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The role of education in developing production forces, a case study at Thai Nguyen University of Technology

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ABSTRACT
In this article, the author provides a theoretical overview of production forces, analyzes the role of education and training in promoting the development of fundamental factors of production forces, and summarizes practical experiences. Furthermore, it offers directions and solutions to enhance the role of Thai Nguyen University of Technology in developing production forces.
Production forces represent the productive capacity of society in certain historical stages, including human factors, production materials, and science and technology. All three factors stem from a foundation of human knowledge. To promote the development of production forces, it is essential to fully recognize and impact the issue of education and training because only by strengthening education and training can the development of human factors, especially knowledge, be promoted.
Education and training provide a high-quality labor force and contribute to the creation of new scientific works, thereby directly generating new production materials. Thai Nguyen University of Technology serves as a high-quality human resources training facility, conducts scientific research, consults, applies, and transfers technology to meet the country's sustainable development requirements and international integration. To fulfill its role and mission in society, the university needs to become a center for high-quality, diversified labor training; a producer of high-quality production materials; and a center for research, creativity, and application of science and technology.
Keywords: Production forces, human factors, production materials, science and technology, education and training

I. INTRODUCTION

C. Marx wrote: "The weapon of criticism cannot, of course, replace criticism by weapons, material force must be overthrown by material force; but theory also becomes a material force as soon as it has gripped the masses". President Ho Chi Minh pointed out: "The theory is the core to be applied in practice. Theory without practice is empty theory". The insights of the classic theorists of Marxism-Leninism and President Ho Chi Minh have clearly demonstrated the role of studying theory and creatively applying it to practice.

For the prosperous and happy development of the country, promoting the development of production forces is crucial; it is the driving force that propels our society forward. Therefore, researching theory related to production forces and applying it to the country's renewal process is absolutely essential. One of the catalysts for advancing the development of production forces is education and training. Education and training create a high-quality labor force and provide the ideal environment for research, application, and creative development of science and technology.

In this article, the author provides a theoretical overview of production forces and analyzes the role of education and training in promoting the development of fundamental factors of production forces.

1.The role of production forces in the dynamics and development of society

1. 1. Overview of production forces

Production forces play a significant role in both life and society. From a comprehensive perspective, the development of production forces leads to changes in production relations, thus altering the superstructure and replacing the old social forms with new, more advanced economic forms. More specifically, the progress of production forces reflects the level of societal development.

Production forces encompass all material and ideational factors that constitute the transformative power over the natural world in

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accordance with human survival and growth needs. It is utilized in the societal production process across specific historical periods.

Structurally, production forces consist of three fundamental factors: Labor, production materials, and science and technology.

Laborers are the subjects of the production process, the creators and users of labor materials to produce goods and services for consumption. The scale and skill level of the labor force are crucial determinants of the scale and capacity of the societal production system.

Production material stands as a fundamental factor, one of the two indispensable elements in shaping a production process. Based on its role in the production process, production material can be classified into two components: labor material and labor objects.

Labor material encompasses all material factors that transmit labor power to labor objects. It also consists of two parts: one part directly transmits labor power to labor objects, commonly existing in the form of labor tools. These tools range from primitive implements like hoes and shovels to modern machinery like excavators and robots. The other part of labor material plays an indirect role in impacting labor objects or participates in supporting the production process, examples of which include warehouses, docks, storage tanks, and labor protective equipment. Among the components of labor material, labor tools are the key factor, as they enhance the productivity of the labor process. Labor tools also undergo continuous development, progressively improving and reflecting the level of production in each era.

The second part of production materials is labor objects, the origins of all products in human life. Labor objects encompass all material factors that humans use labor and labor tools to transform to meet societal needs. Based on their origin, production materials are divided into two forms: raw materials existing in nature, such as natural resources like minerals, geographical locations, natural product richness, land, climate, etc., and processed production materials, transformed by humans from natural resources. These materials exist in various forms, including raw materials, fuels, auxiliary materials, labor tools, seeds, and breeds, continuously diversifying but closely depending on natural resources.

The third factor, and the most distinctive one, of production forces is science and technology. Essentially, science and technology can be regarded as production materials. However, their role in the production process has become increasingly crucial for human production activities. The relative independence of science and technology makes it one of the three fundamental factors of production forces. Science and technology are the products of human intelligence, demonstrating human's ability to conquer nature and determining the progress of production materials. Alongside the development of knowledge, science and technology are always considered a decisive factor in promoting the development of production forces.

Among the three aforementioned factors, labor or human factors are considered the nucleus of the entire production force. Humans operate production, innovate and improve their labor tools, and adapt nature for their benefit. The movement and development of humans propel and generate the movement of all factors within the production force.

1.2. The development of production forces determines the dynamics and progress of society

In the theory of socio-economic formation, Marxist-Leninist classics have affirmed that material production is the decisive factor in the existence and development of human society. Material production creates wealth to serve the survival and development needs of humanity. It also forms the foundation for the development of other sectors in society, such as politics, culture, and ideology.

In any society, the creation of wealth, material production for society, requires both laborers and production materials. Without tools to serve the labor process, humans cannot interact with the natural world to create material wealth. Therefore, production forces play a crucial role as determining material factors in the process of producing goods for society. To satisfy their basic needs, humans must innovate technology, manufacture labor tools, and, most importantly, control production materials. The development of production forces determines the transformations and progress in all aspects of life, determining the development of society from low to high levels.

Production forces are also a component of the mode of production and serve as the foundation and prerequisite for production. Without labor tools, humans cannot produce material wealth to satisfy their needs. The development of production forces leads to the social division of labor, increases social labor productivity, resulting in surplus production. Surplus production is one of the reasons for the emergence of private ownership and social classes. Thus, the development of

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production forces is the deep-rooted cause of the emergence of social classes.

Today, the issue of developing production forces is a matter of survival for countries, nations, especially those that are underdeveloped. To escape poverty and backwardness and keep up with globalization trends, underdeveloped and developing countries must find ways to promote the development of production forces. For developed countries, production forces become increasingly important, determining human capacity to dominate the world and the civilization and progress of humanity.

2. The role of education in the development of production forces

2.1. Humans - the core of production forces

It can be said that the existence and development of society cannot be achieved without relying on production forces. One of the two indispensable factors of production is humans. The developmental resource of society, first and foremost, is humans. For humans, the most important factor is intelligence. Even in the present era, marked by the development of production forces through scientific inventions and modern technologies, human intelligence still holds decisive power, contributing to driving the development of production forces.

Production forces are the combination of laborers with production materials, primarily labor tools, to create a certain level of material production capacity. Thus, production forces consist of laborers and production materials. Nowadays, science and technology have also become production forces as they directly cause many changes in production and become an indispensable factor in the production process. Among the elements of production forces, humans are the main characters in history, serving as both the goal and the driving force for societal development. Humans are not only the creators of all material and spiritual values but also continuously innovate and improve themselves. Although science and technology elevate their status and power, all those forces are ultimately created and controlled by humans. Computers can calculate millions of times faster and more accurately than humans, robots can perform tasks that humans cannot, but ultimately, all those forces are created and controlled by humans. Science and technology only play a significant role when they are mediated through humans, under human control.

In this regard, the role of human factors in production forces is the most important, dynamic, and creative factor in the production process. The central factor of humans is labor power, which includes physical and mental abilities. Laborers are the subjects of the production process, utilizing their strength and labor skills, primarily using labor tools, to affect labor objects and produce material wealth. Alongside the production process, the strength and skills of human labor continuously increase, especially human intelligence. Thus, the process of material production cannot be separated from human labor. In the modern era, the era of information and creativity, human factors, especially knowledge, play an increasingly decisive role in production forces. Today, as our society has developed to a very high level, the constraints of natural resources on production are gradually being liberated. Humans have mastered most land areas, dominated most available resources, and the decisive factor for production forces in the future will be the creative capacity of human intelligence.

2.2. Education: A determining factor in the development of production forces

Education and training represent a unique social phenomenon of humanity. It can be argued that the ability to educate and train has determined the development of human society. The transmission of knowledge, especially scientific knowledge, from one individual to another, from one generation to another, has been a significant difference-maker for humanity. Alongside knowledge transmission, education and training involve individuals delving deeper into their understanding of the world, collectively creating new knowledge, experimenting, synthesizing, and preserving knowledge across generations.

From the essence of education and training, it is evident that humans are at the center of all social activities. Education and training emerge to meet the needs for exchanging, preserving, and developing knowledge. In turn, education and training facilitate the comprehensive development of individuals. It can be said that education and training play a decisive role in the destiny of society. Concerning production issues, education and training serve as the foundation, the conditions for the development of production forces.

Humans are the subjects of material production, the factor determining the development of production forces. For the human factor, education and training are prerequisites for building and developing personality, physical fitness, and intellectual abilities. Furthermore, education and training provide an environment for individuals to unleash their infinite creative

potential. Thanks to education and training, individuals have increasingly access to higher levels of skilled labor. Education and training contribute to enhancing the intellectual level in all countries, meaning an increase in the general understanding of citizens in all fields, especially scientific knowledge.

Education and training play a role in promoting the development of human resources:

The development of science and technology renders human resources the most decisive factor for the sustainable development of the knowledge economy. All countries aspiring to rapid and robust development need abundant, highly trained human resources. To create high-quality human resources, the role of education is irreplaceable. Education and training contribute to providing skilled human resources in sufficient quantity and quality to serve the economic and social development of the country. Education aims to train and develop human resources with technical expertise, high skills, practical abilities, proactive creativity, and responsibility in work. Thereby, it increases labor productivity. Education not only improves quality but also provides a large quantity of high-level human resources, filling the gap to meet actual demands. Educational activities develop high-quality human resources comprehensively, diversify human resource structures. Moreover, education facilitates the rational restructuring of human resources by sector, prioritizing occupations that bring high intellectual value.

Education and training enhance the mastery of production materials:

Humans are born from the natural world, but we differ from animals in that we progressively conquer nature. The process of liberating ourselves from dependence on nature and the historical creativity of humans is also the process of mastering the available resources of nature. Through education and training, humanity teaches each other how to use, transform, and protect the available natural resources. We recognize that the natural resources on Earth are finite. Therefore, in addition to educating for the use of natural resources, we are also educated to protect and sustainably utilize those resources. Education and training also provide guidelines for sharing natural resources, cooperating to leverage the advantages of each nation and ethnic group worldwide. Today, education and training demonstrate their role in creating generations of increasingly knowledgeable and conscious individuals, directly impacting human-to-human relationships in the use of production materials. High levels of human knowledge gradually blur class and ethnic boundaries in society, aiming for democracy and equality in all fields. With high levels of human knowledge, individuals strive for equality in their relationship with production materials, thereby gradually eliminating oppressive and unequal relationships.

Education and training provide an environment for scientific and technological research and innovation.

In their development, education and training have evolved from being knowledge transmission activities to environments and conditions for knowledge development. In society, from time immemorial, no field has created an environment, opportunities, and inspiration for the development of knowledge like education and training. Educational institutions, from places teaching basic knowledge to the highest levels such as universities, research institutes, provide participants with opportunities to exchange knowledge, discuss new ideas, implement and experiment with ideas. The educational environment is also an ideal place to refine, test, and evaluate scientific ideas, as well as to easily find solutions to scientific issues. In the modern era, the educational and training environment, especially universities and research institutes, alongside teaching, research, and technology transfer missions, have become central tasks. In many countries worldwide, universities and research institutes are being oriented to become ideal environments for the development of science and technology. Many universities have owned significant inventions with a great impact on the scientific and technological revolution of humanity.

3. Thai Nguyen University of Technology with the development of production forces

3.1. The role of Thai Nguyen University of Technology in developing the production force

Thai Nguyen Universityof Technology (TNUT), a leading institution in training high-quality human resources, conducting scientific research, consulting, and technology transfer to meet the sustainable development needs of the country and international integration. TNUT is striving to become a nationally and regionally accredited university, focusing on applied directions in the fields of science, technology, and engineering. It aims to be a reputable research, application, and technology transfer center

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nationally and internationally, providing high-quality human resources to serve the community and contribute significantly to the economic, cultural, and social development of the nation and region.

The university aims to provide students with a broad knowledge foundation, deep expertise, and necessary skills to adapt, respond to the trends of the new era, and possess strong ethical values and cultural traditions. Emphasizing the construction of a modern, cooperative, and humanistic educational environment, the university aims to foster a friendly, beneficial, and practical learning environment to promote students' enthusiasm for learning, research, and creativity. It focuses on training necessary skills for students to be independent in perception, collaborative in all activities, enhance adaptability, and create new values for the community and society. It educates students on behavioral norms, social ethical standards, and professional ethics to promote continuous moral and cultural development and to recognize their responsibilities to their families and society, laying the foundation for future success.

Currently, TNUT comprises 25 units, including 12 faculties and training centers with 37 divisions, 05 laboratories and practical workshops, 12 functional departments and centers, 01 research institute, and 01 technology transfer limited company. The university's staff consists of 594 members, including 416 lecturers, 78% of whom hold postgraduate degrees, and 10% hold doctoral degrees. 93% of faculty members proficiently teach theory in a foreign language or have an English proficiency level above 450 TOEFL ITP. They serve in training over 11,000 students and international students in more than 30 undergraduate and postgraduate majors, including 02 advanced programs and 02 international collaborative training programs.

Readying to embrace new opportunities and challenges in the era of integration and development, the university continuously invests in infrastructure, develops and nurtures its staff, determined to achieve the goal of becoming a prestigious technical training center nationally and internationally.

3.2. Enhancing the role of Thai Nguyen University of Technology in developing the production force in the country's innovation career

Based on a correct understanding of the role of education and training, particularly university education, in the development of the production force, the author boldly proposes some directions to enhance the role of TNUT in developing the production force in the country's innovation career.

Firstly, becoming a training institution, providing high-quality and diverse labor resources. Leveraging human factors, particularly labor, is crucial to the production force's development. As a university, TNUTserves as both a place for transmitting scientific knowledge and a scientific research institution. Therefore, it needs to concentrate resources, develop its faculty, and improve the quality of training to contribute to providing the best human resources for social production. In the social material production context, industrial production increasingly becomes the leading sector, driving the production level forward. As an engineering university, TNUT must become a leading training institution, producing engineers, architects, experts, and outstanding scientists capable of mastering and innovating technology.

In the future, the university needs to proactively grasp society's labor demands to guide labor training at various levels and in diverse fields. To achieve this, the university needs to create breakthroughs in human factors within its faculty and staff. Implementing various policies to attract talented faculty, experts, enhancing collaboration with high-quality education and training institutions domestically and internationally, and improving the quantity and quality of its faculty and staff, providing opportunities for them to access and learn from leading training environments. These efforts will directly enhance the university's training quality, producing highly skilled graduates, thereby contributing to boosting the production force of Thai Nguyen province and the whole country.

Secondly, becoming a high-quality production material production base. The result of developing the production force is the development of labor tools and labor subjects. Modern labor tools efficiently using natural resources and producing various new materials demonstrate the development of production materials. Besides being a strong educational institution, TNUTneeds to transform into a reputable institution in applying scientific and technological knowledge to produce advanced and modern labor tools and machinery.

As a research and application center for science and technology in Thai Nguyen province and the northern midland and mountainous region, well aware of the local industrialization, modernization, and economic development processes, TNUT can become a prestigious brand, providing high-quality industrial products serving

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the production of Thai Nguyen province and neighboring regions, even nationally and internationally. Participating in the production process of labor materials and labor subjects through processing also contributes concretely to scientific research and technological innovation topics. Involvement in the production of labor materials also contributes to creating financial resources for reinvestment, developing infrastructure, enhancing training quality, helping the university grow stronger.

Thirdly, becoming a research, innovation, and application center for science and technology. The central task of educational institutions, especially universities, is to teach, convey scientific knowledge, and innovate new technologies. To actively contribute to promoting the development of the production force, TNUTneeds to strive to become a leading research, innovation, and application center for science and technology, at least within Thai Nguyen province and potentially nationwide. The university needs to be at the forefront of the province's industrialization and modernization process.

In the increasingly fast-paced development trend of science and technology, TNUT needs to proactively assess the practicality of current science and technology and forecast the future trends, thereby staying ahead and embracing technology in both teaching and creating new technologies. Regularly updating the latest scientific knowledge while trying to create new technologies suitable for its capabilities is essential. To become a leading research, innovation, and application center, TNUT needs to concentrate material resources, invest in scientific research equipment, and innovate management mechanisms to turn the university into an ideal place for researching, exploring, exchanging knowledge, and developing technology creatively.

II. CONCLUSION

The theory of the production force is an important, pervasive content of historical materialism and the economic and political theory of Marxism-Leninism. The theory clearly identifies the core issue in the development of the economy, politics, and human society, which is the movement of the production force. From the constituent elements of the production force, we can see the relationship and crucial role of education and training, especially university education, in promoting the development of the social production force. Education and training are not only the foundation for the development of all aspects of social life but also the decisive factor in the quality of social production.

With a profound understanding of the production force and the role of education and training in its development, educational institutions, especially TNUT, can correctly determine their position, functions, and tasks in the country's industrialization, modernization, and innovation. This reflects the determination and aspiration to contribute to the prosperous and happy development of the locality and the nation.

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