

TECHNOLOGY REVOLUTION 4.0 PROMOTES THE DEVELOPMENT OF VIETNAM'S ECONOMIC STRUCTURE

LA REVOLUCIÓN TECNOLÓGICA 4.0 PROMUEVE EL DESARROLLO DE LA ESTRUCTURA ECONÓMICA DE VIETNAM

Dung Xuân Bui ¹ 

1. University of Economics Ho Chi Minh City, Vietnam. dungbx@ueh.edu.vn

*Corresponding Author: Dung Xuân Bui, email: dungbx@ueh.edu.vn

Información del artículo:

Artículo original

DOI: <https://doi.org/10.33975/riuq.vol35n1.1007>

Recibido: 27 agosto 2022; Aceptado: 26 enero 2023

ABSTRACT

Today, when assessing the development level of each country, the development level of infrastructure is a crucial indicator. Therefore, investment in the development of production infrastructure is a priority and goes ahead of direct investment. Along with labor, capital, natural resources, etc., science and technology are considered essential resources with a significant impact on economic development. Over 35 years of innovation, our country's science and technology have made positive changes with many achievements in research and investigation, creating a scientific basis for formulating strategies and plans for economic development. Socio-economic, environmental protection, science, and technology, in association with production and life, contribute to improving productivity, quality, and efficiency of all branches and fields.

Keywords: technological revolution; technology 4.0; economic structure.

Cómo citar: Bui, Dung Xuân. (2023). Technology revolution 4.0 promotes the development of Vietnam's economic structure. *Revista de Investigaciones Universidad del Quindío*, 35(1), 157-165. <https://doi.org/10.33975/riuq.vol35n1.1007>

ISSN: 1794-631X e-ISSN: 2500-5782

Esta obra está bajo una licencia Creative Commons
Atribución-NoComercial-SinDerivadas 4.0 Internacional.



RESUMEN

Hoy, al evaluar el nivel de desarrollo de cada país, el nivel de desarrollo de la infraestructura es un indicador crucial. Por lo tanto, la inversión en el desarrollo de infraestructura productiva es una prioridad y va por delante de la inversión directa. Junto con la mano de obra, el capital, los recursos naturales, etc., la ciencia y la tecnología se consideran recursos esenciales con un impacto significativo en el desarrollo económico. A lo largo de 35 años de innovación, la ciencia y la tecnología de nuestro país han logrado cambios positivos con muchos logros en investigación e investigación, creando una base científica para formular estrategias y planes de desarrollo económico. La protección socioeconómica, ambiental, la ciencia y la tecnología, en asociación con la producción y la vida, contribuyen a mejorar la productividad, la calidad y la eficiencia de todas las ramas y campos.

Palabras clave: revolución tecnológica; tecnología 4.0; estructura económica.

INTRODUCTION

The production force of Vietnam today is necessary to promote science and technology. It is a significant factor in theory as well as in practice. It shows that science and technology always promote economic growth through their impact on aggregate supply and demand. Science and technology contribute to expanding the ability to effectively detect and exploit scientific and technological resources and products that directly contribute to GDP while determining long-term growth and increasing quality development, facilitating the transition from breadth to depth. Science and technology development with new and modern technologies such as new materials, nanotechnology, biotechnology, electronics, telecommunications, etc., increase production factors - business. Business grows income, which leads to an increase in consumer spending and investment for the whole economy. The development of science and technology increases people's access to goods and services through information and transportation services. Therefore, in this day and age, the contribution to the economic growth and development of many countries from science and technology is very high.

LITERATURE REVIEW

The Fourth Industrial Revolution is a combination of technology in physics, digital technology, and biology, creating entirely new production possibilities and having a profound impact on economic life, political, and social of the world. The 4th industrial revolution is also known as the "IP industry", "smart manufacturing," or "digital manufacturing" (Lee et al., 2018). Under various names, the fourth industrial revolution has the following characteristics: First, in terms of speed: In contrast to previous industrial revolutions, this revolution has an increasing acceleration, large but not regular in rate. Second, in terms of breadth and depth: Not stopping there, with enormous scope, the wave of new technology applications in all fields ranging from Physics to the area of Digital and biotechnology. Third, systemic impact: The Fourth Industrial Revolution led to the transformation of entire systems across countries, businesses, industries, and entire societies. Fourth, a high degree of automation is one of the basic features of the fourth industrial revolution. Fifth, the technology content in each product is increasing, and the knowledge economy becomes a direct productive force. Each product is born as a result of continuous improvement and innovation in technology, which contains knowledge (Skilton & Hovsepian, 2018).

The productive force is the entire economic structure; it consists of two basic components: workers and means of production (Maddison, 1952). As a part of the productive force, workers are those who can work with intellectual strength and physical strength. Among the factors of the productive force, workers are human beings. Labor plays a decisive role. With their physical strength, intelligence, and labor skills, the worker uses the means of labor, which is, first of all, a working tool, acting on the object of labor to produce material wealth. Regarding the factor of production: it is composed of two parts, the object of labor and the means of labor. The object of labor is what labor acts on, transforming it into a useful item (Bottomore et al., 1991). According to C. Marx, labor objects are parts of the natural world that are put into production; it is available in nature, such as land, water, and minerals. Labor materials are divided into two types: First, those that directly affect the object of labor are called labor tools, which are objects used as media for labor to affect the object of labor and used as labor tools. Second, the indirect impact on the object of labor: the necessary physical conditions of the labor process (in this thesis, we unanimously call it the means of labor). Labor means can be understood as means of production such as constructions, means of transport, communication, electricity, water, factories, etc. Among the parts of the means of labor, the work Labor tools play a vital and decisive role in production. The level of development of the tools of labor is a measure of human natural mastery, the standard that distinguishes economic epochs in history (Marx, 1859).

From the development of human history to the present day, all changes in social life, after all, originate from the transformation of the productive forces. In the current context of globalization and the Fourth Industrial Revolution, the level of productive forces has made great leaps and bounds. Because when science-technology has made great strides, it contributes to increasing labor productivity, promoting the development of the developing economy (Crossman, 2021).

MATERIALS AND METHODS

The article uses the approach of dialectical materialism to point out the birth, movement, and transformation of the industrial revolution 4.0 affected the economic structure of Vietnam to generalize trends and make forecasts. At the same time, the article also uses a combination of other research methods, such as comparison, analysis, synthesis, deduction, induction, abstraction, generalization, etc., to develop the article's content.

RESULTS

Science and technology are a direct productive force. The process of producing material wealth is the impact of man on nature to exploit or modify natural objects to create products that meet human requirements. In the production force, the role of science and technology reflects in the level of workers and work tools, which is the power of "materialized" knowledge. The increasing scientific content of these two factors will create impetus for developing productive forces and thus promote appropriate development of production relations.

The development of fixed capital indicates that common social knowledge (Wissen knowledge) transformed to some extent into a direct force of production. The relations of production constitute the social infrastructure and play a decisive role in the existence and transformation of the social

superstructure(Wang, 2022).

When knowledge crystallizes science and technology, fixed capital (factories, machines, tools, etc.) becomes a direct force of production to a certain extent. “To a certain extent” - when science develops strongly and at a high level, scientific knowledge is directly and quickly applied, “materialized” into fixed capital, labor used in the production process (Mitcham, 2022).

Among the factors constituting the production force, workers hold the most critical position (then the tools of labor), having a decisive role in the development of productive forces as well as production methods. The economic epochs differ not in what they produced but in how they built them and what means of labor.

The production process combines the three fundamental production factors mentioned above according to certain technologies. In which labor power plays the role of the subject factor, while the object of labor and means of labor are the objective factors of production. The distinction between the object of the labor and the means of labor is only relative. An object is the object of labor or the means of labor because of its specific function in the ongoing production process. The combination of the object of labor with the means of labor is collectively known means of production. Productive labor combines labor power with means of production to create material wealth (Sgarbossa et al., 2020).

Strongly developing science and technology, making science and technology the leading national policy, is the most important driving force for the development create modern production forces, knowledge economy, improved productivity, quality, efficiency, and competitiveness of the economy; environmental protection, national defense, and security assurance.

With the promotion of science and technology, it is the basis for the development of the productive force, expressed in the following aspects:

Firstly, promoting science and technology is associated with strong socio-economic development and economic globalization

The conditions for science to become a direct productive force are social production must reach a high level of development, creating opportunities and locations for science and technology. Science must achieve a high level of action capable of solving urgent problems posed by social reality. Technology plays the role of its direct productive force. Science and technology branches are more closely related to production and life. Many new scientific and technological achievements were applied, significantly improving productivity, quality, and efficiency in agricultural production, healthcare, post and telecommunications, transportation, construction, energy, oil and gas, consumer goods, export goods..., building and consolidating national defense and security (Rubin, 2020).

Second, science-technology promotes economic restructuring towards progress, among the factors affecting financial reorganization

Science and technology change the production structure, and the division of labor deepens and divides it into small branches. Create many new professions, many new fields. The structure within

the industry has also changed. Changing production to increase productivity and efficiency will create the possibility of evolving consumption structure due to increased income. The share and position of GDP of industry and services gradually increase, and agriculture gradually decreases. Science and technology affect the production process to increase labor productivity (Genkin et al., 2020). From there, the state can make capable service provision, management methods, and qualifications and working skills of employees, increasing total factor productivity (TFP) and enhancing growth quality. In reality, in developed countries, the contribution of TFP to GDP growth is often very high, over 50%; in developing countries, about 20-30% (Solow, 2001).

Third, science and technology improve the competitiveness of products, businesses, and the economy; a country with scientific and technological potential will be a country with high international competitiveness.

Science, technology, and technology have actively contributed to promoting the application and innovation of technology in socio-economic sectors and fields, especially industry, agriculture, transportation, and construction. , medicine - pharmacy, information, and communication such as: In Vietnam, machine design and manufacturing industry have manufactured hydraulic-mechanical equipment systems for large-capacity hydroelectric power plants, built ships of 53,000 tons and vessels, transported 100,000 tons of crude oil, manufactured a jack-up rig at a depth of 90m, and developed technology to exploit oil in cracked foundation rock. The agricultural sector has increased added value is 30%, with the creation of wide varieties of plants and animals with high quality and productivity. The information and communication technology industry has researched and produced BKAV anti-virus software for computers, Mobile Portal technology Socbay iMedia - general news and entertainment software for mobile phones, etc (Vladimir, 2013).

Technology innovation capacity is one of the essential criteria to rank a country's competitiveness. The application of scientific and technological advances makes the input factors, especially the synthetic ones, enhanced and more effective, and the production and consumption scale increasingly expand, creating a new market, export-oriented, increasing competitiveness in international and regional markets.

Fourth, in a market economy, the goal and motivation of the business is profit

Businesses always aim to reduce costs, lower product costs, and are forced to apply scientific and technological advances, which improve product quality, improve worker productivity, reduce labor costs, and reduce costs, creating competitive advantages. It determined that increasing labor productivity to achieve economic efficiency can be completed through the transition to an innovative economy based on new technologies and the mobilization of all production resources. It characterizes the relationship between productivity, production costs, and production volume (Huseynli, 2022). The domestic market and the foreign market enhance profits. Science and technology improve the material and spiritual life of people; the development of science and technology makes many new professions appear, creates many new jobs, and significantly increases labor productivity, thereby increasing labor productivity income and improving people's living standards. The development of biotechnology and chemistry has produced many new drugs; many modern medical facilities have opened up many new ways of treating diseases, creating better health care conditions. The development of science

and technology also contributes to increasing social exchanges, making people's spiritual lives more prosperous and better. The result of electronic technology, informatics, and telecommunications has shortened the geographical distance between countries and regions.

Fifth, the development of science and technology contributes to and facilitates the improvement of the ecological environment, production and human consumption continuously develop, so waste is constantly increasing, causing harm to people. and ecological environment

Developing and applying biotechnology and chemistry of treated wastes, improving and contributing to environmental protection. Science and technology development also contributes to saving consumption of raw materials and fuel, reducing waste, and finding new sources of energy and materials to replace traditional resources without polluting the environment; science and technology to detect and forecast natural disasters for prevention. However, the impact of science and technology also causes adverse effects on economic development, such as the increasing disparity between rich and developing countries, and many countries monopolize advances in science and technology special medicine...

Sixth, science and technology promote superstructure development

The legal system on science and technology has been promulgated relatively fully, with eight laws creating a synchronous legal corridor, a favorable environment for promoting science and technology development, achieving outstanding results, making practical contributions to socio-economic development, ensuring national defense and security, and improving people's lives. Social sciences and humanities have provided scientific grounds for formulating guidelines, undertakings, and policies for the country's renovation, construction, and development and the path to socialism in Vietnam. The natural sciences have achieved several typical achievements in basic research and applied research to serve socio-economic development goals, ensure national defense and security, and enhance the country's international position in Vietnamese science, especially mathematics and theoretical physics.

In addition to the above-mentioned outstanding achievements, our country's science and technology are still quiet and have many limitations, not becoming a driving force for socio-economic development. Scientific and technological activities are still heavily educational, not closely and effectively linked to socio-economic development goals and tasks, and only meet a small part of society's needs. and businesses; Scientific and technological achievements are still local, not systematic, and not completing the increasing demands of the cause of accelerating industrialization, modernization, and international integration.

The management mechanism, organization, and operation of science and technology still have many irrationalities. The method of formulating and organizing the implementation of scientific and technological tasks at all levels is still overlapping, does not meet the requirements of the reality of socio-economic development, and very few scientific and technical charges are of great significance national and international. The financial mechanism in scientific and technological activities, especially the procedures for payment and settlement of scientific and technological studies, is still cumbersome, complicated, and inconsistent with the characteristics of scientific and technical activities. Even

scientists have to do what they don't want to be "lies" to legitimize spending norms and spending content to settle scientific and technological tasks. Investment in science and technology is still low, and efficiency is not high. The total social investment in science and technology only accounts for approximately 1% of GDP, of which the state budget accounts for about two-thirds. Compared with other developing countries, this level of investment is modest; for example, in China, about 1.75% of GDP, and some countries of the Organization for Economic Co-operation and Development (OECD) reach more than 1.75% of GDP. 2% of GDP and mostly from business...(Government, 2012)

The allocation of 2% of the state budget for science and technology annually is ineffective, especially in localities with no real need and potential for science and technology. Although the system of science and technology organizations has increased rapidly, reaching over 1,600 organizations, it is not synchronized in sectors and fields due to the lack of a master plan. The transformation of public science and technology organizations into an autonomous and self-responsible mechanisms for implementation is still very slow. National - technical infrastructure and scientific and technological potentials are still limited and inefficiently used. The exploitation and use of 03 national hi-tech parks and 17 national key laboratories are inadequate and not commensurate with the investment attention of the State. Our country's science and technology market form slow to develop and is still at a rudimentary level. Market transactions are still mainly equipment, machinery, entire production lines, technology purchase and sale transactions in the form of patents, technological know-how, and practical solutions. Science and technology enterprises have not yet developed. The number is too small, so they have not promoted the increase of technology demand in the market. The context of globalization, international economic integration, and the development of the knowledge economy are creating significant opportunities and challenges for science and technology in our country.

DISCUSSION

Firstly, raising awareness of society, party committees, authorities, and businesses about the critical position and role of science and technology in the cause of industrialization and modernization of the country. Party committees and governments should consider the development and promotion of science and technology application as a critical political task, linking scientific and technological objectives and functions with the goals, tasks, master plans, and socio-economic development plans in each branch, field, and locality.

Secondly, strongly and synchronously renew the management mechanism, organization, and operation of science and technology, considering this as a breakthrough to develop and improve the effectiveness of science and technology, in which, The focus is on innovating investment methods, financial mechanisms and policies for science and technology staff.

Third, the annual allocation and use of the state budget for science and technology should be consistent with the significant scientific and technological directions, objectives, and tasks in each period; based on results and efficiency in using science and technology funds of ministries, branches, and localities to make appropriate adjustments to overcome the situation of spreading, scattered, improper use, not efficiency of this resource the contents for performing science and technology tasks and procedures for payment and settlement of scientific. Technological studies simplify in line with the reality and characteristics of scientific and technical activities. The financial mechanism of scientific and

technological activities must be flexible and timely according to the order or proposal schedule to meet urgent and direct requirements, especially for scientific and technical tasks. Or duration of each task type.

Fourth, innovate the method of mobilizing social resources to invest in science and technology development, especially from enterprises. Vietnam has mechanisms and policies to encourage and pressure enterprises to invest in research. Market technology users scientific enterprises Science and technology play a role. So innovation and digital transformation promote the construction and development of a creative economy and growth based on science, technology, and innovation. Supply chain diversification is the key to building a sustainable supply chain, highly adaptable to significant fluctuations of the world and regional economy, ensuring stable production activities, and participating effectively in the global value chain.

Fifth, innovate the method of deploying science and technology, application efficiency as the top standard. Concentrate on the practical needs of the socio-economic development of the nation. Concentrating resources on research is essential to the economy and, at the same time, promotes the application of new, high technology, especially in the field of information technology, biotechnology, new material technology, and automation technology. Apply research tasks to meet the market's needs, enterprises, and development requirements of the industry, field, region, and locality. Diversify the method of implementing scientific and technological tasks such as assignment, contracting, bidding, and ordering... along with employing funds for the final scientific and technical products to promote the implementation of scientific and technological tasks. Implement the method of ordering scientific and technological studies and consequences associated with the responsibilities of the orderer, the presiding organization, and the individual in charge of performing scientific and technical tasks using service results development of the country, sectors, and localities.

Sixth, develop and implement a policy of detecting, attracting, training, appreciating, treating, and honoring high-level scientific and technological staff with research results of international standards, having international standards scientific products of value to the country. Create favorable conditions for overseas Vietnamese intellectuals and foreign scientists to participate in science and technology activities in Vietnam. Vietnam promotes cooperation and active international integration in science and technology to serve the requirements of technological innovation in the country and improve the national scientific and technical. Science and technology will become a driving force for economic growth if it meets the market's needs and is applied and effectively used by enterprises in production and business activities to create high-quality products, goods, and services. Only through business can science and technology be "materialized" and truly bring into full play their strength.

CONCLUSION

In the context of globalization and deeper international integration, cooperation in science and technology promotes exploiting the opportunities that globalization can bring. In the current conditions of our country, it is necessary to import technology from developed countries mainly to promptly meet the development needs of the economic - technical sectors; at the same time, improve endogenous scientific and technological capacity to absorb modern scientific and technological achievements of the world effectively.

Conflict of interest: The author declare the non-existence of conflicts of interest.

Contribution by author: The author is responsible for all components of this work.

Funding or funds: This research is funded by University of Economics Ho Chi Minh City, Vietnam (UEH).

REFERENCES

- Bottomore, T., Harris, L., Kiernan, V., & Miliband, R. (1991). *The marxist thought*. Blackwell Publishers Ltd.
- Crossman, R. H. (2021). Towards a philosophy of socialism. In *Democratic Socialism in Britain* (pp. 1-32). Routledge.
- Genkin, E., Filin, S., Velikorossov, V., Kydyrova, Z., & Anufriyev, K. (2020). The fourth industrial revolution: personnel, business and state. E3S Web of Conferences,
- Government, V. (2012). *Let science and technology really be the driving force for development*. <https://baochinhphu.vn/de-khoa-hoc-va-cong-nghe-thuc-su-la-dong-luc-cho-phat-trien-102132040.htm>
- Huseynli, I. (2022). Labor productivity as an important factor of efficiency: ways to increase and calculate. In *Digitizing Production Systems* (pp. 444-451). Springer.
- Lee, M., Yun, J. J., Pyka, A., Won, D., Kodama, F., Schiuma, G., Park, H., Jeon, J., Park, K., & Jung, K. (2018). How to respond to the fourth industrial revolution, or the second information technology revolution? Dynamic new combinations between technology, market, and society through open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 4(3), 21.
- Maddison, A. (1952). Productivity in an expanding economy. *The economic journal*, 62(247), 584-594.
- Marx, K. (1859). Preface to a Contribution to the Critique of Political Economy. *The Marx-Engels Reader*, 2, 3-6.
- Mitcham, C. (2022). *Thinking through technology: The path between engineering and philosophy*. University of Chicago Press.
- Rubin, I. I. (2020). *Essays on Marx's theory of value* (Vol. 23). Pattern Books.
- Sgarbossa, F., Grosse, E. H., Neumann, W. P., Battini, D., & Glock, C. H. (2020). Human factors in production and logistics systems of the future. *Annual Reviews in Control*, 49, 295-305.
- Skilton, M., & Hovsepian, F. (2018). *The 4th industrial revolution*. Springer.
- Solow, R. M. (2001). Applying growth theory across countries. *The World Bank Economic Review*, 15(2), 283-288.
- Vladimir, M. M. (2013). Economic modernization in Vietnam from industrialization to innovation stage. *VNU JOURNAL OF ECONOMIC AND BUSINESS*, 29(2).
- Wang, Y. (2022). Recognition of Marx's Machine Thought and Human Development from the Perspective of Intelligent Society. *Multidisciplinary Digital Publishing Institute Proceedings*, 81(1), 143.