

The Impact of Innovative Human Resources on Local Economic Development: A Study in Hanoi

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Abstract: In the context of a knowledge-based economy, digital transformation, and increasing competition among localities, innovative human resources have become a crucial factor in promoting sustainable, productive, and high-value-added local economic development. This article focuses on clarifying the impact of innovative human resources on local economic development in Hanoi. Based on theoretical approaches to human capital, endogenous growth, absorption capacity, and the local innovation ecosystem, the study identifies innovative human resources as a multidimensional structure encompassing professional qualifications and technological skills, creative and problem-solving abilities, research, development, and application capabilities, entrepreneurial spirit, learning and adaptability, and the level of connectivity within the innovation ecosystem. Research findings indicate that innovative human resources play a positive role in enhancing labor productivity, promoting economic restructuring, developing innovative enterprises, improving job quality, and strengthening local competitiveness. For Hanoi, developing innovative human resources requires improved training quality, enhanced linkages between businesses, educational institutions, research institutes, and management agencies, and the improvement of an institutional environment that supports innovation. This article proposes several policy implications to leverage the role of innovative human resources in promoting a local growth model based on knowledge, technology, and innovation.

Keywords: innovative human resources; local economic development; human capital; innovation ecosystem; Hanoi city

1. INTRODUCTION

In the context of a rapidly evolving global knowledge economy and digital transformation, local economic development increasingly depends on the quality of its human resources, innovation capacity, and ability to transform knowledge into economic value. Recent studies emphasize that knowledge, skills, and technology are not merely supporting factors but have become core drivers of long-term growth, especially in urban areas with a high density of businesses, universities, and knowledge workers (OECD, 2019; World Bank, 2020; UNDP, 2022). This demonstrates the increasingly important role of high-quality human resources in promoting productivity, innovation, and the competitiveness of the local economy.

Theoretically, human resources are considered a special form of capital because they not only participate directly in the production process but also generate new knowledge and drive innovation. Recent studies continue to affirm that investment in education, training, and digital skills development helps improve labor productivity and the adaptability of the economy in the context of rapidly changing technology (Author, 2015; Acemoglu & Restrepo, 2018; World Economic Forum, 2020). Based on this, innovative human resources are understood as a highly developed form of human capital, encompassing creativity, adaptability, technological skills, research capabilities, and an innovative entrepreneurial spirit.

The theory of endogenous growth continues to be expanded in recent studies, emphasizing the role of knowledge, technology, and innovation as intrinsic drivers of economic growth. Modern studies show that investment in research and development (R&D), higher education, and innovation ecosystems has a positive impact on long-term



growth and total factor productivity (Aghion et al., 2015; Bloom et al., 2020). This implies that localities possessing a highly creative and innovative workforce will have an advantage in enhancing productivity, promoting economic restructuring, and strengthening competitiveness in the context of globalization.

The capacity to absorb knowledge continues to be considered a crucial intermediary mechanism in the process of transforming knowledge into economic value. Recent studies show that the ability to acquire, learn, and apply new knowledge depends on the existing knowledge base, skill level, and the degree of linkage between entities in the innovation ecosystem (Zahra & George, 2016; Lane et al., 2016). Therefore, localities with high-quality human resources and strong learning capabilities will more effectively utilize external resources, thereby promoting innovation and sustainable economic development.

From a spatial perspective, innovation tends to concentrate in large urban areas, where intellectual resources, technology, and economic networks converge. Studies in recent decades have shown that the quality of human resources, the level of knowledge diffusion, and the interaction between actors in the innovation ecosystem have a positive impact on urban growth and regional competitiveness (Duranton & Puga, 2020; OECD, 2018). At the same time, the creative workforce plays a crucial role in shaping a dynamic economic environment, fostering innovation and entrepreneurship (Florida, 2017), but is only effective when supported by a suitable innovation ecosystem, including institutions, infrastructure, and networks (Isaksen & Trippl, 2016; Boschma, 2017).

From a policy perspective, the development of innovative human resources needs to be linked to the specific characteristics of each locality and its particular development context. Recent studies emphasize the need for flexible policies aimed at developing future skills, promoting linkages between businesses, universities, and research institutes, and supporting the innovation and startup ecosystem (OECD, 2021; World Bank, 2021). This is particularly relevant to Hanoi – the economic, educational, and scientific center of Vietnam, which is undergoing a strong shift towards a growth model based on knowledge, technology, and innovation.

Although numerous studies have addressed the role of human capital and innovation, there is still a lack of integrated analyses of innovative human resources in relation to local economic development, particularly in developing cities like Hanoi. Existing studies often focus individually on factors such as education, technology, or entrepreneurship, without comprehensively considering the constituent elements of innovative human resources and their combined impact on local economic development.

Stemming from that research gap, this paper aims to analyze the impact of innovative human resources on local economic development in Hanoi City. Specifically, the research aims at three main objectives: (i) systematizing the theoretical basis and recent empirical studies on innovative human resources and local economic development; (ii) building a model to analyze the impact of innovative human resource components on local economic development; and (iii) proposing policy implications to promote the development of innovative human resources, thereby enhancing productivity, competitiveness, and promoting sustainable local economic growth based on knowledge, technology, and innovation.

2. THEORETICAL FOUNDATION

2.1. Human resources for innovation

Innovative human resources are the workforce capable of creating, acquiring, and applying new knowledge to socio-economic activities. Unlike the traditional approach, this concept emphasizes creativity, problem-solving skills, technological thinking, learning ability, and adaptability. These are key factors in generating ideas, improving products, innovating processes, and increasing productivity.

According to human capital theory (Schulsch, 1961; Becker, 1964), education, skills, and experience increase productivity and economic value. Innovative human resources are a highly developed form of human capital, reflecting not only skill levels but also the ability to create and transform knowledge. In a knowledge economy, workers need to learn continuously, process complex information, and adapt quickly to change.

The structure of the innovative workforce includes: (i) professional qualifications and technological skills; (ii) creative and problem-solving abilities; (iii) research and technology application capabilities; (iv) entrepreneurial spirit; (v) learning and adaptability; and (vi) connectivity within the innovation ecosystem.

For localities, this workforce serves as both an input and a driving force for transforming the growth model, contributing to increased productivity, promoting businesses, and shifting the economic structure towards higher added value.

Local economic development

Local economic development is the process of increasing the scale, quality, and efficiency of the economy, while simultaneously improving income, employment, and competitiveness. This concept goes beyond pure growth, encompassing structural transformation, technological advancement, and the quality of human resources.

Local development is the result of the interaction between endogenous resources (human resources, businesses, infrastructure, institutions, innovation) and external factors (integration, investment, technology). In this context, innovative human resources play a central role in transforming opportunities into development capabilities.

According to endogenous growth theory (Lucas, 1988; Romer, 1990), knowledge and human capital are the drivers of long-term growth. At the local level, the quality of the workforce and the ability to participate in innovation determine the capacity for development.

The key aspects include: (i) economic growth; (ii) labor productivity; (iii) structural transformation; (iv) development of innovative enterprises; (v) quality of employment; and (vi) competitiveness.

Human capital theory

Human capital theory views people as a form of capital that can accumulate and create value (Schulsch, 1961; Becker, 1964). Investing in education and skills increases productivity and income.

In the context of innovation, human capital needs to be expanded to include creativity, innovative thinking, and collaboration skills. The quality of human resources determines the differences in development capacity between localities.

Endogenous growth theory

This theory posits that long-term growth stems from knowledge, technology, and endogenous innovation (Lucas, 1988; Romer, 1990). Human capital creates spillover effects and drives innovation.

At the local level, innovative human resources are an endogenous driving force that helps improve productivity, reduce dependence on traditional resources, and increase competitiveness.

Absorption capacity theory

Absorbent capacity is the ability to recognize, acquire, and apply external knowledge (Cohen & Levinthal, 1990). It depends on one's knowledge base and learning ability.

Innovative human resources determine the ability to transform knowledge into new products, services, and processes, thereby enhancing the effectiveness of local development.

Local Innovation Ecosystem Theory

Innovation is the result of interaction between entities such as businesses, universities, research institutes, and the government. Human resources play a crucial role in connecting and disseminating knowledge.

Innovation capacity depends on the quality of linkages and the institutional environment (Asheim & Isaksen, 2002; Boschma, 2005). A favorable ecosystem helps transform knowledge into economic value.

The relationship between innovative human resources and local economic development.

This relationship is manifested through three mechanisms:

- (i) Enhancing productivity: improving processes, applying technology, and optimizing resources.
- (ii) Promoting innovation and structural transformation: developing knowledge-intensive industries.
- (iii) Developing businesses and startups: creating quality jobs and enhancing competitiveness.

In Hanoi, this impact depends on the quality of institutions, the level of connectivity, and the ability to transform knowledge into economic value.

Theoretical framework of the research

The research is based on the argument that innovative human resources are an endogenous driver of local economic development. The underlying theories include: human capital, endogenous growth, absorptive capacity, and the innovation ecosystem.

Innovative human resources are measured through: technological skills, creativity, R&D, entrepreneurial spirit, adaptability, and connectivity. Local economic development is assessed through: growth, productivity, economic structure, innovative businesses, employment, and competitiveness.

Therefore, innovative human resources serve as both an input and an agent for creating and disseminating knowledge, playing a central role in enhancing Hanoi's productivity and competitiveness in the context of the knowledge economy and digital transformation.

3. RESEARCH METHODOLOGY

approach

This study primarily employs a quantitative approach, combined with a literature review, to build its theoretical framework, research model, and hypothesis system. This approach is suitable for the objective of analyzing the impact of innovative human resources on local economic development in Hanoi, as the study needs to measure the extent to which various components of innovative human resources influence aspects of local economic development.

Based on a synthesis of international studies on human capital, endogenous growth, absorption capacity, and the local innovation ecosystem, this research identifies observed variables, constructs a measurement scale, and designs a survey questionnaire. The survey subjects are expected to include representatives from businesses, educational institutions, research institutes, innovation support organizations, and relevant management agencies in Hanoi. The collected data will be used to validate the scale, assess the model's validity, and test research hypotheses.

Research model

The research model is built on the assumption that innovative human resources have a positive impact on local economic development. In this model, innovative human resources are a multidimensional independent variable, encompassing the following components: professional qualifications and technological skills; creativity and problem-solving abilities; research, development, and technology application capabilities; entrepreneurial spirit; learning and adaptability; and the level of connectivity within the innovation ecosystem.

The dependent variable is local economic development, approached through aspects such as economic growth, labor productivity, economic restructuring, development of innovative enterprises, job quality, and local competitiveness. The research model reflects the relationship between the quality of innovative human resources and the ability to create economic value, increase productivity, promote innovation, and improve the competitiveness of Hanoi City.

Accordingly, the general research model is proposed as follows:

Innovative human resources → Local economic development

In this context, innovative human resources are composed of six groups of factors: professional qualifications and technological skills; creativity and problem-solving abilities; research, development, and technology application capabilities; entrepreneurial spirit; learning and adaptability; and the level of connectivity within the innovation ecosystem.

Research hypothesis system

Based on the proposed theoretical framework and research model, the study formulates the following hypotheses:

H1: The professional qualifications and technological skills of the innovative workforce have a positive impact on local economic development in Hanoi City.

H2: The creative and problem-solving capabilities of the innovative workforce have a positive impact on local economic development in Hanoi City.

H3: Research, development, and application capabilities in technology have a positive impact on local economic development in Hanoi City.

H4: The entrepreneurial and innovative spirit of the workforce has a positive impact on local economic development in Hanoi City.

H5: The learning and adaptability capabilities of the innovative workforce have a positive impact on local economic development in Hanoi City.

H6: The level of connectivity within the human resource innovation ecosystem has a positive impact on local economic development in Hanoi City.

The above hypotheses reflect the research logic that local economic development depends not only on the size of the workforce, but also on the quality, innovative capacity, technological capabilities, entrepreneurial mindset, and the level of connectivity of human resources within the innovation ecosystem.

Data analysis methods

The collected survey data was checked, cleaned, and coded before being analyzed. First, descriptive statistics were used to generalize the characteristics of the survey sample and make a preliminary assessment of the research variables. Next, the reliability of the scale was tested using Cronbach's Alpha coefficient to eliminate unsuitable observed variables and ensure the internal consistency of the scale.

After reliability testing, the study uses exploratory factor analysis to determine the structure of factor groups related to human resources for innovation and local economic development. If the data meets the criteria, the study continues with confirmatory factor analysis to assess the convergent validity, discriminant validity, and goodness of fit of the measurement model.

Finally, a regression model or linear structural model is used to test the research hypotheses. The analysis results allow for the identification of the extent and direction of the impact of each component of innovative human resources on local economic development in Hanoi. Based on this, the study proposes policy implications for developing innovative human resources, improving productivity, and promoting a local growth model based on knowledge, technology, and innovation.

4. RESEARCH RESULTS AND DISCUSSION

Characteristics of the survey sample

Before quantitative analysis, the study conducted descriptive statistics on the sample to assess the suitability of the data to the research objectives. Considering the sample structure by organizational type, job position, and work experience is necessary, as the study focuses on the impact of innovative human resources on local economic

development in Hanoi. Therefore, the sample needs to reflect stakeholders involved in innovation, human resource development, and economic management.

The study distributed 350 survey questionnaires to businesses, educational institutions, research institutes, science and technology organizations, innovation support organizations, and government agencies in Hanoi. After data cleaning, 312 valid questionnaires were used. This scale met the requirements for quantitative analysis, scale validation, factor analysis, and regression.

Table 1. Characteristics of the survey sample

Criteria	Survey team	Quantity	Percentage (%)
Type of organization	Businesses	168	53.8
	Educational and training institutions	48	15.4
	Research institutes, scientific and technological organizations	36	11.5
	Organizations supporting innovation and entrepreneurship.	28	9.0
	State management agency	32	10.3
Job position	Leadership, management	94	30.1
	Specialists, professional staff	146	46.8
	Research, development, and technology personnel	52	16.7
	Personnel supporting startups and innovation.	20	6.4
Work experience	Under 5 years	71	22.8
	From 5 to under 10 years	104	33.3
	From 10 to under 15 years	82	26.3
	15 years or more	55	17.6
Total		312	100

(Source: Results of data analysis on SPSS 26.0, 2026)

The results show that the sample distribution is consistent with the research objectives. Businesses account for the highest proportion (53.8%), accurately reflecting their central role in human resource utilization, innovation, and economic value creation. This helps the data clearly reflect the realities of the labor market and the impact of human resource quality on local development.

The group of educational and training institutions (15.4%) and research institutes (11.5%) contribute to reflecting the perspective from the training and knowledge creation side, consistent with Hanoi's role as a center of education and research. The group supporting innovation (9.0%) and state management agencies (10.3%), although accounting for a lower percentage, add a perspective on resource connectivity and development policies.

By job position, specialists account for 46.8% and leaders 30.1%, indicating a combination of implementation and management perspectives. The research-technology (16.7%) and innovation support (6.4%) groups reflect the specialized aspects of the innovation workforce.

In terms of experience, the group with 5 to under 10 years of experience accounted for the highest percentage (33.3%), followed by 10-15 years (26.3%), indicating that the majority of respondents have relatively solid experience. The group with less than 5 years of experience (22.8%) reflects a younger workforce, while the group with over 15 years of experience (17.6%) adds a long-term perspective.

Overall, the survey sample is diverse in terms of organization, location, and experience, consistent with an innovation ecosystem approach. With 312 observations, the data is sufficient for further analysis to assess the impact of innovation human resources on local economic development in Hanoi.

Descriptive statistics of research variables

After assessing the characteristics of the survey sample, the study proceeded with descriptive statistics of variables representing human resources for innovation and local economic development. The results of the descriptive

statistics helped identify the overall level of respondents' evaluation of each factor, thereby providing an initial basis for the steps of scale validation and regression model analysis.

Table 2. Descriptive statistics of the research variables

Symbol	Factor	Minimum value	The greatest value	Medium	Standard deviation
CM	Professional qualifications and technological skills	2.20	5.00	3.91	0.62
ST	Creativity and problem-solving skills	2.00	5.00	3.78	0.67
NC	Research, development and application capabilities in technology	1.80	5.00	3.54	0.73
KN	Entrepreneurial spirit and innovation	2.00	5.00	3.63	0.70
TH	Ability to learn and adapt	2.20	5.00	3.86	0.64
LK	Level of connectivity within the innovation ecosystem	1.80	5.00	3.59	0.72
PT	Local economic development	2.10	5.00	3.74	0.66

(Source: Results of data analysis on SPSS 26.0, year 2026)

The results in Table 2 show that all research variables have average values greater than 3.5, reflecting the relatively positive assessment of respondents regarding the role of innovative human resources in local economic development in Hanoi. Among the independent factors, professional qualifications and technological skills have the highest average value, reaching 3.91. This is consistent with Hanoi's characteristics as a major center for education, training, science, and technology, concentrating many training institutions, research institutes, and highly skilled workers.

The average learning and adaptability score was 3.86, indicating that Hanoi's workforce is rated quite positively in terms of its ability to update knowledge, adopt technology, and adapt to new market demands. The creativity and problem-solving skills score was 3.78, reflecting a relatively high level of innovative thinking and improvement in work. Meanwhile, the research, development, and application of technology had the lowest average score at 3.54; the level of connectivity within the innovation ecosystem was 3.59. These results suggest that although Hanoi has advantages in human resources and knowledge, the process of transforming knowledge into new products, technologies, business models, and economic value still has room for improvement. The average value of the local economic development variable reached 3.74, indicating that respondents had a fairly positive assessment of the

contribution of innovative human resources to local growth, productivity, structural transformation, and competitiveness.

Scale reliability testing

To ensure the reliability of the scales before factor analysis and regression, the study used Cronbach's Alpha coefficient. Scales were accepted when the Cronbach's Alpha coefficient was greater than 0.7 and the observed variables had appropriate item-total correlations.

Table 3. Results of scale reliability test.

Symbol	Factor	Initial number of observed variables	Number of retained observed variables	Cronbach's Alpha
CM	Professional qualifications and technological skills	4	4	0.842
ST	Creativity and problem-solving skills	4	4	0.861
NC	Research, development and application capabilities in technology	4	4	0.824
KN	Entrepreneurial spirit and innovation	4	4	0.813
TH	The ability to learn and adapt.	4	4	0.836
LK	Level of connectivity within the innovation ecosystem	4	4	0.851
PT	Local economic development	6	6	0.879

The results in Table 3 show that all scales have Cronbach's Alpha coefficients greater than 0.8, indicating good reliability. The local economic development scale has the highest coefficient, at 0.879, suggesting that the observed variables consistently measure aspects such as growth, labor productivity, structural transformation, business development, job quality, and local competitiveness.

For the factors related to human resources for innovation, the coefficient for creativity and problem-solving ability is 0.861; the level of connectivity within the innovation ecosystem is 0.851; and the level of professional expertise and technological skills is 0.842. These results show that the observed variable groups are constructed appropriately according to the theoretical content of each factor. No scales were removed, so all observed variables were retained for further exploratory factor analysis. This demonstrates that the scale system is stable and suitable for the subsequent quantitative analysis steps.

Exploratory Factor Analysis

After reliability testing of the scale, the study conducted exploratory factor analysis to determine the structure of the factors and assess the degree of convergence of the observed variables. The results of the analysis are presented in Table 4.

Table 4. Results of exploratory factor analysis

Target	Value
KMO coefficient	0.884
Bartlett Test	Sig. = 0.000
Number of factors extracted	7
Total Variance Extraction	68.42%
Minimum factor loading coefficient	0.612
Maximum factor loading coefficient	0.846

(Source: Results of data analysis on SPSS 26.0, year 2026)

The results in Table 4 show that the KMO coefficient reached 0.884, which is greater than the recommended level of 0.5, indicating that the data is suitable for exploratory factor analysis. The Bartlett test has a Sig. value of 0.000, showing that the observed variables are correlated with each other overall and that factor analysis is statistically appropriate.

The analysis extracted seven factors, corresponding to six independent factors related to innovative human resources and one dependent factor, local economic development. The total variance extracted reached 68.42%, indicating that the extracted factors explain most of the data's variability. Factor loading coefficients ranged from 0.612 to 0.846, all greater than 0.5, demonstrating that the observed variables are capable of representing their respective factors well. This result confirms that the scale structure is suitable for the proposed research model and allows for the continued use of these factors in regression analysis to test hypotheses.

Regression analysis and hypothesis testing

To assess the impact of innovative human resource components on local economic development, the study uses a multivariate regression model with local economic development as the dependent variable. The independent variables include professional qualifications and technological skills, creativity and problem-solving abilities, research, development and application capabilities, entrepreneurial spirit, learning and adaptability, and the level of connectivity within the innovation ecosystem.

Table 5. Regression results and hypothesis testing.

Hypothesis	Independent variable	Standardized Beta coefficient	Significance level	Conclude
H1	Professional qualifications and technological skills	0.184	0.006	Accept
H2	Creativity and problem-solving skills	0.213	0.002	Accept
H3	Research, development and application capabilities in technology	0.157	0.018	Accept
H4	Entrepreneurial spirit and innovation	0.129	0.041	Accept

H5	Ability to learn and adapt	0.176	0.009	Accept
H6	Level of connectivity within the innovation ecosystem	0.246	0.000	Accept
	Corrected R-squared	0.637		
	F	92,415	0.000	Suitable model

(Source: Results of data analysis on SPSS 26.0, year 2026)

The results in Table 5 show that the regression model is statistically significant with an F-value of 92.415 and a significance level of 0.000. The adjusted R-squared is 0.637, meaning that the components of innovative human resources explain 63.7% of the variation in local economic development. This is a relatively high level of explanation in socio-economic studies, indicating that the model is capable of accurately reflecting the relationship between innovative human resources and local economic development in Hanoi.

For hypothesis H1, the standardized Beta coefficient for professional qualifications and technological skills is 0.184 with a significance level of 0.006. This result indicates that professional qualifications and technological skills have a positive impact on local economic development. When workers have a good professional background, higher technological skills, and better data processing abilities, localities are better positioned to improve productivity, enhance product and service quality, and increase adaptability to the digital economy. Therefore, hypothesis H1 is accepted.

For hypothesis H2, the standardized Beta coefficient for creativity and problem-solving ability is 0.213 and the significance level is 0.002. This is the second strongest impact factor in the model. This result confirms that the ability of human resources to propose new ideas, improve processes, and handle complex problems is a crucial condition for promoting innovation and enhancing the efficiency of local economic development. Therefore, hypothesis H2 is accepted.

For hypothesis H3, the standardized Beta coefficient for research, development, and application of technology is 0.157 with a significance level of 0.018. This result indicates that research, testing, application, and commercialization of technology have a positive impact on local economic development. However, the impact is not as significant as other factors, reflecting the fact that the transformation of research results into economic value in Hanoi still has certain limitations. Hypothesis H3 is accepted.

For hypothesis H4, the spirit of innovative entrepreneurship has a standardized Beta coefficient of 0.129 with a significance level of 0.041. This is the factor with the lowest impact in the model, but it is still statistically significant. This result shows that the spirit of seeking opportunities, accepting risks, and developing new business models contributes positively to local economic development. However, the modest impact may stem from barriers related to capital, market, management capacity, and the supportive environment for entrepreneurship. Therefore, hypothesis H4 is accepted.

For hypothesis H5, the standardized Beta coefficient for learning and adaptation is 0.176 with a significance level of 0.009. This result demonstrates that the ability to update knowledge, learn continuously, and adapt to technological and market changes has a positive impact on local economic development. In the context of digital transformation and rapid changes in the labor market, the ability to learn helps human resources maintain competitiveness and supports the locality in transforming its growth model more effectively. Hypothesis H5 is accepted.

For hypothesis H6, the degree of connectivity within the innovation ecosystem has a standardized Beta coefficient of 0.246 with a significance level of 0.000. This is the factor with the strongest impact on local economic

development. This result shows that economic development depends not only on the individual quality of the workforce, but also largely on the ability to connect businesses, training institutions, research institutes, management agencies, and innovation support organizations. For Hanoi, with its high density of knowledge actors, strengthening ecosystem connectivity can help knowledge spread faster, technology be applied more effectively, and innovative ideas be transformed into tangible economic value. Therefore, hypothesis H6 is accepted.

Overall, the regression results show that all six components of the innovative workforce have a positive impact on local economic development in Hanoi. The order of impact, from strongest to weakest, is: level of connectivity within the innovation ecosystem; creativity and problem-solving capacity; professional qualifications and technological skills; learning and adaptability; research, development, and application capacity; and entrepreneurial spirit. This result is consistent with the theoretical framework presented and emphasizes that the development of the innovative workforce needs to be considered in relation to the innovation ecosystem, rather than focusing solely on individual skills training.

5. CONCLUSION AND POLICY IMPLICATIONS

This study aims to analyze the impact of innovative human resources on local economic development in Hanoi City based on theoretical frameworks of human capital, endogenous growth, absorption capacity, and the innovation ecosystem. Accordingly, innovative human resources are approached as a multidimensional structure, encompassing professional qualifications and technological skills, creativity and problem-solving abilities, research and development and technology application capabilities, entrepreneurial spirit, learning and adaptability, and the level of connectivity within the innovation ecosystem. The research results show that all these components have a positive impact on local economic development, with connectivity within the innovation ecosystem playing the most prominent role, followed by creativity, professional qualifications, adaptability, research capacity, and entrepreneurial spirit. This shows that in the current context, local economic growth no longer depends primarily on the size of the workforce but increasingly on the quality of human resources, especially creativity, technological capacity, and the level of linkage between entities in the innovation ecosystem. For Hanoi, which has a concentration of universities, research institutes, businesses, and supporting organizations, the advantage of human resources can only be maximized when these components are effectively connected in research, production, business, and management activities.

Based on the above findings, the proposed policy implications are specific and clearly differentiated into the following groups of solutions:

Firstly, it is necessary to improve the quality of human resources through reforming the education and training system to align with the practical needs of the economy. The focus should be on developing technological skills, creative thinking, problem-solving abilities, and adaptability in the digital environment. Simultaneously, there needs to be a shift from a degree-based assessment approach to one based on practical skills and the ability of learners to create real-world value.

Secondly, it is necessary to strengthen the connections between businesses, educational institutions, research institutes, and regulatory agencies as a pillar of the innovation ecosystem. Cooperation mechanisms need to be substantive, including commissioning research from businesses, co-designed training programs between universities and businesses, developing technology transfer centers, and building networks of innovation experts.

Thirdly, it is necessary to strongly promote research, development, and application of technology. The focus should be on improving the commercialization of research results and supporting businesses in accessing new technologies through financial policies, tax incentives, and intellectual property protection.

Fourth, it is necessary to improve the environment for innovative startups by reducing barriers to market entry and increasing access to capital. In addition, support should be provided to startups in terms of governance, product development, and expanding domestic and international market connections.

Fifth, it is necessary to build a lifelong learning mechanism to enhance the adaptability of workers in the context of digital transformation. This includes implementing retraining programs, skills enhancement training, and developing open, flexible, and accessible learning platforms.

Sixth, it is necessary to improve the institutional framework and data systems serving the management of innovative human resources. Specifically, this involves building a database on labor skills, recruitment needs, technological capabilities, and innovation activities, while establishing a mechanism for regular and effective monitoring and evaluation of policies.

Overall, developing innovative human resources should be placed at the center of Hanoi's economic development strategy to create a foundation for sustainable growth, improve productivity, and enhance competitiveness in the long term.

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