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### Human Resource Development of Innovation Center in Hanoi City, Vietnam

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#### Abstract

Innovation, science and technology have become the strategic foundation and key driving force for socio-economic development, aiming to bring our country to a modern industrialized state by 2030 and become a high-income country by 2045, according to the orientation of the 13th National Party Congress. In 2024 and the following years, it is necessary to continue to maintain innovative thinking and synchronously deploy major solutions to develop the national innovation system; improve the science and technology management mechanism; improve the capacity and level of the science and technology sector; promote the innovation and creative startup ecosystem; as well as expand international cooperation and integration in

this field. As a political and scientific center, Hanoi needs to create a legal environment and more favorable socio-economic conditions for research and development of science, technology and innovation. This will help motivate scientists and technologists to persistently pursue their dreams and passions, overcome challenges to achieve practical results, bring benefits to the capital Hanoi and the whole country, and contribute to human knowledge. Therefore, the author decided to choose the topic: "Human resource development of innovation center in Hanoi city, Vietnam" as the content of the scientific article, with the goal of contributing to improving the efficiency of innovation activities.

**Keywords:** Human Resources, Center, Innovation, Hanoi City

#### 1. Introduction

Hanoi always focuses on investing resources in the field of science and technology, with the long-term goal of promoting research, transfer and application of science and technology; building the capital into a leading center for innovation, research and development, with the highlight being the Hoa Lac High-Tech Park, research institutes and universities.

Currently, Hanoi accounts for more than 70% of science and technology organizations, universities, research institutes and 82% of laboratories nationwide (including 14 national key laboratories), and more than 65% of leading scientists live and work here. The city's leaders have identified this as a strategic advantage for the capital to continue to invest heavily in the development of science, technology and innovation.

From 2021 to present, Hanoi has implemented nearly 300 tasks under 9 city-level science and technology programs, along with the intellectual property development program. The total productivity factor has increasingly contributed to GRDP growth, reaching 62.86% in 2023. Notably, the city has carried out three important tasks: Developing the Capital Law (amended), establishing the Hanoi Capital Planning for the period 2021-2030 with a vision to 2050, and adjusting the Capital Master Plan to 2045, with a vision to 2065.

Notably, for two consecutive years (2022 and 2023), Hanoi has led the country in the local innovation index (PII). The city has more than 1,000 innovative startups, accounting for more than 26% of the country's total, with the number of incubators and business promotion organizations accounting for more than 38% and 40%, respectively, nationwide. Nearly 300 high-tech agricultural production models in the area have brought positive results.

Based on the reasons for choosing the topic as above, this study aims to propose solutions to improve the legal and policy framework to promote innovation in Hanoi, contributing to improving business performance, supporting the sustainable development of enterprises and the capital's economy, aiming to build Hanoi into a comprehensive innovation city.

## 2. Theoretical Basis and Research Model

### 2.1 Some concepts

*Open innovation* is a concept introduced by Henry Chesbrough in the early 2000s. According to Chesbrough (2003)<sup>[2]</sup>, open innovation is a method by which organizations tap resources and ideas from both inside and outside the organization to drive the development of new products, services, and processes. The main components of open innovation include:

**Internal and external resources:** Use both resources and ideas from within and outside the organization (Chesbrough, 2003)<sup>[2]</sup>.

**Sharing and collaboration:** Inter-organizational collaboration and knowledge sharing to develop new solutions (Chesbrough, 2006)<sup>[3]</sup>.

**Processes and business models:** Applying different innovation models and managing the process from research and development to commercialization (Chesbrough & Crowther, 2006)<sup>[5]</sup>.

**Knowledge management and protection:** Ensuring intellectual property rights and knowledge management to support innovation (Chesbrough, 2003)<sup>[2]</sup>.

▪ **Technology and digitalization:**

The development of digital technology, artificial intelligence and big data analytics has promoted open innovation (Chesbrough & Rosenbloom, 2002)<sup>[6]</sup>.

The development and maturity of digital technologies such as artificial intelligence (AI), big data analytics (Big data), Internet of Things (IoT), Blockchain, cloud computing have had a profound impact on open innovation. Digital technologies and digital platforms enable companies to connect and collaborate with global partners and communities more easily and effectively. Artificial intelligence and big data analytics help analyze and process huge volumes of data to detect trends, predict needs and optimize innovation processes.

**Digital technology:** Platforms such as social networks, online communities, and online collaboration tools facilitate knowledge sharing and collaboration in open innovation. Companies can access ideas and technologies from around the world, increasing the speed and efficiency of the innovation process (Chesbrough & Rosenbloom, 2002)<sup>[6]</sup>.

**Artificial Intelligence (AI):** AI aids in data analysis, pattern detection, and process optimization. It can automate innovation processes, helping to rapidly discover and develop new solutions (Chesbrough & Rosenbloom, 2002)<sup>[6]</sup>.

**Big data analytics:** Using big data analytics helps companies better understand customer behavior, market trends, and product performance, thereby making more accurate and effective innovation decisions (Chesbrough & Rosenbloom, 2002)<sup>[6]</sup>.

**Expanding international cooperation:**

Organizations increasingly collaborate internationally to take advantage of global knowledge (Chesbrough, 2003)<sup>[2]</sup>.

Organizations are increasingly looking to expand international cooperation to leverage knowledge and technology from global markets. International cooperation not only helps companies access new resources and knowledge, but also creates opportunities to expand markets and reduce risks to technology and sustainable development.

**International collaboration:** Organizations are building international collaboration networks with partners in different countries to share knowledge, resources, and

technology. This collaboration helps companies access advanced technologies and diverse market insights (Chesbrough, 2003)<sup>[2]</sup>.

**Leveraging global knowledge:** Companies can tap into knowledge from global markets to develop products and services that meet global needs and trends, and improve their competitiveness in international markets (Chesbrough, 2003)<sup>[2]</sup>.

**Startups and innovation ecosystems:**

Startups and innovation ecosystems play an increasingly important role in open innovation (Chesbrough, 2006)<sup>[3]</sup>. Large companies often partner with technology startups to take advantage of the rapid innovation and creativity in small companies and groups of young, energetic and creative people.

**The role of startups:** Startups apply technology to bring new creative solutions, with the ability to innovate quickly and flexibly. Large enterprises in the world often cooperate with startups through incubation and acceleration programs, with the participation of venture capital funding from investment funds, and strategic alliances to explore and develop creative solutions (Chesbrough, 2006)<sup>[3]</sup>.

**Innovation ecosystems:** Innovation ecosystems include incubators, and support networks that connect companies, investors and venture capital funds, and research institutes and universities. These ecosystems facilitate collaboration and knowledge sharing, contributing to the promotion of open innovation (Chesbrough, 2006)<sup>[3]</sup>.

**Sustainable innovation and social responsibility:**

Companies are looking for sustainable and socially responsible solutions (Chesbrough & Bogers, 2014)<sup>[4]</sup>. Companies are increasingly focusing on developing innovative sustainable and socially responsible solutions. This not only helps to solve environmental and social problems but also enhances the image and value of the company.

**Sustainable innovation:** Companies are looking to develop sustainable products and processes to minimize negative impacts on the environment. Sustainable innovation includes using recycled materials, reducing emissions, and developing environmentally friendly products (Chesbrough & Bogers, 2014)<sup>[4]</sup>.

**Social Responsibility:** Companies also focus on social responsibility by ensuring that their operations benefit the community and society. This includes implementing community projects, supporting social development programs, and ensuring fair working conditions (Chesbrough & Bogers, 2014)<sup>[4]</sup>.

**Support from government and organizations:**

Governments and international organizations increasingly provide support and incentives for open innovation through policies, funding programs, and innovation support initiatives. These policies help facilitate the development and deployment of innovative solutions (Chesbrough, 2006)<sup>[3]</sup>.

**Supportive policies:** Governments provide policies and regulations that support innovation, including creating legal frameworks that facilitate knowledge sharing and protection of intellectual property rights (Chesbrough, 2006)<sup>[3]</sup>.

**Funding programs:** Funding programs and research funds from governments and international organizations provide companies and organizations with additional resources to carry out innovation projects (Chesbrough, 2006)<sup>[3]</sup>.

**Innovation Support Initiatives:** Organizations and governments also encourage innovation initiatives through organizing innovation competitions, workshops and networking events to promote collaboration and knowledge sharing (Chesbrough, 2006)<sup>[3]</sup>.

## 2.2 Some models of innovation research

### a, Cooperation model

**Collaborating with partners:** SMEs collaborate with companies, research organizations, or research institutes to jointly develop new products or solutions (Chesbrough, 2003)<sup>[2]</sup>.

**Partner networks:** Participate in industry networks or clusters to exchange knowledge and technology (Chesbrough, 2006)<sup>[3]</sup>.

### b, Model of collecting ideas from the community

Gathering ideas from a large community or customers to develop new products or services (Howe, 2008).

**Solution Crowdsourcing:** Inviting the community or experts to contribute solutions to specific problems faced by the business (Brabham, 2013).

### c, Funding model for innovation

**Venture capital:** Participate in venture capital or innovation funds to raise capital for innovative projects (Chesbrough, 2012).

**Support programs:** Take advantage of government or nonprofit support programs for innovation (Miller, 2014).

### d, Customer-driven innovation model

**Customer Consulting:** Conduct surveys and research to collect opinions and feedback from customers about products or services (Von Hippel, 2005).

**Custom development:** Developing products or services according to customers' specific requirements, customizing them to fit their needs (Sawhney, Wolcott, & Arroniz, 2006).

### e, Testing and development model

**Develop a team of innovators:** Create small teams or innovation labs to test new ideas and develop new business models (Blank, 2013).

**Pilot programs:** Implement pilot programs to evaluate the feasibility and effectiveness of innovative solutions (Ries, 2011).

### f, Technology trading model

**Patent acquisition:** Acquiring or licensing technology from other companies for integration into a firm's products or services (Arora & Gambardella, 1994).

**Licensing negotiations:** Negotiating and licensing the use of other partners' technology to save development costs and time (Jensen & Thursby, 2001).

### g, Internal innovation model

**Innovation Incentive Programs:** Create programs that encourage and motivate employees to participate in the innovation process (Tushman & O'Reilly, 1996).

**Process Improvement:** Applying process improvement methods and technology to improve efficiency and product quality (Bessant & Tidd, 2015).

## 3. Research Methods

### 3.1 Secondary and primary data collection methods

To conduct research on open innovation at the Hanoi Department of Science and Technology, the author deployed data collection methods through three main methods: Document research, expert interviews, and business surveys.

### 3.1.1 Document research

Collect information from the following sources:

Science, Technology and Innovation Report 2020 conducted by the World Bank in 2020.

Project on integration and international cooperation of Hanoi city until 2030 (Decision 2887/QĐ-UBND dated December 26, 2023 of the Chairman of Hanoi People's Committee).

National and international reports, books, scientific research articles, seminars related to innovation provincial /municipal level.

**Purpose:** The literature review aims to synthesize and analyze existing information from domestic and international reports, books, and scientific articles on open innovation and its application models in Hanoi.

**Implementation process:**

**Documents used:** In academic databases, electronic libraries, research reports, monographs, and related scientific articles.

Select the most relevant and valuable documents to ensure the accuracy and completeness of information.

**Synthesis and analysis:** Read, summarize, and analyze documents to build a theoretical basis and research framework for the topic. Focus on important trends and findings on open innovation in Hanoi. Contribute to promoting and implementing to help Hanoi become a city of innovation in the coming time.

### 3.1.2 Expert Interview

Interviews with experts in the innovation ecosystem, aiming to collect opinions, experiences and perspectives from people with deep expertise in innovation, science and technology management and research and development activities.

**Implementation process:**

**Expert selection:** Identify and select reputable experts in the field of innovation and innovation ecosystem management such as presidents of small and medium-sized enterprise associations, presidents of Hanoi Young Entrepreneurs Association, presidents of private entrepreneurs associations in Hanoi, presidents of startup incubators in Hanoi. The experts are professors, lecturers, researchers, industry managers, and business consultants on innovation.

**Interview Questionnaire Design:** The author developed a detailed set of interview questions, covering key issues related to understanding and readiness for open innovation and open innovation models, digital transformation, technology, financial resources, challenges and opportunities from the market. In addition, refer to the questionnaire on business readiness for open innovation designed and issued by Strateger in 2020.

**Consists of 3 main pillars and related sub-elements:**

- **Leadership factor**

Publish and guide strategy (clear innovation strategy identifies where to focus).

Resource Allocation (Allocating available resources for innovation).

Portfolio management (exploring new opportunities to run core business).

- **Organizational design**

Legitimacy and power (status of innovation teams and projects within the organization). Bridge to the core (access to resources and skills). Reward incentives (Incentive systems for subordinates to perform).

- **Implement innovation**

Innovation Tools use innovation tools across the company. Managing the innovation process from idea to scale.

**Skills Development:** Training in skills and innovation experience.

**Interviews:** Conduct in-depth interviews with individual experts. Interviews are conducted in person, over the phone, and via online platforms.

Conduct in-depth interviews with experts in the innovation ecosystem such as:

Director, Deputy Director of Hanoi City Innovation Support Center

Director of startup incubator centers

Leaders of innovation centers at universities

Hanoi City Innovation Advisors

Angel investors, venture capital funds

Business advisors on innovation.

*Data collection and analysis:*

Record and analyze information obtained from interviews to draw conclusions and recommendations based on expert opinions and experiences.

**3.1.3 Business survey**

Primary data through direct interviews with 50 innovative enterprises in Hanoi in 2024. The interviews focused on clarifying factors that are believed to have an impact on innovation capacity in enterprises, the importance of these factors, other supports or limitations that impact innovation, especially the impact of policies to propose solutions.

**3.2 Data analysis method**

- **Qualitative analysis:** Using coding method to analyze data from interviews.
- **Quantitative analysis:** Use statistical tools to analyze data from surveys.

The study used SPSS 26.0 software to analyze factors and test the reliability of data and used correlation regression model to test the relationship between dependent variable and independent variables.

**4. Research Results**

**4.1 Hanoi city innovation center**

Scientific and technological activities have created many outstanding marks and played a good supporting role for other sectors and fields of the Capital. For the industrial sector, it has successfully researched and manufactured a number of modern, synchronous technological equipment lines to serve the development of consumer goods production, contributing to improving the quality of goods and products, meeting domestic demand, replacing imported goods; supporting training, research and application in industry and creating a premise for the next steps of development. For the agricultural sector, high technology has been applied in agricultural production to create products with high economic value and safety for users (enoki mushroom production model using Japanese technology of Kimoko Thanh Cao Import Export Company Limited (My Duc district), high-tech melon growing model (Ung Hoa district...); preserving and developing specialty plants (Dac So Buddha's hand, Dong Du guava, Ha Tay late-ripening longan, Xuan Dinh sapodilla...), producing flowers with high economic value (phalaenopsis orchids, lilies, roses...); maintaining and developing quality rice varieties

with good drought and pest resistance, stable productivity, typically the high-quality rice model in My Duc, Ung Hoa, Phu Xuyen... for an additional income compared to traditional rice cultivation of about 25% - 30%; safe vegetable production areas in Dong Anh, Phuc Tho, Gia Lam... for a production value of 400 - 500 million VND/ha/year; fruit growing areas in Dan Phuong, Hoai Duc, Thanh Oai... have a value of 0.5 - 1 billion/ha/year.

The science and technology market continues to be promoted, initially creating a favorable environment for businesses to invest in technological innovation, improving competitiveness in the context of integration, contributing to the rapid and sustainable economic development of the capital. The city pays special attention to exploiting and promoting the intellectual potential and gray matter potential of the intellectual team to promote the development of science, technology and innovation, making an important contribution to improving the productivity, quality, efficiency and competitiveness of the capital's economy.

To develop science and technology potential, Hanoi city has coordinated with ministries/sectors to speed up progress, basically completing investment in the common infrastructure of Hoa Lac High-Tech Park, attracting investment from large domestic and foreign enterprises and corporations; building and putting into operation the Hanoi Innovative Information Technology Business Incubator, the project of the Center for Research, Technology Transfer and Technology Appraisal at Hoa Lac High-Tech Park.

However, in addition to the achieved results, the city's science and technology activities still have many limitations, not commensurate with the potential. Science, technology and innovation have not really become an important driving force to improve labor productivity, competitiveness, and promote socio-economic development. The system of mechanisms and policies on science and technology is not complete; it has not encouraged, supported, and created conditions for enterprises to invest in innovation, application, transfer, and improvement of technology level; it has not created autonomy for research units; the connection of research activities between scientists and the market and enterprises is still weak. The science and technology market has not achieved the expected efficiency; the role of intermediary organizations and technology transfer consultants is still unclear, especially organizations with the function of technology assessment, valuation, promotion and brokerage.

**4.2 Creating jobs and using innovative human resources**

Innovating the economic growth model associated with sustainable development towards improving quality, creating many new jobs with high productivity and quality. Increase investment in resources for programs and projects to create more sustainable jobs, especially high-productivity jobs; research and propose policies to support the recruitment and use of specific labor groups, vulnerable laborers, laborers from poor households, near-poor households, and newly escaped-poverty households to participate in the labor market and have sustainable jobs. Timely remove difficulties and obstacles to increase the effectiveness of vocational training, create jobs for young people who have completed their military service, police service, and young volunteers who have completed their tasks.

Increase credit sources to promote the creation of new, creative, high-quality, sustainable jobs; green jobs; jobs for

the disadvantaged; prioritize capital allocation for the City Social Policy Bank to have enough resources to effectively implement credit programs to create jobs and provide vocational training for workers, contributing to the development of a sustainable labor market.

There are policies to encourage production and business establishments and households to register and operate as enterprises to attract and employ formal workers, gradually converting informal workers into formal workers.

#### ***4.3 Support the development of insurance for employees, build labor relations in the innovation center of Hanoi city***

With the goal of developing science and technology in the capital by 2030, in line with the socio-economic development strategy of Hanoi by 2030, Hanoi will become a national innovation center, a high-tech development center with leading scientific and technological potential and research, invention, innovation, application and technology transfer capacity in the country and with prestige in the region. Hanoi continues to identify key orientations for science and technology development as follows:

Developing science, technology and innovation to serve the economic development of the Capital in a sustainable direction, in which digital transformation is based on three pillars: Digital economy, digital society and digital government.

Research on science, technology and innovation to serve urban management; exploit and use resources effectively; build and modernize infrastructure systems. Improve the state management capacity of science, technology and innovation in the capital towards supporting and promoting businesses to innovate, improve productivity and quality.

Scientific research, technology and innovation serve business management, machinery and equipment innovation and technological level improvement. Developing the science and technology market with the focus on technology transaction value.

Focus on developing scientific, technological and innovative activities with appropriate steps towards ensuring network safety and security, thereby creating a solid foundation for successfully implementing the development goals set by the city.

To promote the development of science, technology and innovation, in the coming time, the city needs to prioritize the implementation of the following tasks:

Research and propose to the Central Government to perfect legal policies on science, technology and innovation in accordance with market mechanisms and international practices.

Developing science and technology potential focuses on financial and investment solutions, mobilizing social resources to invest in science, technology and innovation; promoting technology transfer and application to improve productivity, quality and competitiveness for the capital's economy; building programs to support businesses in innovation, technology application and transfer, digital transformation, etc.

Developing the science and technology market, the innovation and startup ecosystem; accelerating the implementation of the Science and Technology Market Development Program; developing a network of service organizations for technology assessment, valuation, appraisal, technology brokerage, and technology transfer; building a technology exchange floor...; strengthening

linkages, cooperation and integration according to the principles of open science and open innovation to create connections and linkages between people, management agencies, businesses, research institutes and universities in the area; expanding and improving the effectiveness of international cooperation in science, technology and innovation.

## **5. Policy Implications**

### **5.1 Perfecting innovation institutions and policies**

Innovate and perfect institutions, policies and laws in accordance with market mechanisms and international practices to develop science - technology and innovation. Continue to perfect mechanisms and increase city budget investment in science - technology activities to allocate state budget resources commensurate with the requirements of science - technology development. Develop specific mechanisms and policies to promote invention, application, technology transfer, mastery of new technologies and support innovation activities.

Exploit and promote resources for science, technology and innovation development, linking the goals, targets and tasks of science and technology development with the goals and tasks of socio-economic development of the capital. Attract scientists and high-quality human resources; promote the connection between universities and enterprises. Encourage foreign direct investment projects to transfer technology to domestic enterprises. Actively and synchronously implement the construction of an innovation ecosystem and an innovation startup ecosystem in the area with all three main groups of subjects: Startups, startup support organizations and investors for startups. Strengthen public-private partnership (PPP) models to mobilize resources from the private sector to promote innovation. This may include encouraging private investment in innovation support funds or cooperation in R&D projects.

### **5.2 Perfecting the organization and operation system of the Innovation Center**

Innovate and improve the system of organizing scientific and technological activities: Review and rearrange the system of organizing scientific and technological activities, reduce intermediary contacts, overcome the overlapping, scattered, and duplicated functions, tasks, and research fields. Strengthen coordination between parties: Scientific and technological management agencies, research units, and enterprises to improve research quality, scientific and practical values. Develop a key program to develop innovative enterprises and develop key products of the Capital based on the following activities: Support for application, innovation, and technology transfer (especially source technology, new technology, core technology of the Fourth Industrial Revolution, such as digital technology, artificial intelligence, blockchain, 3D printing, biotechnology, environmental technology, etc.); Support businesses to improve their competitiveness and international integration through supporting advanced management system standards, productivity and quality improvement tools, applying geographical indications, applying and managing traceability systems; building, managing and developing product brands, craft villages...; strengthening the protection and enforcement of intellectual property rights.

### 5.3 Mobilizing resources to support the Hanoi Innovation Center

Develop an Open Innovation Platform to strengthen the connection and connectivity of research infrastructure of central and Hanoi research organizations, corporations and enterprises to create an environment for developing and testing new technologies. Expand and improve the effectiveness of international cooperation in the field of science, technology and innovation; select partners from developed countries with advanced and modern science and technology. Strengthen communication to raise social awareness, promote science, technology and innovation activities; reward and honor organizations and individuals with outstanding achievements in science, technology and innovation activities. Train and improve skills for employees.

### 6. Conclusion

The science and technology information policy includes various measures from the management agency, aiming to ensure that science and technology information is widely disseminated to all people. Among these measures, innovation in science and technology information activities is considered a core element, playing an important role in promoting the entire information organization system in Hanoi. However, this innovation process is also influenced by measures related to the structure and organizational model of science and technology information activities.

The study shows that there are currently up to 5 different models of scientific and technological information organization in the network system in Vietnam, which affects the standardization of scientific and technological activities. Factors such as organizational structure, operating model and innovation in processes, products, as well as marketing methods are considered barriers to innovation in scientific and technological information activities in Hanoi.

Therefore, the issue of perfecting the science and technology information policy at the Hanoi Innovation Center has become urgent, in order to overcome barriers in innovation of science and technology information activities through three main solutions. Specifically, it is necessary to ensure that the organization of science and technology information is consistent with the model of a public service unit with a complete operating process according to the information chain and records, creating a premise for standardizing the organizational model. The study also proposed to develop a draft Law on Science and Technology Information, including regulations to strengthen and expand the network of science and technology information organizations, especially for organizational models in Hanoi.

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