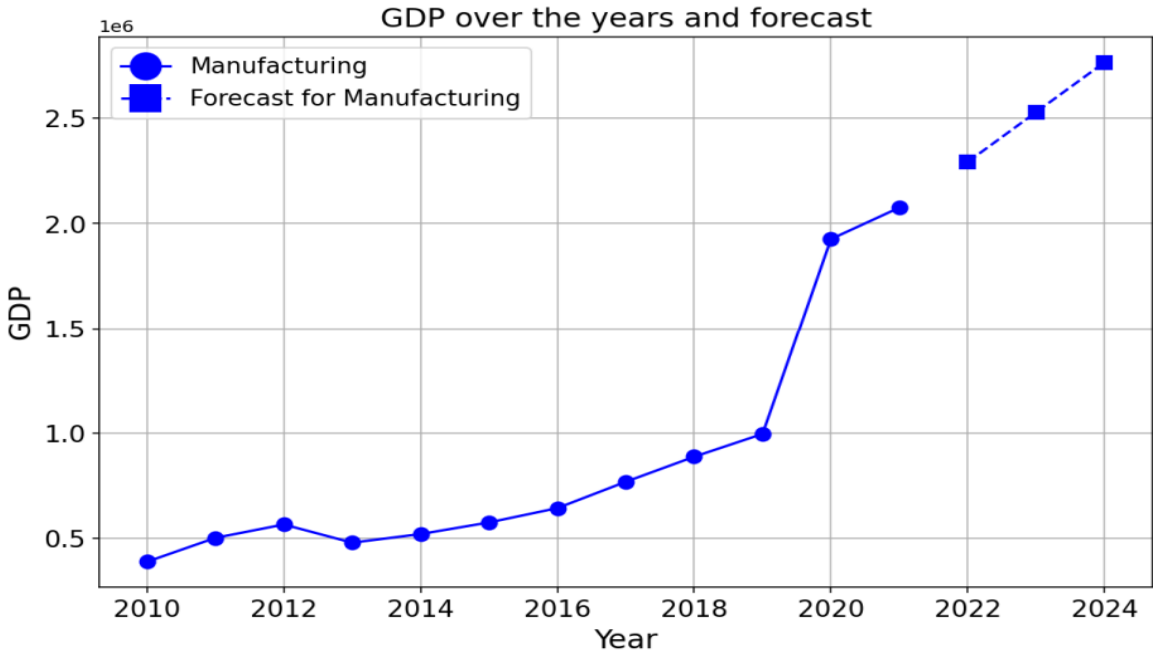

Figure 2.
Descriptive Statistical Analysis and GDP Forecast.
Source: Author's calculation from data conducted by GSO from 2010 – 2024.

Most enterprises in Vietnam, particularly private businesses, exhibit a low level of technological advancement and innovation. A significant number of firms continue to rely on outdated and obsolete technologies, lagging behind global technological standards by two to three generations. This underscores the necessity for Vietnam to further develop a conducive environment, along with new institutional frameworks and policies, to foster technological advancement and innovation within the business sector. This is considered a critical aspect of the country's economic growth model transformation.

Figure 3 illustrates the profitability trends of three technology groups (High, Medium, and Low) over time.

- High-tech group (Purple): In the early period (2010–2014), profitability gradually increased but remained somewhat unstable. Between 2015 and 2020, the sector experienced significant growth, with sharp surges in certain years. After 2020, profits showed signs of stabilization, although slight fluctuations persisted.
- Medium-tech group (Green): This group had the lowest profitability among the three during the initial period (2010–2014). Post-2015, there were signs of growth, albeit slow and inconsistent. Notably, a sharp increase in profitability was observed in 2020.
- Low-tech group (Red): Profitability remained at a moderate level but exhibited strong year-to-year fluctuations. After 2015, certain years saw sharp profit spikes, though these were not sustained. Growth continued, but with significant volatility.

The high-tech group consistently maintained the highest profitability and is expected to remain the leading sector. The medium-tech group demonstrated slow growth but holds potential for rapid expansion in the future. Meanwhile, the low-tech group exhibited substantial fluctuations yet continued

to grow steadily. Forecasts indicate a positive growth trajectory for all three groups, with the high-tech sector expected to lead in technological and financial performance.

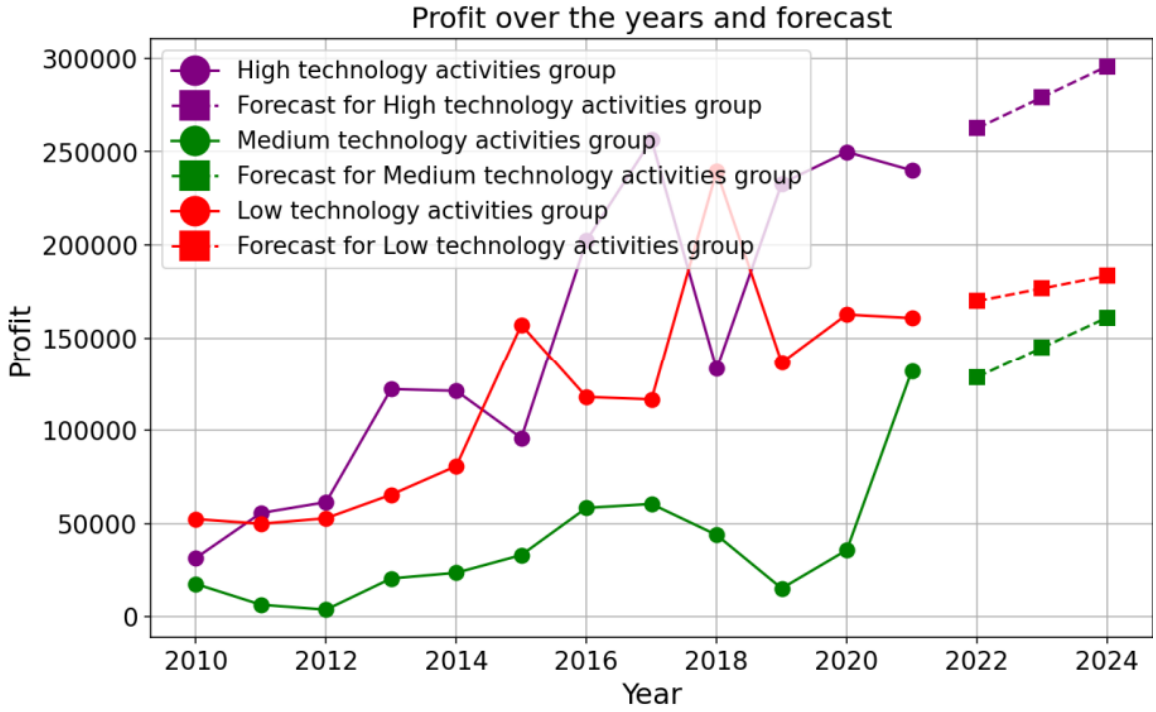

Figure 3.
Descriptive statistical analysis and profit forecasting.
Source: Author's calculation from data conducted by GSO from 2010 – 2024.

Figure 4 illustrates the changes in the manufacturing workforce from 2010 to 2024.

- 2010–2014: The labor force grew slowly, fluctuating between 6,500 and approximately 7,500.
- 2014–2018: The growth rate accelerated, reaching nearly 11,000 by 2018.
- 2018–2022: A stabilization phase occurred, with no significant growth, as the labor force hovered around 11,000–11,500.
- 2022–2024: The upward trend resumed, with projections indicating a workforce exceeding 13,000 by 2024.

The strong growth from 2014 suggests the presence of driving factors such as increased investment in manufacturing or rising market demand. The stabilization period from 2018 to 2022 may reflect the impact of macroeconomic factors, such as economic downturns or changes in labor policies. Projections indicate a positive outlook for the manufacturing sector, particularly if favorable influencing factors persist.

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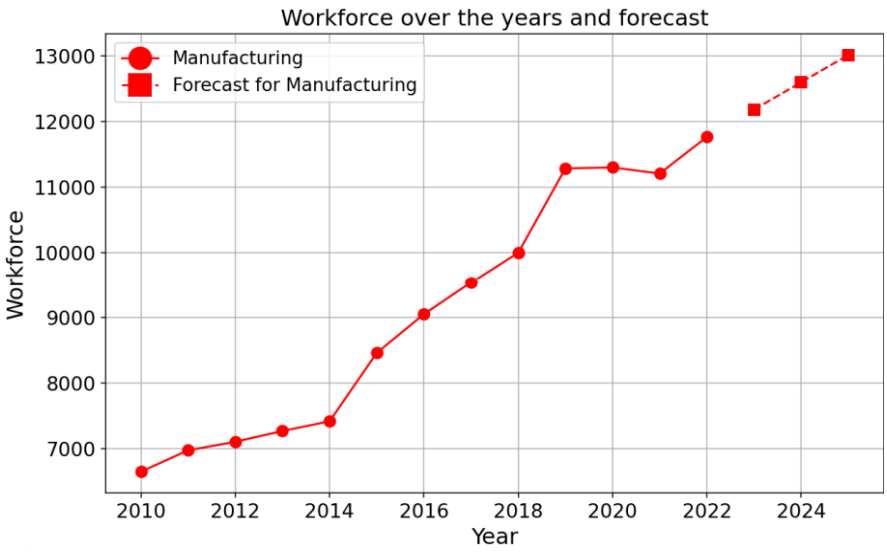

Figure 4.
Descriptive statistical analysis and workforce forecast.
Source: Author's calculation from data conducted by GSO from 2010 – 2024.

Figure 5 illustrates the changes in manufacturing productivity from 2010 to 2024. Productivity shows a gradual upward trend over time, with a significant breakthrough after 2020.

The post-2019 growth trend may be attributed to factors such as new technologies, improvements in production processes, or increased investment in automation. The stagnation phase from 2012 to 2019 could reflect a slowdown in innovation or the impact of external factors on production.

Projections indicate continued productivity growth, which could be a positive signal for the manufacturing sector, particularly if supportive development policies remain in place.

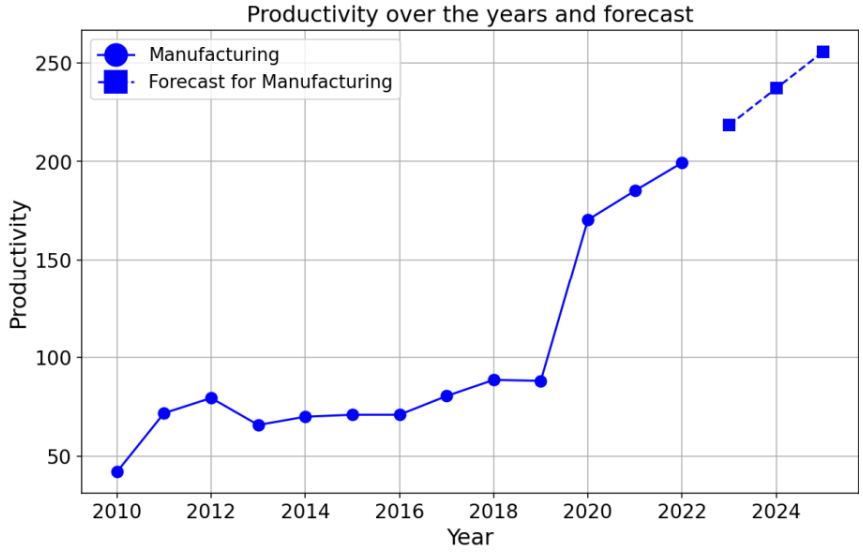

Figure 5.
Descriptive statistical analysis and productivity forecast.
Source: Author's calculation from data conducted by GSO from 2010 – 2024.

The proportion of trained workers remains low, with an imbalanced training structure, a shortage of highly skilled labor, and a significant gap between vocational education and labor market demands.

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Although the proportion of workers aged 15 and above who have received formal training has gradually increased over the years, by 2011, only 15.4% of the workforce held a degree or certificate, rising to 21.9% in 2018. This means that as of now, approximately 42.4 million workers-accounting for 78.1% of the total labor force-have not undergone any formal technical training.

Moreover, Vietnam's labor structure by educational attainment remains unbalanced. In 2015, the ratio of workers with university-level education or higher to those with college, intermediate, and elementary vocational training was 1-0.35-0.63-0.38, highlighting a shortage of practical engineers and highly skilled technical workers. Additionally, youth unemployment and the mismatch between job requirements and workers' qualifications remain prevalent issues. A large segment of the workforce lacks training in industrial labor discipline, teamwork skills, collaboration abilities, risk tolerance, and innovation. These factors pose significant barriers to improving labor productivity (LP). Furthermore, population aging is expected to have a considerable impact on Vietnam's LP in the future. Figure 6 illustrates the proportion of trained workers across different age groups from 2010 to 2024: The 25-29, 30-34, and 35-39 age groups have the highest training rates (35-40% in 2024). The 15-19 age group exhibits the lowest training rates (5-10%), with little improvement over time.The 50+ age group has a relatively low training rate but shows a slight upward trend. From 2010 to 2018, there was a stable increase in training rates across all groups. Between 2018 and 2022, some groups experienced stagnation, particularly the 20-24 and 30-34 age groups. By 2024, most age groups continue to exhibit slight growth in training rates.

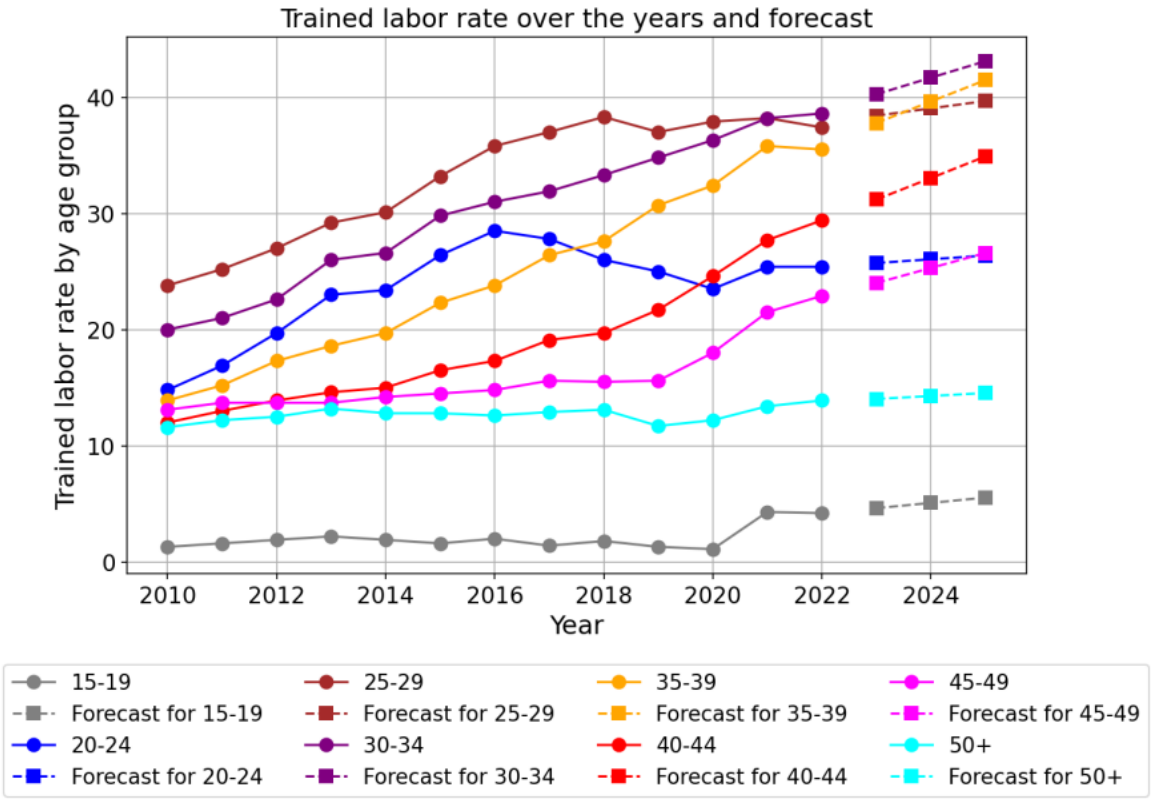

Figure 6.
Descriptive statistical analysis and forecast of the trained labor rate by age group.
Source: Author's calculation from data conducted by GSO from 2010 – 2024.

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5. Conclusion

Vietnam has made significant efforts to reform and improve its economy, creating momentum for growth. However, productivity bottlenecks remain, affecting economic restructuring and growth model transformation. The market economy lacks synchronization, particularly in labor, technology, and real estate markets. Given Vietnam's low starting point and ongoing transition, developing productivity-specific markets is challenging due to an incomplete and inconsistent legal framework.

The study provides empirical evidence for policymakers to formulate strategies enhancing labor productivity. Key recommendations include investing in technology and human capital, promoting technology transfer, and encouraging private sector innovation to enhance competitiveness and sustainability in Vietnam's manufacturing industry.

Funding:

This research was conducted under the research project QG, code QG.22.73, "Measuring the Impact of Training on Labor Productivity: The Case of the Manufacturing Industry in Vietnam," at Vietnam National University, Hanoi.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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