

# The Changes of Modern Science and Technology Notion and New Economic and Social Mode

Qijie Zhou<sup>1, 2</sup>, Zhihong Chu<sup>2</sup>, Xiaowei Wang<sup>2</sup>

(1. Heilongjiang University, Harbin, Heilongjiang 150080, China, Email: Zhouqijie@neau.edu.cn

2. Northeast Agricultural University, Harbin, Heilongjiang 150030, China)

**Abstract:** Since the 19th Century, science and technology have brought both positive and negative influences on human society. Many western scholars, including futurists, ecologists, Marxist cultural critics, humanists, existential thinkers, have analyzed and criticized human living conditions brought about by science and technology. It is now necessary to construct a good and united developing mode of science and technology for the development of human societies and global economics. [Nature and Science. 2004;2(3):66-69].

**Key words:** science; technology; alienation; economic mode; social developing mode

The development of science and technology along with the establishment of a scientific spirit originated from ancient Greek and Roman rationalism, represented by Plato. Religious reformation and the notion of new ethics helped science and technology develop and spread in Euro-America. British philosopher Bacon argued that knowledge was power; this offered the spiritual framework to criticize traditional culture, while using science as a powerful weapon to criticize religious divinity, superstitious and traditional bias ideas (Chen, 2001).

Because of the advancement of science and technology and its great achievements in every field, mono-scientific and mono-technological thoughts emerged and developed just as what Benedetto Croce said in his book *The Theory and Practice of History*, The Era of Proofs created by Kongde defined natural science, and spread the principle to social fields (Benedetto, 1982). Inheriting this tradition, the great influential logicalism in scientific schools attributed all the experiences and significant propositions to scientific ones, but these untested, unobserved objects, reasons and metaphysical explanations have to be overcome or removed.

Echoing with this scientific notion, some scholars protested the developing mode of society by economic progress and the social structure changes

preceded by science and technology. We call this “technological optimistic notion”. This theory was first advocated by Austrian American economist Joseph Alois Schumpeter who put technological innovation to the core of economic development; this is called the Economic Development Theory. He believed that “a modern enterprise should first set up a research department. Every member of the department should understand that his bread and butter come from the success of his invention (Joseph Alois Schumpeter, 1979). Later, Englishman Christopher Freeman and Americans Nathan Rosenberg and Richard Nelson used this idea. They argued that economic increase meant the investment of science and technology and the outcome of more innovative technology, and the increase combined technology acceleration with demand promotion. American economist Walt Whitman Rust, according to economic index in his book, *On Economic Growth*, divided social development into six phases, so that proletariat revolution and communism can be eliminated in the future. This book used *Non-communist Declaration* as its subtitle.

As for science-tech revolution’s stimulating on human beings and society, Daniel Bell and Alvin Toffler raised another post-industrial social theory-super industrial society (The Third Tide) (Daniel Bell, 1989). According to this idea,

post-industrial society was made up of knowledge, and the accumulation and spread of theoretical knowledge has become direct strength of social innovation and reformation. Productivity and technology is the core of social structure. Power has been shifted from the capitalists to intellectuals, and capitalists are disappearing. Toffler claimed that electronic industry and information technology could solve many social conflicts. In the respect that science-tech influences all sides of human development, Michael G. Zey predicated that the wish of the science and technology advancement in the 21st century, human intelligence and creativity will develop much faster, while such problems as pollution and population will be solved at a later date (Michael Zey, 1997). Even French scientist and philosopher Jean Ladriere thought that science-tech decided human's living manner and value system and science-tech was cultural key, that couldn't have a direct impact on human values but made a difference in setting up new morals while traditional morals were deconstructed (Jean Ladriere, 1997). These ideas have offered us a reference when we try to know the developing conditions and contemporary society trends.

To criticize the traditional notion of science and technology in the early 20th century, Rachel Carson pointed out that environmental and ecological problems were caused by science-tech development and harmed human existence, and the reasons of the problems lied in the traditional idea of conquering and controlling nature and economic practicability (Rachel Carson, 1997). While optimistic futurism went ahead in its theory, Roman club published a horrible warning book *The Limit of Growth*, in 1972. It stated the limits of the earth resources and the limited population support point, and concluded that human social economic growth was faced with unsurpassed limits. That is to say the world economy and population have to stop increasing within a limited period; otherwise, human existence will meet inevitable collapse. The book enlisted 5 indexes --- human population, grains, resources and energy, ecological environment and nuclear threat --- into the world human living difficulties, which were listed by ex-chairman of the club, Aurelio Peccei (Dennis Meadows, 1972). The UN passed Environmental Declaration in 1972 and Brazil passed the 21st

Century Agenda in The Meeting on Environment & Development in 1992, which raised the issue of sustainable development.

Apart from ecological criticism of science and technology, some social and humanity criticisms give a deeper reflection on traditional science and technology. The most influential critics were Herbert Marcuse, Jurgen Habermas and Erich Fromm in the school of Frankfurt. Marcuse developed Marx Horkheimer and Theodor Wiesengrund Adorno's thoughts. Marx Horkheimer thought that due to the development of science and technology, enlightenment becomes knowledge-pursuit and efficiency-pursuit technical tool and the tool of governing from critical ratiom. Even the highly development of science-tech and industrialization cannot liberate human beings. However, science becomes a ruling tool and this deeply suppresses humans. The reason is that the development of modern science and technology kills human defense awareness. Enlightenment is to oppose legend and superstition, learn the world correctly, strengthen human ability, oppose extreme power and allow progress. Finally rational enlightenment itself turns out to be a legend deforming the true world and degrading human beings (Herbert Marcuse, 1993). It turns into extreme power and causes recession without defending human rights. It is rational enlightenment that makes machines to be the effective political means. The victory of technical ratiom not only improves the human living condition, but also makes ruling reasonable. It puts mankind in a technical system, political alignment, and it shows a more lawful appearance than politics. Marcuse said, "The result of reasonable ruling is to make human less free and lose the dimension of surpassing or denying" (Herbert Marcuse, 1999). The existence of mankind is mono-dimensional, being controlled by uncontrolled power and mechanism. To abandon such technical alienation is to integrate values and fine art into scientific technology so as to set human and nature free from abuse of scientific technology that deconstructs. This liberation action is associated with political change.

Habermas made a new development. In his opinion, the objective condition for science and technology became a new ideology with government's interference on economic affairs and the increasing trend of the relationship between science and

technology. Under the condition of a developed industrial society, scientific technology has its own property of consciousness, and shows more controlling, concealing and defending of property than conscious forms. Habermas didn't agree that Marcuse looked for reasons which made science and technology alienate from it or integrates values and art into scientific rasion in order to get rid of the passive factor of scientific rasion and technology. Habermas thought that the alienation of science and technology is up to the property and the development of it. The essential reason is that modern industrial society makes reasonable labor into unreasonable communicative behavior. To remove the alienation of science and technology is to make communicative behavior reasonable so that labor's key position in social historical theory can be replaced (Jurgen Habermas, 1999).

Considering that human beings obtained greater achievements in using scientific technology to control nature, while, human beings digressed into thoughtless economic tools ---- passive, emotionless and strength less, due to over strengthening of material production, consumption and technical values. Human society had been controlled completely by mechanization and becoming a slave to the machine. The reason lies in the non-humane development of technology. If we want technology to serve mankind, individuals are supposed to be motivated with initiative playing an important role, so that a humane consumption view is established and the human psycho renewed. In this complete society, love is used to build a new living manner which emphasized an existence and commitment.

J. O. Y. Gasset, Lewis Munford, Martin Heidegger and Jacgues Ellul criticized scientific technology from the view of humanity. Gasset believes that technology can't be confined to itself, but must be analyzed from the relationship between human and technology. Technology is to serve human life beyond human physical demand, and to be connected with human creativity. The inner creativity provides an outer creation with a foundation. Human fascination with modern technology kills their creativity of making proper goals for technological progress (Gasset, 1980). Munford persists that the property of material is not the ultimate explanation for physical activities. The real foundation of human

activity is spirit, which pursues the realization of creative human himself. He doesn't want to refuse every kind of technology, but to distinguish those which are very different from human beings rather than to expand the power of machines so as to suppress human nature (Lewis Munford, 1990). Heidegger calls technology "enframing", which unfolds the world. As a non-human will, modern technology confines and requires the world and mankind. Human and nature are driven by an invisible strength that conceals a substantial existence, and causes the existence to be forgotten. In modern technology, it is the human being that is confined to the enframing of technology instead of that human beings must control technology. If human beings are to recognize the danger of technological enframing, they must understand the insight and turn to the truth of existence (Martin Heidegger, 1977). Ellul claims that modern technology isn't a means, but a goal. Everything comes from and for technology, and the relationship among human beings is pure technological one. Technology sets goals for human beings, instead of human for technology. Ellul believes that it is necessary to seek for a remedy which creates an ethics to confine the sphere of technological practice.

Modern criticism from western scholars on technical alienation shows that the modern concept of scientific technology has changed completely ---- scientific technology has a positive function as well as passive negative effect. In the 19th century, Marx pointed, "Everything seems to have its negative side in our era. We have seen that machinery has miraculous power not only to reduce human labor and make it more effective, but also to cause famine and fatigue. The newly found source of the wealth becomes the root of poverty because of some strange and ridiculous magic power. Victory of technology is got at the cost of decline of morality" (Karl Marx, 1972). As a two-edge sword, scientific technology goes toward alienation, just because it alienates from human values and the confinement of social conditions, and pursues economic benefit and war weapons only depending on technology, without the thought of possible destruction of natural environment like ecology and resource. This brings great threat to human beings as well as human mental and emotional disappointment. A new concept on the development of science and technology is to establish

a united economic and social developing mode, which tries to understand science from the view of relating science to economy, politics, culture and society, supported with a harmonious development. Corresponding to the new developing notion, it is also necessary to establish a new economic developing theory, breaking the former closed mode that is only supports GDP increase existing in today's modern western industrial society. We must establish such economic developing concept that values environmental and ecological protection as well as human resources that develop the economy in a healthy and harmonious manner. In this mode, human beings have corrected the notions of production and consumption, allowing both society and human's society to develop comprehensively. Human beings must remove the operational programs of a two-dimensional social life that is caused by ideological science and rational technology. The function of science and technology should be confined, while the suppressed human creativity should be restored. In this way, human beings should insist on the sustainable developing notion, in which human living rights are superior to everything else, and civilization is a comprehensive historic process.

**Correspondence to:**

Qijie Zhou  
Northeast Agriculture University  
Harbin, Heilongjiang 150030, China  
Telephone: 01186-451-55191539 (H)  
Email: [Zhouqijie@neau.edu.cn](mailto:Zhouqijie@neau.edu.cn)

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