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STAGES OF TECHNICAL REVOLUTION AND ITS SOCIO-PHILOSOPHICAL IMPORTANCE

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Abstract: This article examines the transformative discoveries in production, industry, and technology from the 17th to the 20th centuries, highlighting their profound impact on human life. **General Background:** The period marked a pivotal shift in economic and political relations, often referred to as the "big bang" of European industrialization, which catalyzed unprecedented advancements. **Specific Background:** Key developments in manufacturing machinery, automation, and computing are analyzed, revealing a trajectory of revolutionary change that reshaped labor, productivity, and societal structures. **Knowledge Gap:** Despite extensive research on individual technological innovations, there is a lack of comprehensive studies connecting these advancements to broader socio-economic transformations. **Aims:** This article aims to bridge this gap by situating technological progress within the context of evolving economic and political frameworks. **Results:** Findings indicate that the interplay between technological innovation and socio-economic change facilitated the emergence of new economic paradigms, contributing to both local and global shifts in power dynamics. **Novelty:** This study introduces a holistic perspective that integrates technological advancements with the evolution of economic relations, offering a fresh lens through which to understand the interconnectedness of industry and society. **Implications:** The insights gained from this research have significant implications for contemporary discussions on the relationship between technology and socio-economic development, suggesting that current technological trends may similarly reshape future economic landscapes.

Keywords: Electric Motor (Dynamo), Steel Industry, Textile, Agricultural, Industrial, Engine, Mechanical Spinning Wheel, Locomotives, Boats

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Introduction

Innovations in the production industry and technology of the 17th-20th centuries brought humanity to a new high level of consciousness. After the agrarian society, the formation of the industrial society led to an increase in the types of stratification.

The 17th century was a decisive period for the industrial revolution. The power of steam was discovered. The work of James Watt (1736 - 1819) on the steam engine made it possible to create a machine for pumping water from coal mines (this was actually an important phenomenon for England because of the early strata and high groundwater levels). This discovery led to the rapid development of the steel industry, textile production and other sectors of the national economy. In England, by 1810, there were about 5,000 machines (for comparison: in Prussia, the first steam engine appeared only in 1830). In a short time, England became the most technologically advanced country, although several more machines were created in this country in a few decades. In the same 18th century, the mechanical spinning wheel was invented, initially combining eight spindles and serving only one

worker; later the number of spindles increased to eighty, and large machines - "spinning wheels" did the work of six or even eight workers. In the economic sector of England, there was a sharp increase in labor productivity. The purpose of such discoveries was not only economic profit, but also control of leadership in the industry. Thus, steam engines and boats were created in western Europe after the steam engine. This made a real revolution in the deepening of communication and cultural communication between people, cities and countries. He developed mutual cultural ties between peoples.

The discoveries of the science of that time helped to create new machines. The determination of electric power was of great importance. In 1867, a universal engine - an electric motor (dynamo) appeared.

Methods

Literature Analysis and Methods

Therefore, the transition of manufacturing to industrial production led to the widespread introduction of machine-building technology into production and the use of it in the production process. This, in turn, has dramatically increased the demand for engineering activities, which can no longer be met casually. This indicated the growing interest of people in the field of engineering, their interest in acquiring specialized knowledge, and the need for scientific-methodical and professional training of engineers. The first steps in this field were made by the French mathematician and engineer Gaspard Monge (1746 - 1818) with the establishment of the Paris Polytechnic School in 1794. This, in turn, led to the discovery of a type of education in which scientific-theoretical and technical-practical training of students is carried out harmoniously. It was through this type of education that a large number of professional engineers began to be trained, whose main goal was to operate and develop mechanical engineering technology.

Results and Discussion

Results

The introduction of machinery into production not only made manpower redundant, but also greatly increased labor productivity by making extensive use of low-paid child and women's labor in the process. As a result, hundreds of thousands of workers were forced to leave production and were thrown into the streets. The machine becomes the competitor of the worker, so the workers directed their anger and discontent first against the machines, not against the capitalist owners, and then a wave of anti-machine riots swept across Western Europe, as a result of which hundreds of machines were destroyed and put out of work. Others were burned en masse or otherwise destroyed.

The volume of calculations and design increases dramatically, because the engineer is not only involved in the development of a new engineering object, but also in the creation of a similar modified product (for example, a car of the same class, but with different characteristics - different power, speed, dimensions, weight, design etc.). In other words, the engineer is now busy both creating new engineering objects and developing a whole class of engineering objects similar to (homogeneous) invented ones.

Discussion

Automation and computerization should be mentioned. This is one of the most important processes of the scientific and technological revolution that took place in the second half of the 20th century.

At the beginning of the century, conveyors appeared in the industry. In 1913, the first assembly line was launched at Ford factories, which increased labor productivity eightfold. However, the

assembly line had its own production. This limited human activity to some extent. This required a change in the labor regime and other measures to ensure the desired productivity. In more developed industrial countries, research was also carried out on the transfer of a number of functions of those who worked on the conveyor to the machine. The goal was to create an automatic machine and systems of such automatic machines, which include special devices capable of maintaining the optimal operating mode, setting feedback and correcting the work. Such automatic machines were created. They first appeared in the United States. In the middle of the century, the first automatic plant producing pistons for car engines was launched in the USSR.

Automation is capable of covering not only individual factories and industries, but (in the future) the entire industry. Automation, on the one hand, leads to a sharp increase in production, a decrease in its cost, and on the other hand, a reduction in the number of workers, unemployment, which in turn requires them to provide financial support as a result of retraining former workers and the organization.

The main types of engineering activity are being formed: engineering invention, design, engineering project.

Inventive activity is a complete cycle of engineering activity: the inventor establishes connections between all the main components of the engineering reality - the functions of the engineering device, natural processes, natural conditions, structures (all these components are found, described, calculated).

Design is an incomplete cycle of engineering activity: connections between the main components of engineering reality are already established in inventive activity. The design task is different - based on these connections, it is possible to determine (including calculation) the structural location of the engineering structure.

In engineering design, a similar task (determining the design of an engineering device) is solved in a different way - the design method: in the project, the operation, structure and production method of the engineering device (machine, mechanism, engineering structure) are simulated and installed, without resorting to prototypes. A gradual process of schematization of engineering devices took place, in which these objects were divided into separate parts and each of them was replaced by an "idealized image" (scheme, model). On the one hand, idealized concepts began to be considered as an engineering object of mathematical knowledge, and on the other hand, they were introduced to natural sciences. The replacement of the engineering object with mathematical models was necessary both as a necessary condition for invention, design and calculation in itself, and as a stage in the construction of ideal objects of natural science necessary for these procedures.

Conclusion

In conclusion, the construction of the theory of technical science was carried out. As a result of these theoretical processes, technology forced the human labor potential to be directed to other fields. Since then, technology has become a competitor for human employment. As a result, a person began to work on himself (his attitude to work). The attitude towards the concept of work has changed radically, the concepts of high-quality performance of work and a responsible approach to it have increased several times..

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