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The impact of structural transformation of industries on the GRDP growth of Hanoi city, Vietnam

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ABTRACT: Industrial restructuring is considered one of the key drivers of long-term economic growth through the mechanism of resource reallocation and improvement of average productivity. In the context of strong urbanization and service development in major economic centers, assessing the impact of industrial restructuring at the local level is crucial for sustainable development policy planning. This study analyzes the impact of industrial restructuring on Gross Domestic Product (GDP) growth in Hanoi during the period 2010-2024. Based on the theoretical framework of structural restructuring and productivity growth, the study uses a time series quantitative method combined with a lagged autoregression model to estimate the short-term and long-term impacts between variables. Empirical results show that industrial restructuring has a positive and statistically significant impact on GDP growth in the area. Growth decomposition analysis reveals that Hanoi's growth is driven by both intra-industry productivity enhancement and inter-industry resource reallocation, with intra-industry components accounting for a larger proportion but reallocation still contributing significantly. The research results imply that the quality of structural transformation, particularly in the process of service industrialization and industrial upgrading, plays a key role in the city's sustainable growth.

Keywords: Industrial restructuring; GRDP growth; Resource reallocation; Intra-industry productivity; Service modernization; Hanoi.

1. INTRODUCTION

In modern development economics, structural transformation is considered one of the core drivers of long-term economic growth. From classic studies on structural transformation from agriculture to industry and services, many scholars have asserted that the redistribution of resources among sectors can fundamentally alter the growth trajectory of an economy (Chenery & Syrquin, 1975; Kuznets, 1966). According to Lewis's (1954) argument, the shift of labor from low-productivity sectors to higher-productivity sectors creates room for increased output and capital accumulation, thereby promoting sustainable growth. Later studies further emphasize that structural transformation is not only a consequence of growth but also a direct cause of growth through the redistribution effect and enhancement of total factor productivity (Mcmillan & Rodrik, 2011; Timmer, de Vries & de Vries, 2015).International empirical evidence shows that the contribution of structural shifts to growth depends strongly on the quality of the resource reallocation process. When labor and capital are shifted to higher-productivity sectors, the economy can achieve a "shift reward" through an increase in average productivity (Duarte & Restuccia, 2010). Conversely, if resources shift to low-productivity sectors or slow productivity growth, structural shifts can dampen overall growth rates (Mcmillan & Rodrik, 2011). This is particularly important for developing economies and large cities, where serviceization is rapid but uneven in terms of value-added quality (Herrendorf, Rogerson & Valentinyi, 2014).

In the context of globalization and the shift towards productivity-based growth models, many studies emphasize the role of industry structure in determining resource efficiency and technology diffusion (Rodrik, 2013; Szirmai, 2012). Analyses based on cross-border data indicate that the processing and manufacturing industries often have a stronger capacity for learning effects, technology accumulation, and value chain linkages, thereby contributing positively to long-term growth (Szirmai, 2012). However, in modern urban economies, the service sector can become a growth driver if upgraded towards knowledge-based and high value-added services (Timmer et al., 2015). Thus, the essence of structural transformation lies not in a simple change in proportion, but in the quality and productivity of the resource-receiving industries.

For Vietnam, many studies note a strong structural transformation process over the past three decades, with a trend towards a decrease in the proportion of agriculture and an increase in the proportion of industry and services (Nguyen, 2018; ADB Institute, 2017). However, the level of contribution of structural transformation to growth still varies among localities and depends on regional economic characteristics, institutional quality, and innovation capacity (Timmer et al., 2015; Rodrik, 2013). In this context, Hanoi, as the country's major political, economic, and service center, has undergone rapid serviceization and urbanization. The city's value-added structure is increasingly skewed towards the service and industrial-construction sectors, while the agricultural sector accounts for an increasingly smaller proportion.

However, the question arises whether the structural shift in Hanoi's industries truly creates sustainable growth momentum for the Gross Domestic Product. According to McMillan and Rodrik (2011), to assess the impact of structural shift, it is necessary to distinguish between growth due to increased intra-industry productivity and growth due to the reallocation of resources between industries. If the shift primarily involves expanding low-productivity service industries, the positive effect on growth may be limited (Herrendorf et al., 2014). Conversely, if the structural shift is linked to the development of high-tech industries and knowledge-based services, the contribution to growth can be significant (Szirmai, 2012; Rodrik, 2013).Although there have been many studies on structural transformation at the national level, quantitative studies at the urban level, especially for Hanoi, are relatively limited and have not clarified the mechanisms by which structural transformation of industries impacts the growth of the Gross Domestic Product. This gap highlights the need for in-depth research to systematically assess the relationship between structural transformation of industries and economic growth in Hanoi in the context of transforming its growth model towards productivity and innovation-based growth.Based on a synthesis of theoretical frameworks and international empirical evidence (Lewis, 1954; Kuznets, 1966; Chenery & Syrquin, 1975; McMillan & Rodrik, 2011; Duarte & Restuccia, 2010; Herrendorf et al., 2014; Szirmai, 2012; Rodrik, 2013; Timmer et al., 2015), this study aims to analyze the impact of structural shifts in industries on Gross Domestic Product growth in Hanoi. The research not only measures the degree of structural change over time but also examines the quality of resource reallocation and the role of intra-industry productivity in determining growth. Through this, the paper contributes empirical evidence at the urban level, helping to refine the scientific basis for sustainable economic development policy planning in Hanoi in the coming period.

2. THEORETICAL FOUNDATION

Theory of structural transformation and laws of economic development: The theory of structural transformation is based on classic works on economic development, which emphasize the law of resource transfer from low-productivity sectors to higher-productivity sectors as an inevitable driver of long-term growth (Lewis, 1954; Kuznets, 1966). According to Lewis's (1954) two-sector model, surplus labor in agriculture can be absorbed by the modern industrial sector, thereby increasing average productivity and capital accumulation for the entire economy. Kuznets (1966) further asserted that economic growth is accompanied by structural changes in the sectors, especially the decline in the proportion of agriculture and the increase in the role of industry and services. Later empirical studies showed that structural shifts are not only a consequence of growth but also an endogenous factor determining the rate of growth (Chenery & Syrquin, 1975). The redistribution of labor and capital between industries can generate an increase in total factor productivity if resources are allocated to more efficient industries (Herrendorf, Rogerson & Valentinyi, 2014). This reinforces the argument that industry structure is a crucial component in the modern growth model.

The mechanism of impact of structural transformation on economic growth. In the modern analytical framework, the impact of structural shifts on growth is explained through two main channels: increasing intra-industry productivity and reallocating resources among industries. McMillan and Rodrik (2011) point out that productivity growth in the economy can be broken down into an "intra-industry" component

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and a “relocation” component. If labor shifts from low-productivity industries to high-productivity industries, the reallocation effect will contribute positively to growth. Conversely, if the shift occurs in the direction of expanding low-productivity industries, growth may be hampered.

Duarte and Restuccia (2010) demonstrated that productivity differences between sectors are a determining factor in the rate of structural transformation and the degree of growth convergence between countries. When the productivity gap between sectors is large, the potential for growth from redistribution is higher. However, the effectiveness of this process depends on the institutional environment, the degree of flexibility of the labor market, and the ability to absorb technology (Rodrik, 2013).Timmer, de Vries and de Vries (2015) emphasize that in the modern context, the service sector can play a role in driving growth if structural transformation is accompanied by improved productivity and increased knowledge content. Therefore, the essence of structural transformation is not only changing the proportion of industries but also improving the quality and efficiency of the industries receiving resources.

Structural transformation in the urban economy and the role of services. For large cities, structural transformation is often reflected in the rapid trend towards service development. Herrendorf, Rogerson, and Valentinyi (2014) argue that as income increases, the demand for services tends to increase, leading to the expansion of the service sector in the value-added structure. However, the contribution of services to growth depends on the internal structure of this sector. Szirmai (2012) points out that the processing and manufacturing industry plays a particularly important role in the early stages of development due to its ability to create learning and technology diffusion effects, while services only truly become a growth driver when they reach a high level of development and have high added value. Rodrik (2013) warned about the phenomenon of "premature deindustrialization," in which many developing economies shift to services while productivity and industrial levels are still low, leading to the risk of slowing growth. This shows that the structural transformation process in urban areas like Hanoi needs to be evaluated not only in terms of the degree of change in proportion but also in terms of the quality of growth of each sector.

Framework for analyzing the impact of structural transformation on Gross Domestic Product growth in the region.

Based on theoretical arguments and international empirical evidence (Lewis, 1954; Kuznets, 1966; Chenery & Syrquin, 1975; McMillan & Rodrik, 2011; Duarte & Restuccia, 2010; Herrendorf et al., 2014; Szirmai, 2012; Rodrik, 2013; Timmer et al., 2015), an analytical framework for this study can be constructed as follows: structural shifts in industries impact Gross Domestic Product growth through two main mechanisms: redistribution of resources among industries and enhancement of intra-industry productivity. The extent and direction of the impact depend on the characteristics of the resource-receiving industries, the quality of institutions, and the local capacity for innovation.

In the context of Hanoi, as the country's major economic and service center, the process of service industrialization and industrial upgrading is occurring simultaneously. Therefore, empirical testing of the relationship between structural industry shifts and Gross Domestic Product growth is necessary to determine whether the city is benefiting from the "shifting reward" or facing the risk of reduced growth efficiency due to suboptimal reallocation. This theoretical framework provides the foundation for building the research model and conducting quantitative testing in the following sections of the paper.

3. RESEARCH METHODOLOGY

Approach: The study was conducted using a quantitative approach, based on the theoretical framework of structural transformation and economic growth that has been confirmed in international studies. This approach views structural transformation of industries as a dynamic economic variable, capable of impacting growth through the reallocation of resources and changes in the average productivity of the economy (Mcmillan & Rodrik, 2011; Duarte & Restuccia, 2010).

Based on this, the study chooses a time-series econometric approach to examine the relationship between structural transformation of industries and Gross Domestic Product growth in Hanoi. The use of time-series data allows for the analysis of structural transformation trends in the context of urban development, while also assessing both the short-term and long-term impacts of this process on economic growth (Timmer, de Vries & de Vries, 2015). The research approach ensures consistency with the presented theoretical framework, according to which structural shifts not only reflect changes in the proportion of industries but also demonstrate the quality of resource allocation and operational efficiency of each economic sector (Herrendorf, Rogerson & Valentinyi, 2014).

Research model

The research model was developed to analyze the impact of structural shifts in industries on the growth of Gross Domestic Product in Hanoi. The dependent variable of the model is the growth rate of Gross Domestic Product at constant prices, measured by the first-order difference of the natural logarithm of the actual Gross Domestic Product. This measurement method is consistent with the standards in economic growth research and helps to limit heteroskedasticity (Rodrik, 2013).

The central independent variable is the degree of structural shift in the sector, represented by indicators such as the change in the proportion of value added between economic sectors, the structural concentration index, and the shift index according to the Lilien method. The use of multiple indicators allows for reflecting both the direction and intensity of structural change (Chenery & Syrquin, 1975; Duarte & Restuccia, 2010).

Furthermore, the model incorporates control variables to eliminate the impact of other factors on growth, including: realized investment capital in the area, the size of the workforce, and the level of foreign direct investment attraction. Controlling for these factors is consistent with the growth analysis framework based on capital, labor, and productivity (Lewis, 1954; McMillan & Rodrik, 2011).

The general form of the model can be represented as follows:

The growth of the Gross Regional Product at time t depends on the degree of structural shift in the industry and the control variables at the same time and at lagged time points.

To reflect dynamic relationships and the potential for long-term effects, the study uses a lagged autoregressive model. This approach allows for simultaneous estimation of short-term and long-term effects between variables under conditions where the data series may differ in degree of integration (Timmer et al., 2015).

Research hypothesis system

Based on theoretical foundations and international empirical evidence, the study proposes the following system of hypotheses:

Hypothesis 1: Shifting the industrial structure towards increasing the proportion of high-productivity industries has a positive impact on the growth of Gross Domestic Product in Hanoi (Mcmillan & Rodrik, 2011; Duarte & Restuccia, 2010).

Hypothesis 2: The greater the intensity of structural shift, the more pronounced the impact on growth, if the redistribution process occurs efficiently (Chenery & Syrquin, 1975; Herrendorf et al., 2014).

Hypothesis 3: The impact of structural transformation on growth is realized through two main channels: improving intra-industry productivity and reallocating resources among industries (Mcmillan & Rodrik, 2011).

Hypothesis 4: If structural shifts primarily expand low-productivity service sectors, the impact on growth may be negligible or negative (Rodrik, 2013; Szirmai, 2012).

This system of hypotheses ensures consistency between the theoretical framework and the empirical model, while also allowing for the testing of both the direction and mechanisms of structural transformation.

Data analysis methods

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Data analysis is performed in four steps.

Firstly, descriptive statistics are used to reflect trends in the structural changes of industries and the growth rate of Gross Domestic Product in the area over the years. Means, standard deviations, and coefficients of variation are calculated to assess the distribution characteristics of the data.Secondly, stationarity testing of the data series is performed to determine the degree of integration of the variables. This helps in selecting an appropriate estimation model and avoiding spurious regression (Timmer et al., 2015).

Third, a lagged distributed autoregression model was estimated to determine the short-term and long-term impacts of sectoral structural shifts on growth. Diagnostic tests such as residual autocorrelation, heteroskedasticity, and parameter stability were conducted to ensure the reliability of the results.

Fourth, growth decomposition analysis is applied to separate the contributions of intra-industry growth and redistribution among industries. The decomposition results allow us to determine whether Hanoi's growth mainly comes from improvements in intra-industry productivity or from structural transformation, thereby clarifying the assumed mechanisms of impact in the model (Mcmillan & Rodrik, 2011; Duarte & Restuccia, 2010).This data analysis approach ensures scientific rigor, systematic approach, and alignment with the research objectives, while also providing a solid foundation for the results and discussion in the subsequent sections of the paper.

4. RESEARCH RESULTS AND DISCUSSION

Descriptive statistics and trends in industry structural transformation.

Table 1 presents descriptive statistics of the variables used in the research model for the period 2010-2024, including the growth rate of Gross Regional Product, the sectoral structural shift index, the structural concentration index, social investment capital, labor, and realized foreign direct investment.

Table 1. Descriptive statistics of research variables for the period 2010-2024

Variable	Medium	Standard deviation	Minimum value	The greatest value
GRDP growth (%)	7.20	1.56	2.51	8.04
Lilien Index	0.0089	0.0026	0.0037	0.0130
HHI structure	0.5061	0.0194	0.4774	0.5369
Social investment (trillion VND)	368.3	104.7	220	535
Labor force (million people)	4.12	0.28	3.70	4.58
Realized FDI (billion USD)	2.54	0.86	1.3	4.0

(Source: Results of survey data processing by the authors, 2026)

Descriptive statistics show that the average annual growth rate of Hanoi's Gross Domestic Product (GDP) reached 7.20% during the study period, reflecting relatively high and stable growth, except for 2020, which was negatively impacted by the pandemic. The standard deviation of 1.56 indicates that growth fluctuations were not excessive, consistent with the characteristics of a diversified urban economy.The structural shift index according to the Lilien method has an average value of 0.0089, with a maximum of 0.0130, reflecting periods of stronger structural redistribution, especially during the transitional years between industry and services. The Herfindahl-Hirschman structural concentration index gradually increased over time, from 0.4774 to 0.5369, indicating that the economic structure is increasingly concentrated in the service sector. This trend is consistent with the serviceization process in urban economies.Social investment capital and the size of the workforce have both shown a continuous upward trend, providing a foundation for growth. Foreign direct investment has increased relatively steadily, although there was a temporary decline in 2020 before a strong recovery afterward.

To clarify the preliminary linear relationship between the variables, Table 2 presents the Pearson correlation matrix.

Table 2. Correlation matrix between variables

Variable	Growth	Lilien	HHI	Invest	Labor	FDI
Growth	1.00	0.42	0.38	0.55	0.47	0.51
Lilien	0.42	1.00	0.61	0.34	0.29	0.30
HHI	0.38	0.61	1.00	0.48	0.44	0.45
Invest	0.55	0.34	0.48	1.00	0.72	0.63
Labor	0.47	0.29	0.44	0.72	1.00	0.58
FDI	0.51	0.30	0.45	0.63	0.58	1.00

(Source: Results of survey data processing by the authors, 2026)

The results show that the growth of the Gross Regional Product has a positive correlation with the structural transformation index and the structural concentration index, with correlation coefficients of 0.42 and 0.38, respectively. This implies that the intensity of structural transformation and the level of serviceization are positively related to economic growth. Growth also has a fairly strong correlation with social investment and foreign direct investment, consistent with the theory of growth based on capital accumulation and economic integration.Although correlation does not equate to causation, these preliminary results provide a reasonable basis for conducting econometric model estimation in subsequent subsections to more rigorously examine the impact of sectoral structural shifts on Gross Domestic Product growth in Hanoi.

Results of stationarity testing and selection of estimation models

Before proceeding with the impact model estimation, the study performed stationarity tests on the data series to avoid spurious regression and determine the degree of integration of each variable. Unit tests were conducted on the variables including Gross Regional Product growth, Lilien structural shift index, structural concentration index, social investment capital, labor, and foreign direct investment.

Table 3. Stationarity test results

Variable	Verification statistics	Critical value 5%	Conclude
GRDP growth	-3.87	-3.00	Stop at this level
Lilien Index	-3.42	-3.00	Stop at this level
HHI structure	-2.11	-3.00	Not stopping at
HHI (first-order difference)	-4.26	-3.02	Stop after difference
Social investment	-1.95	-3.00	Not stopping at
Investment (difference)	-4.01	-3.02	Stop after difference
Labor	-2.08	-3.00	Not stopping at
Labor (difference)	-3.75	-3.02	Stop after difference
FDI implementation	-2.54	-3.00	Not stopping at this level
FDI (differential)	-4.18	-3.02	Stop after difference

(Source: Results of survey data processing by the authors, 2026)

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The results show that the Gross Regional Product growth variable and the Lilien index are stationary series, while variables such as the structural concentration index, social investment, labor, and foreign direct investment are non-stationary series but become stationary after first-order difference selection. Thus, the variables have mixed integration order, consistent with the conditions for applying a lagged distributional autoregression model to estimate the short-term and long-term relationship between structural transformation and growth.

Results of the model estimating the impact of structural transformation on growth.

After determining the optimal lag structure based on information criteria, a distributed lag autoregression model was estimated with the dependent variable being the growth rate of Gross Domestic Product in the area and the central independent variable being the Lilien index. The results are presented in Table 4.

Table 4. Results of the structural shift impact model estimation.

Variable	Estimated coefficients	Standard error	Value t	Significance level
Constant	1.84	0.92	2.00	0.069
Lilien Index	125.30	45.70	2.74	0.018
Investment (difference)	0.012	0.004	3.00	0.011
Labor (difference)	1.85	0.73	2.53	0.026
FDI (differential)	0.41	0.19	2.16	0.049
Error correction factor	-0.61	0.18	-3.39	0.006
R squared	0.72			

(Source: Results of survey data processing by the authors, 2026)

The estimation results show that the structural transformation index has a positive coefficient and is statistically significant at the 5% level. This implies that as the intensity of structural transformation increases, the growth rate of the Gross Regional Product also increases. The coefficient of 125.30 reflects that a small increase in the structural transformation index can have a significant impact on growth, consistent with the theoretical argument about the role of resource reallocation in improving average productivity.

The control variables all have positive and statistically significant coefficients, indicating that investment, labor expansion, and attracting foreign direct investment continue to be important drivers of Hanoi's economic growth. The error correction coefficients are negative and statistically significant, confirming the existence of a long-term equilibrium relationship between structural transformation and growth, and also showing a relatively rapid rate of adjustment to equilibrium.

Mechanism analysis through growth decay.

To clarify the mechanism of impact, the study decomposed productivity growth into two components: intra-industry growth and redistribution between industries. The results are presented in Table 5.

Table 5. Decomposition contributes to average productivity growth (%)

Stage	Internal industry	Reallocation	Interact	Total
2010-2014	4.10	1.35	0.22	5.67
2015-2019	4.25	1.52	0.28	6.05
2020-2024	3.60	1.20	0.19	4.99

(Source: Results of survey data processing by the authors, 2026)

The analysis results show that the majority of productivity growth comes from improvements within each sector, accounting for approximately 70-75% of the total increase. However, the contribution of structural reallocation remains significant, ranging from 1.20% to 1.52% depending on the period. This indicates that Hanoi not only grew thanks to improved efficiency within each sector but also benefited from the shift of resources towards higher value-added sectors, especially services and processing industries.During the period 2020-2024, the contributions of both components decreased compared to the previous period due to the impact of economic shocks, but the positive trend was maintained. Thus, the empirical results support the hypothesis that the structural shift in Hanoi's industries created a "shifting reward," contributing to the enhancement of Gross Domestic Product growth through both intra-industry and redistribution channels.

Testing the research hypothesis system.

Based on the model estimation results and growth decomposition, the study proceeded to test each hypothesis proposed in the methods section.

Regarding Hypothesis 1 concerning the positive impact of structural industry shifts on Gross Domestic Product growth, the coefficient of the Lilien index in Table 4 is positive and statistically significant at the 5% level. This indicates that as the intensity of structural reallocation increases, Hanoi's economic growth rate also increases. This result is consistent with the theoretical argument that reallocating resources to high-productivity industries creates an effect of increasing the average productivity of the entire economy. Therefore, Hypothesis 1 is accepted.Regarding Hypothesis 2 concerning the role of structural shift intensity, the analysis shows that periods with higher Lilien indices, particularly 2013-2014 and 2016-2018, also correspond to years with relatively high and stable growth rates. The large estimated coefficient of the Lilien variable in the model confirms that not only the direction of shift but also the intensity of shift is significant for growth. Thus, Hypothesis 2 is supported by empirical results.Regarding Hypothesis 3 concerning the mechanism of impact through two channels—intra-industry and redistribution—the decomposition results in Table 5 show that the redistribution component accounts for approximately 20-25% of the total average productivity increase, while the intra-industry component accounts for a larger proportion. This confirms that structural transformation plays an independent role alongside intra-industry productivity enhancement, thus accepting Hypothesis 3.

Regarding Hypothesis 4 concerning the potential for negative impacts if the shift occurs in an inefficient manner, empirical results show no negative signs during the study period. The coefficient of the structural concentration index in the expanded models remains positive, and there is no evidence of statistically significant negative impacts. This implies that Hanoi's service-oriented development process during the 2010-2024 period has not led to a decrease in growth efficiency. However, the contribution of reallocation tends to decrease slightly in the post-pandemic period, suggesting the need for continued monitoring of the quality of the shift in subsequent years.

Reliability testing and model diagnosis

To ensure the robustness of the results, the study conducted diagnostic tests on the estimation model. The results are presented in Table 6.

Table 6. Results of model diagnostic validation

Inspection	Statistical	p-value	Conclude
Autocorrelation of residuals	1.85	0.18	There is no autocorrelation.
Heteroskedasticity	0.94	0.41	No heteroskedasticity
Parameter stabilization	Meets the conditions		Stable model

(Source: Results of survey data processing by the authors, 2026)

The test results showed that the residuals of the model were not autocorrelated and did not exhibit heteroskedasticity at the usual significance level. Simultaneously, the parameter stability test confirmed that the model maintained stability throughout the entire study period. This strengthens the reliability of the estimation results and allows the coefficients to be used to interpret policy.

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The synthesis of quantitative analysis results shows that the structural transformation of industries in Hanoi during the period 2010-2024 had a positive and statistically significant impact on the growth of the Gross Domestic Product. The city's growth stemmed not only from capital accumulation and labor expansion but also from the reallocation of resources to higher value-added industries. Simultaneously, the combination of improved intra-industry productivity and structural transformation created a relatively sustainable growth foundation for the urban economy.

Sensitivity analysis and alternative models

To test the robustness of the estimation results, the study conducted a sensitivity analysis by replacing the variable representing structural shift and adjusting the model specifications. Specifically, instead of using the Lilien index as the central independent variable, the model was re-estimated with the Herfindahl-Hirschman structural concentration index and with the variable representing the change in the proportion of the service sector in the Gross Domestic Product.

The results of the alternative model estimation are presented in Table 7.

Table 7. Results of the alternative model with different representative variables for structural shift.

Variable	Model 1 (HHI)	Model 2 (Changes in service proportion)
Structural variables	18.42**	0.31**
Investment (difference)	0.010**	0.011**
Labor (difference)	1.72**	1.68**
FDI (differential)	0.39*	0.37*
Error correction factor	-0.58**	-0.60**
R squared	0.69	0.71

Note: ** is significant at the 5% level; * is significant at the 10% level.

(Source: Results of survey data processing by the authors, 2026)

The results show that the coefficients of the variable representing the structure in both models are positive and statistically significant. This confirms the consistency of the results: whether measuring structural shift by concentration index or by the increase in the proportion of services, the impact on Gross Domestic Product growth remains positive.

The model using changes in the service sector's share shows that when the service sector's share increases by one percentage point, the economic growth rate tends to increase correspondingly. This result reflects that the serviceization process in Hanoi during the study period did not diminish the effectiveness of growth but, on the contrary, contributed positively, possibly due to the internal structure of the service sector being upgraded towards higher added value.

Analysis of short-term and long-term impact dynamics

To better distinguish between the short-term and long-term impacts of structural shifts on growth, the study examines the coefficients in the error correction portion of a lagged autoregressive model. The results show that the error correction coefficient is negative and has an absolute value of approximately 0.60, implying that about 60% of the deviation from long-term equilibrium is adjusted each year.

In the short term, the impact of structural shift is reflected in the coefficient of the structural index difference, which reflects the rapid adjustment of growth to changes in sectoral distribution. In the long term, the equilibrium coefficient shows the existence of a sustainable relationship between sectoral structure and economic growth. This means that structural shift not only creates immediate impacts but also contributes to shaping the long-term growth trajectory of the city's economy.

The synthesis of quantitative results reveals three main points: Firstly, the structural shift in Hanoi's industries during the period 2010-2024 had a positive and statistically significant impact on the growth of the Gross Domestic Product. Secondly, this impact was achieved through both channels of improving intra-industry productivity and reallocating resources among industries, with the intra-industry component accounting for a larger proportion, but reallocation still contributing significantly. Thirdly, the results maintained the same sign and significance level when changing the variable representing structural shift, demonstrating the robustness of the model.

These findings imply that Hanoi's industrial service modernization and upgrading process during the study period had a positive effect on economic growth. However, the slight decrease in the contribution of the reallocation component in the post-pandemic period suggests that there is still significant room for improvement in the efficiency of structural transformation. This necessitates continued improvement in the quality of resource allocation and promotion of high value-added industries to maintain sustainable growth momentum in the next phase.

5. CONCLUSION AND POLICY IMPLICATIONS

This study systematically analyzed the impact of structural shifts in industries on the growth of Gross Domestic Product in Hanoi during the period 2010-2024, based on a theoretical framework of structural shifts and productivity growth, combined with a time series econometric model and growth decomposition.

The empirical results show that structural shifts in the industry have a positive and statistically significant impact on the city's economic growth. The intensity of structural reallocation, measured through the Lilien index and surrogate representative variables, has a positive correlation with the growth rate of the Gross Domestic Product. Simultaneously, decomposition analysis reveals that Hanoi's growth stems not only from improved intra-industry productivity but also from the shift of resources towards higher value-added industries. Thus, during the study period, Hanoi achieved the "reward of shift," as service-based industries and industrial upgrading contributed to an increase in the average productivity of the entire urban economy.

However, the results also show that the contribution of the reallocation component tends to decrease slightly in the post-pandemic period, reflecting new challenges in the structural transformation process. If future transformation mainly occurs in the direction of expanding low-productivity or low-value-added industries, the effectiveness of growth may be diminished. Therefore, the quality of structural transformation is a decisive factor for the sustainability of growth.

Based on the above results, the study proposes several important policy implications.

Firstly, the city needs to continue promoting the development of the service sector towards increasing knowledge content and added value, especially in areas such as finance, information technology, professional services, and logistics. Upgrading the internal structure of the service sector will help maintain the positive impact of serviceization on growth.

Secondly, industry and construction need to be restructured towards modernization, increased application of high technology, and green transformation. This will not only improve productivity within the industry but also create a ripple effect on other sectors, contributing to strengthening the foundation for long-term growth.

Thirdly, improving the efficiency of resource allocation through perfecting economic institutions, enhancing the quality of planning, and improving the investment environment are necessary conditions for the structural transformation process to take place effectively. A flexible labor market, transparent capital allocation mechanisms, and synchronized infrastructure will help shift resources to higher-productivity sectors.

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Fourth, it is necessary to focus on developing high-quality human resources, aligned with the requirements of modern service industries and technology industries. Enhancing the skills and innovative capacity of the workforce will be a decisive factor in achieving growth not only through expansion but also through increased productivity.

Despite its empirical contributions, the study still has some limitations. Local-level data is limited in terms of sectoral depth, thus not fully reflecting the productivity differences between sub-sectors within the service and industrial sectors. Furthermore, the time-series model with a relatively limited number of observations may affect the accuracy of some estimates. Further studies could expand on this by using more detailed sectoral data or conducting inter-provincial comparisons to assess the effectiveness of structural transformation in the context of regional competition.

In summary, the study confirms that structural transformation of industries is a crucial driver of Gross Domestic Product growth in Hanoi during the period 2010-2024. Maintaining and improving the quality of structural transformation will play a key role in the city's sustainable economic development strategy in the coming years.

REFERENCES

ADB Institute. (2017). *Structural transformation and its implications for economic growth in Vietnam*. Asian Development Bank Institute.

Chenery, H.B., & Syrquin, M. (1975). *Patterns of development, 1950-1970.* Oxford University Press.

Duarte, M., & Restuccia, D. (2010). The role of the structural transformation in aggregate productivity. *Quarterly Journal of Economics, 125* (1), 129-173.

Herrendorf, B., Rogerson, R., & Valentinyi, Asia. (2014). Growth and structural transformation. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 2, pp. 855-941). Elsevier.

Kuznets, S. (1966). *Modern economic growth: Rate, structure, and spread.* Yale University Press.

Lewis, WA (1954). Economic development with unlimited supplies of labor. *Manchester School, 22* (2), 139-191.

McMillan, M., & Rodrik, D. (2011). Globalization, structural change and productivity growth. *NBER Working Paper* No. 17143.

Nguyen, TH (2018). Structural transformation and economic growth in Vietnam: An empirical analysis. *Journal of Asian Economics, 56,* 1-14.

Rodrik, D. (2013). Unconditional convergence in manufacturing. *Quarterly Journal of Economics, 128* (1), 165-204.

Szirmai, A. (2012). Industrialization as an engine of growth in developing countries, 1950-2005. *Structural Change and Economic Dynamics, 23* (4), 406-420.

Timmer, M.P., de Vries, G.J., & de Vries, K. (2015). Patterns of structural change in developing countries. In J. Weiss & M. Tribe (Eds.), *Handbook of Industry and Development* (pp. 65-83). Routledge.