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Analysis on the Positive and Negative Effects of Science and Technology

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ABSTRACT
Science and technology are actually composed of two parts: science and technology, each of which has different connotations. Science, as a theoretical system of knowledge, is gradually obtained and accumulated by mankind in long-term social practice. It brings together the precious achievements of human understanding of nature and society in various historical periods. It is a correct understanding. Based on scientific development, through the updating of certain means, products, procedures, methods, methods, etc., technology makes the process and activities more concise and more efficient. The impact of science and technology on social development is becoming more and more far-reaching, and science and technology are like a double-edged sword：while promoting the rapid progress of society, it also has a negative impact on society.

Keywords: *Science and technology, Powerful levers, Production methods, social and economic structure，Negative social effects*

1. SCIENCE AND TECHNOLOGY ARE POWERFUL LEVERS TO PROMOTE SOCIAL DEVELOPMENT

Science and technology are the products of social practice, in which social needs are the actual fulcrum and stimulus of scientific and technological invention, but once science and technology are formed, they will in turn greatly promote social progress and become a powerful driving force for social development. As a social phenomenon and activity, science and technology plays a very important role in the dynamic system of social and historical development. Marx said: "Science and technology are productive forces," "Science and technology are powerful levers of history". Science and technology have a profound impact on the development of social production methods.

1.1 The impact of science and technology on production methods.

Science and technology have changed the constituent elements of social productivity. In terms of its substantive elements, productivity enables workers to use labor tools and labor materials to act on labor objects. That is to say, the components of productivity include laborers, labor materials, and labor objects. These three are the substantive nature of productivity, which can also be referred to as the "software" of productivity. While science and technology are the permeable factors of productivity, which is called the "hardware" of productivity. Specifically, we can analyze form the perspective of three substantive elements of labor: laborers, labor materials, and labor objects.

Firstly, the key to improving the quality of laborers and their production efficiency lies in the armed forces of modern science and technology. As workers, people are the most active factor in productivity, but workers in modern social productivity are no longer just understood as people with sound limbs and well-developed muscles, but as knowledgeable, skilled, and creative people. Workers must continue to learn to master modern science and technology theories, enhance the ability to transform nature, and adapt to the needs of social development. It is human intellectual labor that creates amazing production capabilities.

Secondly, scientific and technological achievements have penetrated into labor materials, causing changes in the nature, structure and function of labor materials［1］. In labor materials, the decisive role is the labor tool.

Every technological revolution has caused a revolutionary change in the labor tool, and the transformation of the labor tool has promoted the tremendous development of productivity. With the widespread use of electronic computers, human beings have developed from directly using their bodies as labor tools to manufacturing tools, and to the development and use of electronic computers to simulate human thinking, which is the development of modern machines to a high degree of intelligence [2].

Finally, the development of science and technology and its application in production have expanded the scope of labor objects and improved the quality and utilization of labor objects. Whether many substances in nature can enter people's practical fields as labor objects depends on the current level of science and technology. Take space resources for example. In the past, people could only imagine the story of Zhang'e flying to the moon in their minds. However，the development of space technology enabled humans to begin to develop, research and use space resources, even marine resources and mineral resources, etc.. Only in the advanced technology today can these resources gradually enter the human labor process and become the object of labor.

1.2 Science and technology have changed people's labor forms

The development of science and technology promotes the labor mode of the production process, that is, the change of the way that the laborer combines the labor means and the labor object in the production process. The emergence and widespread application of microelectronics technology has enabled intelligent machines to replace part of human brain work, and people's working methods have undergone a fundamental change from mechanical automation to intelligent automation, from partial automation to large-scale system management and control automation.

1.3 Science and technology have changed the social and economic structure

Science and technology continue to create new processes, new materials, and new tools, constantly develop new resources, and launch new products and new processes, which not only transforms the technology of traditional production departments, but also provides new production departments on the basis of new technologies. For example, the following chart shows the changes in the proportion of China's tertiary industry (data from the 2020 edition of *China Statistical Yearbook*):

Table 1. Changes in the proportion of the tertiary industry

Name \ Year	1978	2000	2018	2019
Total value of tertiary industry (100 million yuan)	905.1	39889.1	489700.8	534233.1
GDP (100 million yuan)	3678.7	100280.1	919281.1	990865.1
The tertiary industry accounts for the proportion of GDP	25%	40%	53%	54%

From the chart above, it can be seen that while the new technological revolution promotes the modernization of traditional industries, it has made the tertiary industry account for an increasing proportion of the national economy and optimized the industrial structure and economic structure.

As Marx said: "Gunpowder, compass, and printing-these are the three major inventions that herald the arrival of bourgeois society. Gunpowder blasted the knight class to pieces, the compass opened the world market and established colonies, and printing became the tool of Protestantism"[3], the development of science and technology has promoted the tremendous progress of productivity, and the result of the increase of productivity has an extremely far-reaching impact on the social system.

1.4 Science and technology have changed people's way of life

Science and technology have created amazing tools and resources, which in turn have gradually integrated into people's lives. Life can no longer be separated from science and technology. Now, the clothing, food, housing, transportation of our lives are closely related to technology, which, to some extent, change our way of life.

During the epidemic, although at home, one can also use computer to learn online. There are a lot of learning resources on the Internet, and one can listen to the courses of famous teachers from famous schools on major websites while sitting at the computer desk. Not only learning resources, one can also watch movies, watch games, and watch entertainment programs online, all of which continue to enrich and improve the quality of our spiritual life.

Modern transportation such as high-speed rail and airplanes has greatly changed the way people travel and improved the efficiency of people's travel; the payment method of electronic payment has changed the traditional paper money and bank card payment, which is faster and more convenient; services such as shared bicycles have provided new leasing services, which effectively realized the reasonable allocation of resources, etc..In a word, science and technology have greatly facilitated people's lifestyles.

2. THE NEGATIVE SOCIAL EFFECTS OF SCIENCE AND TECHNOLOGY

Since the 20th century, the development of science and technology has reached an unprecedented level. With the great strides of modern science and technology, human beings continue to expand their living space and enter a stage of relative material abundance. Science and technology are the primary productive forces. The progress of science and technology marks the progress of productivity, and the change of productivity marks the progress of society. However, at the same time, we must also see that science and technology is a double-edged sword. When science and technology are applied to society, they will also bring negative consequences to the survival and development of mankind, and the problems encountered are becoming more and more prominent.

Science and technology acting on production have promoted the development of industry and agriculture, created huge social wealth, and met the material needs of mankind. At the same time, the development of industry and agriculture has brought a series of environmental pollution and ecological damage problems. Due to environmental pollution, a well-known environmental pollution incident-the London Environmental Smog Incident in the United Kingdom caused constant heavy fog, killing more than 5,000 people.

For another example, over-exploitation and over-expropriation of natural resources has led to environmental and ecological problems, such as global warming, ozone layer destruction, acid rain, freshwater resource crisis, energy shortage, sharp decline of forest resources, land desertification, accelerated species extinction, excessive garbage accumulation. These problems directly threaten the survival of mankind.

Science and technology play a role in war. Looking at the past and present, many sciences and technologies in human history were first applied to wars, and military needs have also stimulated the development of science and technology. The invention of iron weapons "brought out" iron weapons and greatly increased the scale and cruelty of ancient wars. The three-series black powder of nitrate, sulfur, and charcoal inadvertently invented by alchemists in the Tang Dynasty in ancient China were firstly used in the military, and derived a series of explosive firearms, tubular projectile firearms and rockets. The harm caused by the three scientific revolutions to mankind far exceeds that of the invention of iron and explosives in ancient times. For example, nuclear weapons, which were born with the development of the third scientific and technological revolution, brought devastating blows to mankind. On August 6, 1945, a U.S. plane dropped the first atomic bomb on Hiroshima, Japan. Causing 90,000 dead people in a flame brighter than the sun, and the city instantly became a pile of ruins; then on August 9, another atomic bomb exploded in Nagasaki. 35,000 Japanese were killed. The nuclear explosion released huge energy in an instant, and its lethality far exceeded any weapon in human history. Moreover, the radioactive pollution produced by the atomic bomb blasted humans. And the natural ecology caused irreparable damage. People were fully aware that the use of nuclear weapons will cause huge disasters to mankind and even destroy human civilization.

3. CONCLUSION

As the primary productive force, science and technology have promoted economic development, facilitated people’s lifestyles, provided more sufficient material conditions for the comprehensive and free development of mankind, and liberated mankind from work and life, which provided more ample time for people to perfect himself in order to realize the all-round development. But it also can be seen that with the development of science and technology, the disadvantages of science and technology have become more and more obvious, and the corresponding problems have become more and more serious, such as the depletion of resources, the destruction of the environment, the frequent occurrence of local wars, and world hegemonism. As Einstein said: "Science is a powerful means. How to use it to bring happiness or disaster to mankind depends on man himself, not on tools [4]." Mankind should use science and technology rationally, respect nature, respect the interests of others and other countries, and jointly promote the process of science and technology for the benefit of mankind in a peaceful and shared attitude.

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