

Dialectics of Technology and War

Bing Ji

Aeronautics Engineering College, Air Force Engineering University, Xi'an710038, China.

Abstract

The diachronic study of technological progress and the evolution of war has shown that in most periods of human history, technology and war have a close dialectical relationship. War is a catalyst for science and technology. It not only stimulates, restricts, and promotes the direction, purpose, and resources of science and technology research and development and application, but also serves as a testing ground for science and technology, contributing to scientific research organized by the state. In turn, science and technology can greatly affect the way and progress of warfare, and can avoid severe military conflicts between major powers in a special way. Since the beginning of the new century, the rapid development of high and new technology has had a revolutionary impact on modern warfare, and has also played an important role in enlightening the development of national defense.

Keywords

Science and technology; war; dialectical relationship; technological revolution.

1. Introduction

"The written history of the world is roughly a history of war, because most of the countries in which we live have been conquered, civil wars or struggles for independence. Not only that, the great state officials in the written history are generally violent people, because Even though they are not warriors, they know how to use violence to achieve their goals, and they are not afraid to use violence to achieve their goals." The relationship between science and technology and war is a long-standing problem in human society that cannot be ignored. Technological progress Historical research on the evolution of war and war shows that technology and war have a close dialectical relationship.

2. The Catalytic Effect of War on Technology

The development of science and technology is not only determined by the inherent development force of science and technology, but more importantly, it is affected by certain social forces, especially war factors. The war has provided demand and resources for the development of science and technology, thereby stimulating and restricting the direction, focus and application of scientific research and development. Historically, every development of science has been promoted by military factors, and science and war have always been extremely closely linked.

2.1. The War Guided the Direction of Technology

Since weapons of war are one of the core elements that determine the outcome of wars, all warriors care about and actively promote the improvement of weapons of war, and the improvement of weapons of war depends on the development of science and technology. Therefore, the manufacturing and evolution of weapons of war can clearly reflect that war is an important factor that stimulates and restricts scientific and technological research, development, and application. As the famous British philosopher Russell said: "The actual importance of science is first recognized from the perspective of war."

Amid the artillery fire of the Second World War, the third technological revolution began to sprout and develop. Many sciences and technologies that were still in the "childhood" suddenly matured during World War II, such as airplanes, radars, atomic bombs, and computers. In such a short period of time, so many major breakthroughs in the field of science and technology are unprecedented in human history. After World War II, these technologies continued to develop in the field of military applications, bringing military technology to a higher level, and causing a huge change in military thinking and war patterns; at the same time, through the transfer of military to civilians, they developed into a flourishing The technological revolution. For example, the manufacture of the atomic bomb triggered an energy revolution, the development of rocket technology opened the door for mankind to enter space, and the development of electronic computers led to the arrival of the information age. In fact, war not only stimulates and restricts the direction, purpose and resources of scientific and technological research, development, and application, but also directly promotes technological progress.

2.2. The War Has Accelerated the Practical Application of Technology

The latest advances in science and the latest inventions of technology are often the first to be applied to the transformation and invention of weapons of war, and the first to be applied to the military and warfare fields, regardless of whether scientists or engineers are actively or forced to meet the needs of war; and war makes scientific research results pay. The speed of various applications is several times faster than the limit in peacetime, and the frontline has begun to become a testing ground for science and technology.

Before the First World War, the development of science and technology in various countries was mostly the responsibility of the individual scientist, and the development of science and technology was also in a slow and sporadic state. During the First World War, the development of science and technology gradually moved towards a state of scale and integration. The Second World War prompted the United States to establish the "National Research Foundation" after the war, as a central institution to support and encourage basic research, science education, and formulate national science policies. Organizing the overall research on major scientific and technological problems has gradually become the basic function of the state to support army building and prepare for war. The war promoted the institutionalization of scientific and technological research and promoted scientific research organized by the state.

3. The Advancement and Restriction of Technology on War

From the perspective of the material conditions for human existence, science and technology are the cornerstone and ladder of human progress. From the perspective of the war between the state and the nation, science and technology have become the giants of the war. History, especially the history of modern science and technology and military history, shows that almost every advance in science and technology is inevitably reflected in the improvement of weapons. However, after World War II, with the exception of some local wars and conflicts, no war broke out among the major powers in the world, and frontal conflicts were avoided. From the perspective of technological revolution and technological development, technological development has largely restrained the outbreak of large-scale wars and played an important role in maintaining international peace after the war.

3.1. The Role of Technology in Promoting War

The impact of science and technology on war is immeasurable. It can be said that what kind of war will emerge at the level of science and technology in an era, and science and technology can be called the "first combat power of war." When a new technology is applied to the military field, it first changes the military's weapons and equipment, then leads to the reform of the military's system and organization, and then leads to a series of changes in combat methods, command

principles, and finally a military structure and war. The form developed to another more advanced military structure and war form. Engels said: "Once technological advances can be used for military purposes and have been used for military purposes, they immediately and almost compulsively and often against the will of the commander cause changes or even changes in the way of fighting."

With the progress of human society, human warfare is also entering high-tech after several historical periods after the era of unarmed combat, the era of metal weapons (or the era of cold weapons), the era of gunpowder weapons (or the era of hot weapons), and the era of mechanized warfare. The historical development period of the war.

3.2. The Restrictive Effect of Technology on War

The development of science and technology has caused major changes in the way of competition among capitalist countries, and the role of war has been relegated to a secondary position. This is the fundamental reason for post-war international peace. After World War II, with the continuous development of the third scientific and technological revolution marked by information, the economic types of capitalist countries have undergone great changes. From the energy and raw material-led economy to the knowledge-information-led economy, economic development no longer depends on For energy and raw materials, but for technology and information resources, high-tech has become the focus of competition among major capitalist countries. The change in the competition mode of capitalist countries is still manifested as a division of the world economically, but this division is characterized by increasing the high-tech commanding heights and share of domestic products in the world market, which is different from the previous division by military power There are important differences in spheres of influence.

High-tech weapon combat has formed a huge deterrent capability. This is also the direct reason why major powers avoid using war to resolve international disputes. With the widespread application of high technology, the battlefield of modern warfare is constantly developing towards information networking, so that the modern combat system can constitute both the most powerful defense system and the most difficult to prevent attack system. Therefore, the rapid development and widespread application of high-tech weapons has made any major country in the world have to adopt an extremely cautious attitude towards the use of weapons of mass destruction, and always try to avoid resorting to aggressive methods to resolve international disputes. As long as the major powers are cautious about war, international peace can be maintained for a long time.

4. The Influence of the Technological Revolution on the New Century on Modern Warfare

Mastering advanced technology and applying it to the military field is an important factor in winning the war. The widespread use of science and technology in the military field has triggered profound changes in the forms of war and combat methods. The popularization and application of metal smelting technology has brought human warfare from the Stone Age to the cold weapon era; the invention and use of gunpowder opened the prelude to the war of the hot weapon era; military technological innovations such as tanks, aircraft, and ships have led human warfare Towards the age of mechanization; entering the mid to late 20th century, electromagnetic and network technologies developed vigorously, and information warfare began to emerge. Through the evolution of war patterns, we can see that technology has an increasing influence on the outcome of war. Before the cold weapon era, the victory or defeat of a war mainly depended on the number of soldiers, their physical abilities, and the skill of

using weapons; after entering the hot weapon era, advanced technology and weaponry gradually became the key to winning the war.

At present, a new round of technological and industrial revolution in the world is gestating and emerging, and a large number of revolutionary breakthroughs in the field of science and technology are beginning to emerge, driving the integration and development of key technologies and the leap of groups. Human society has entered the key node of a new round of technological revolution. This round of scientific and technological revolution will not only become the most powerful "lever" to leverage human economic and social development, but will also have a revolutionary impact on the world security situation and the pattern of military competition.

Some important scientific and technological achievements bred by the new round of scientific and technological revolution have shown good prospects for military applications and continue to trigger the growth of new quality combat effectiveness. The Internet of Things technology promotes the interconnection of everything on the battlefield, laying the foundation for the establishment of a ubiquitous sensor network system; big data processing technology presents unique advantages in military forecasting, intelligence analysis, and decision-making assistance, and has become an important promoter of victory in modern warfare; Distributed parallel network computing technology represented by cloud computing provides a new engine for system confrontation; technologies such as quantum communication, cognitive radio, mobile Internet, and terahertz communication create conditions for large-capacity data transmission in complex electromagnetic environments ; Artificial intelligence technology is developing rapidly, and relevant indicators in some fields have reached or exceeded human level. At the same time, biological computers, optical and quantum computers, and new computer technologies based on non-silicon materials will break the curse of Moore's Law and usher in a new era of information technology development; military aerospace, hypersonic vehicles, laser weapons, and unmanned combat platforms The rapid development of technologies such as battlefield robots and battlefield robots shows overwhelming advantages over traditional weapons; technologies such as electromagnetic railguns, low detectability, supercavitation, mechanical exoskeleton, and system integration are becoming more mature, all of which will change the face of future wars. potential.

Facing the new round of scientific and technological revolution and the turbulent wave of military revolution, major countries in the world have stepped up their military scientific and technological innovation and actively sought new advantages in future military development. Relying on technological advances in sensor technology, big data development, visualization, robotics, and artificial intelligence, the United States has promoted the implementation of the "third offset strategy" and accelerated the development of new global real-time strike systems, unmanned combat systems, electromagnetic railguns, and laser weapons. Concept weapons, and strive to build a new combat system ahead of the opponent's generation. Russia actively promotes the upgrading of strategic nuclear forces, develops hypersonic aircraft, establishes cyber security forces, strengthens research and development of disruptive technologies in the fields of frontier medicine, new materials, artificial intelligence, future energy and bionics, and advanced underwater technologies, and strives to increase its armed forces The technological content. At the end of 2015, the Russian army deployed a ground assault cluster composed of robots in Syria to participate in ground counter-terrorism operations. This was the world's first combat robot cluster combat. Japan, Britain, France and other countries have also stepped up the pace of military technological innovation and improved the modernization of weapons and equipment. Increasing the combat effectiveness of the military through the development of advanced science and technology and weapons and equipment has increasingly become a feature of the era of the game among major powers in the world.

5. Conclusion

The issue of the relationship between scientific and technological progress and war deeply reveals the social application value of science and technology, and also stimulates people to reflect more deeply on the value of science and technology, especially the problem of alienation. From the perspective of human society, science and technology and war, war and science and technology have been mutually used and hand in hand for most of the history. The war strongly stimulates the research and development, application and dissemination of science and technology, and the scientific and technological achievements in turn promote the development of war, making the war field a dense place to absorb and compatible the latest scientific and technological achievements, and gradually evolve the military establishment system, strategy, tactics and war style.

From a philosophical point of view, the "marriage" of technology and warfare and the "alienation" of technology in the application of warfare are the result of a combination of various social factors. If mankind can avoid wars and directly use the resources in this area to research and develop science and technology, then social and economic needs can lead to more inventions and discoveries, and science and technology will move toward a more rapid and healthy development.

References

- [1] Sterling M. Pavelec. War and Warfare since 1945[M].Taylor and Francis:2017-08-04.
- [2] W.J.Dongfang,J.X.Guo: War and Science-OSRD during World War II, Vol. 10 (1988) No. 2, p. 35-44. (In Chinese)
- [3] G.Y.Zhi: A Diachronic Study of the Linkage between Technology and War, Journal of Linyi University, (2012) No. 2, p. 51-55. (In Chinese)