

# Analysis of Technological Determinism and Social Constructionism

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## ABSTRACT

The theory of technological society has developed for a hundred years, and its real prosperity is in the recent century, but its root ideas have a long history. The reality of technological and social phenomena is so complex and varied that these factors have directly influenced the way people view the relationship between technology and society from multiple perspectives, and as a result, many different theories of technological society have been proposed. The debate over technological determinism and social determinism and the fact that the theory of techno-society has undergone a historical process of dialectical development mean that the Marxist theory of techno-society, which emphasizes the evolution and development of socio-technology as a whole, is maturing, a trend that has important theoretical significance for the complex relationship between technology and society as a whole, and also considerable practical value for the sound development of techno-society. Along with the development of technology as the first productive force, social guidance as a mutually reinforcing role plays an unimaginable power and leads the changes of the future. Through the comparison and analysis of the two views in the article, it could be concluded that the social construction of technology shaped our society during modern times.

**Keywords:** *Technology determinism, Social determinism, Hazardous Concept (Leo Marx), Socio-technical*

## 1. INTRODUCTION

It is important to emphasize that "technology" and "society" are two terms that have always been confusing and that the reality of technological and social phenomena is so complex and varied. These factors have directly influenced the way people view the relationship between technology and society from multiple perspectives, and have led to a variety of different social theories of technology [1].

In the American cultural definition of progress, Volti states that technology is a dynamic and cumulative process. It is rooted in the notion that we can do things better than our predecessors and create technological inventions to push society forward. However, there is another approach that advocates society to create technological outcomes and different meanings. Artifacts can have political values and they can alter the power between people or groups; they are integrated into the social system, supported by social arrangements and embodied in certain values. These arguments make us wonder how society is affected by social groups and the media, and how they have framed the controversy during

modern times. By comparing and exploring the different views of historical sociologists on technological determinism and social determinism, as well as Leo Marx's approach to meaning making, this paper will examine why social construction is the dominant expression in today's society.

A detailed discussion of the main perspectives of technological determinism, social determinism, techno-social interactionism, and socio-technological holism will show that techno-social theories have undergone a historical process of dialectical development [1]. This process implies that the Marxist theory of techno-society, which emphasizes the evolution and development of socio-technology as a whole, is maturing, and attention to this trend has important theoretical implications for us to grasp the complex relationship between technology and society as a whole, as well as considerable practical value for the sound development of techno-society.

## **2. TECHNOLOGY DETERMINISM**

### ***2.1. The Origin and Definition of Technology Determinism***

In the 20th and 21st centuries, technology has become more abstract and less visible. With the advent of modern technological society, especially after the Industrial Revolution, many intellectuals began to show great enthusiasm for human progress and modern society, and the notion of progress previously associated with social change began to be increasingly linked to technological change, and technological progress began to be widely welcomed as a major component of social development.

Technological social theory begins with the fundamental question: What explanation or judgment should be given about the relationship between technology and society? But in the absence of a precise and clear social theory of technology, the so-called "cultural myth" of technology dominates our thinking and is widely disseminated [2]. Scholars in different fields such as philosophy, history, sociology and media studies have thought about the powerful influence of technology.

Technological determinism has two arguments: (1) technology is an independent factor or an autonomous force; and (2) technological change causes social change. The key question here is how autonomous technology that affects social change is [1]. If one believes that technology is absolutely autonomous and claims that technological change is the most important cause of social change, this constitutes hard technological determinism; if one recognizes that technology can influence the direction of social history while at the same time, technology is recognized as relatively autonomous, loaded with certain social, political and ethical values, and not the only factor of social change, this theoretical tendency can be called soft technological determinism.

### ***2.2. The representative and main viewpoint of technological determinism***

In the sociological definition of technology, technology determinism prioritizes material artifacts. As Veblen discussed, technology is pushing society and altering ideas; even though it won't be immediate, but time lag is the critical moment. Technology developed at a "fixed, naturally determined sequence", and social change became the factor in order to prove the technical importance [3]. Technology has the ability to predict the next level of social structure, with simultaneous inventions, there is no absence of technological leaps because technological determinists believe technology can place the norms of society; that technology is built upon existing tech and adopted tech imposed norms on society. For instance, technology created in the Industrial Revolution caused massive socioeconomic changes, that

is with no regulation but created the composition of the labor force, hierarchical organization of work, capitalist social norms including where we live, workdays hours, salaries, etc.

As technology determinism states, people do exist and matter in this approach; they are largely involved and people alone can't do this, but can place the norms of society with the technology. It is linked to notions of progress that technology will make things better, and it is almost impossible to be stopped nor should we want to or try to stop especially during the modern times.

However, Marx argues technology determinism is what everyone has learned growing up but not many have adopted about [2]. He critiques that it removes human responsibility for technology, creates a positive view of human nature, and ignores other major drivers such as religion. He also argues that people in the society don't actually understand it, but instead trust the expert of technology to lead us; the boundary between the intricately interlinked artifactual and other components – conceptual, institutional, human – is blurred and often visible. To be accepted, technology must be compatible with existing conditions. However, with technology determinism, it will set aside culture and the post hoc fallacy when people all believe that technology can drive human progress.

## **3. SOCIAL DETERMINISM**

### ***3.1. The Origin and Definition of Social Determinism***

Although technological determinism has become the most influential social theory of technology, there is a rival social theory of technology, social determinism, which assumes that technology and technological change are socially constituted or constructed products rather than determined by some self-developing path. The idea of social determinism was born later than technological determinism, under the influence of the sociology of science since Merton, and gradually emerged from the growing sociology of technology research after the 1960s.

Social determinism is primarily concerned with the social production (construction) of technology. It has two arguments: (1) society is an independent factor or autonomous force; and (2) social change causes technological change. The key question here is to what extent society influences technology without being influenced by it[4]. If one believes that society is absolutely autonomous from technology and claims that society is the most important cause of technological change, this is called strong social determinism. If, at the same time, social attributes or human values influence the direction of technological history, the macroscopic influence of technology on society is also recognized, and

society is not the only factor in technological change, this theoretical tendency can be called mild social determinism.

### **3.2. The representative and main viewpoint of Social Determinism**

Social determinism, proposed by sociologists such as Bijker and Winner, addresses that technology is derived from society by giving it meaning and the artifacts' value created and created by the power structure of society. Social determinism holds that technology is never something with an inherent rational logic, but rather a craft demonstration of social, political, and cultural values. It emphasizes that social factors or value (interest) orientations construct technology, and that technological innovation is rooted in the social context and determined by cultural, economic, and political choices rather than by a specific technological logic.

Social construction of technology is the approach that advocates seeing technology as a black box. It argues that society creates technological outcomes, in which different societies might result in different outcomes. Society also creates meaning that can be changed driven by specific different social groups, and relevant social groups stabilize the meaning and the power. Bijker (1995) states that "One should never take the meaning of a technological artifact or technological system as residing in technology itself", which reinforces that the power of technology is in the meaning and the meaning is given by different people [2]. During the social media times, people on the internet have various applications to play with and individuals themselves can control their own media space, such as personal accounts. However, in the traditional media, people can only acknowledge information and news on TV or in newspapers, which has much narrower information and less control over the content.

Social determinism contains three assumptions: (1) technology and society are discrete; (2) technology constitutes society, i.e., technology has an impact on society; and (3) society constitutes technology, i.e., society can play some constructive role in technology [2]. This approach avoids the reductionist shortcomings of technological and social determinism by endorsing the interaction and exchange between technology and society. Social determinism states that technology is neither good nor bad, and it is not neutral. In other words, technology and society are in an interactive relationship: technological development often has environmental, social and human consequences that go beyond the immediate purpose of the technological device and the practical application itself, and the same technology can have completely different results when applied in different cultural and social conditions.

In Winner's words, artifacts can have politics (value) and artifacts can alter the power between people/groups, and they creates and created by the power structure of society. Artifacts are integrated into the social system, supported by social arrangements and embodied in certain values, which contradicts technological determinism.

## **4. CRITIQUES OF TD**

Marx [3] argues that "technology as such, makes nothing happen." In the Hazardous Concept that Marx presented, people believe that technological innovation is the driving force of human history and society changes because of technology; it is considered mechanical innovation as a means of achieving progress but not progress itself, that time prevailed and changed society and human thinking. Just like the political revolutionaries, they praised mechanical innovation because they saw technology as the main means of achieving social and political ends. The author also agrees that because of the progress of society, technology is not limited to locomotives and railroad tracks, it has influenced and changed society far more than certain objects; the creation of business organizations, the formation of a standardized system, are all long-term effects on the development of society. But at the same time, on the basis of the popularity of technology in today's society, people simultaneously refit it and ignore the meaning of technology. Because, technology is not only technology, it is difficult to be reduced to a component, but a complex system. Marx divides the concept of technology into two categories; ideology and substance [9]. That is, the change in the general conception of the mechanical arts that developed in American society, and the material development of the machinery itself and the resulting institutional environment.

Marx mentions that technology is hazardous when we add the artifact to an action verb [9]. By Webster's time, innovations in the mechanical arts were not just instrumental, but technical means to achieve social and political goals. To use an example from the article, Boston Associates, the businessmen who started the Lowell textile industry, believed that in the long run, they could rely on innovation in the mechanical arts to bring progress and prosperity to all. Because the unique tangibility of the machine materials enhanced their confidence in the inherent progressive impact of the new machines, being physical, visible, perceptible objects. And in operating the propaganda process, other new factories and machines saw what they claimed to spread 'the ideology of social progress'. It's as if simply seeing the claim that "technology invented cloth" is an improvement on the past, as if the future is expected. Like Webster's critiques, "the progress of the age has almost

outstripped human belief; the future is known only to Omniscience" [9].

Like Webster's view, Marx saw the idea of social progress (liberalization) as inevitably propagated by ideals of great progress. He insisted on the notion of technology as a complex socio-technical system. This is because he believes that "generalizations of words are easily specified" and that materialization is "so strictly rational and all-encompassing that it obscures every trace of its essential nature" [10]. He mentions extracting the current concept of technology from reification and making the word "technology" neutral. Humanity should also be responsible for this because social change and upheaval do not depend exclusively on technology; the socio-technical system should be equal to technology and all the others, which will include everything. And the function of technology is to fill the void of people who can't explain technology and semantics. Therefore, the author agrees with Marx's view that "technology as such, makes nothing happen", and criticizes the two kinds of thought that either technology forms us or it changes our lives through technology.

## 5. CONCLUSION

According to the statements from the previous paragraphs, the interaction between society and technology drives the socio-technical whole in a perpetual flow and evolution of economic, political, cultural, social and physical elements. The transformation of society, especially the establishment of the capitalist mode of production, is where the development of the productive forces became dependent on scientific-based technological progress, thus changing the nature of production. The steam engine revolution, the electric power revolution, and the information (internet) revolution appear to demonstrate the powerful role of technological progress, but also the combined influence of government policy, capital tendencies, market push, and social needs in which these factors played a role. In this sense, from the proposition of "science and technology is the first productive force", it can be inferred that not only the penetration of technology on factors of production such as labor force, labor tools and labor objects, but also the evolution and development of the social support system of technology, society and technology influence each other in the same process, promote each other and co-development. As a conclusion, the limitation would be the social interaction elements of technology on social media that haven't been mentioned; human responsibility on technology and the culture hoc fallacy could lead to future research and discussion.

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