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The 4th industrial revolution and the innovative society

第四次工业革命与创新型社会

Challenges to Traditional Ethics by Application of New Technologies

新技术应用对
传统社会伦理的挑战

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Challenges to Traditional Ethics by Application of New Technologies

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Abstract: Human society has witnessed rapid technological development as the 4th industrial revolution is booming. In the in-depth integration of science, technology and society, science and technology exert an inevitable impact on the internal structure of traditional society. While integrating with society closely, new technologies develop rapidly with wide influence. The application of various new technologies has brought unprecedented challenges to social ethics, which is an inevitable problem.

Adjusting the traditional ethics and values to overcome challenges posed by the new technological revolution is not only a theoretical issue, but also a practical one in urgent need of answer. Because ethics are stable while technologies are revolutionary and "advanced", the "dilemma of Collingridge" remains in social integration of technologies. Therefore, we must be result-oriented in overcoming challenges to traditional ethics posed by technologies. In dealing with these challenges, we need to have a complete picture of

technology, consider both global and national conditions, tackle main problems, and solve them in the context of "technology-society", so as to gradually build a new system of technological ethics.

In the 21st century, the development and renewal of technologies have accelerated, and the integration of science, technology and society has entered a new stage. The rapid renewal of technologies has brought unprecedented social prosperity as well as technological risks. As new technologies enter every aspect of the social structure, modern society is undergoing profound changes (including social production, society and culture). Growing influence of technologies will bring more unpredictable social problems, among which problems in traditional culture and ethics are often overlooked because of their subtlety. In fact, the cultural problems brought by new technologies are the most daunting ones and it's a historical mission to tackle them. Therefore, the development of ethics of technology is important.

Catalog

1 Ethical challenges posed by new technological development

As the 4th industrial revolution deepens, technologies such as e-commerce, artificial intelligence, big data, genetic technology, and vaccines are constantly being reinvented, bringing great convenience and prosperity to human beings. What's more, mushrooming technologies are transforming our society quietly and profoundly. However, people can't be complacent about these technological achievements, because network security, information leakage, GMF, mobile phone addiction and many related issues have popped up one after another. The social and ethical challenges posed by new technologies become more prominent.

1.1 The situations and characteristics of new technology development

Klaus Schwab has once described the current technological revolution at the World Economic Forum as "the 4th Industrial Revolution instead of a continuation of the third". It's a new one for three reasons: speed, scope and systematic impact. The current speed of technological breakthroughs is unprecedented. Compared with previous industrial revolutions, the fourth has proceeded at exponential speed. Moreover, it has hit almost every country. The depth and breadth of this revolution necessitates transformations in the entire system of production, management and government. In short, technologies are developing exponentially with unprecedented social impact. Specifically, the main features of new technology

development can be summarized as the following (see Figure 1).

First, new technology is highly integrated with the modern society. Technological innovation has been closely followed by its social application.

Second, new technology is directly related to people's lives. Typical technologies like artificial intelligence, big data, Internet, and genetic engineering have developed into a "human science and technology cluster".

Third, new technologies are still highly specialized. Although these technologies are integrated into people's lives, their principles and internal mechanisms are highly specialized, showing a clear interdisciplinary trend. This has become an important feature.

Fourth, new technologies exert great and global impact in social, political, economic, and cultural arena at higher speed.

Fifth, new technology and business are closely integrated, and the industrialization and commercialization of technology have become a trend. As a result, technological innovation and economic development are mutually reinforcing.
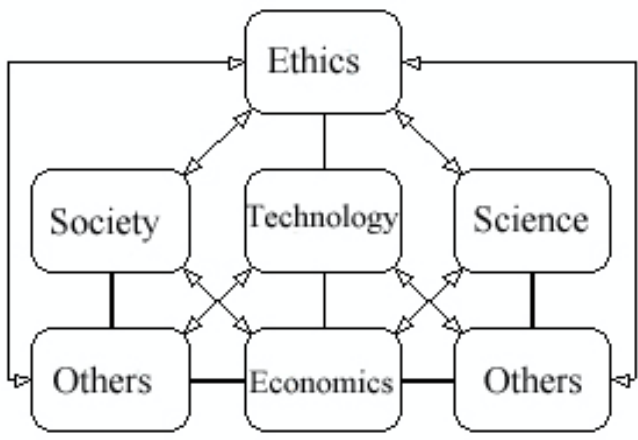
Figure1 Main features of new technology development

In short, the impact of new technologies on modern society has covered all aspects of social life and played a key role. According to Bijker, technology has become an indispensable part of modern life. In particular, the technology breakthroughs in recent years have caused, what Harvey calls "time and space compression" for traditional life. Therefore, both individuals and society need to adapt to the rapid development of technology, in order to strike a balance between traditional culture and new technologies. The latest Global Competition Report states that technological progress is creating far greater value than what statistics have shown. As a result, technology is bringing asymmetry and uncertainty to the political and economic environment, making it more difficult for policy makers to predict future developments. Therefore, it is an urgent task to deal with these

issues.

1.2 Ethical challenges posed to traditional society by new technologies

Unexpected development of technology has replaced universal optimism with mixed feelings. On one hand, people are cheering for the infinite possibilities brought by new technologies. On the other hand, they are also concerned that technologies may be out of control. Amidst rapid advancement in technologies, China is vigorously advocating fairness, rule of law, and harmonious socialist values. Against this backdrop, people have generally developed a contradictory mentality. While enjoying the convenience of new technologies, people are also unsettled by growing ethical controversies arising from new technologies. The philosopher Sandel describes this situation in a classic way. He notes that when people's moral understanding cannot follow scientific progress, as it is now, people would try hard to express their anxiety. This is an ethical challenge for the development of new technologies. Specifically, this anxiety falls into three aspects.

First, can human being effectively control the hesitation and uncertainty of emerging technologies? In other words, will the negative impact of technology on its producers and users be out of control?

Second, will new technologies pose an unexpected threat or adverse impact on others? People are concerned about new

technologies' impact on their own interests, privacy and security.

Third, can human society effectively adapt to the new changes brought by new technologies? People have doubts about the technology-based social life.

People are culturally anxious as ethical problems brought about by new technologies constantly emerge and the inconsistencies between traditional values and new concepts of technologies are inevitable. The ethical and cultural collision has increasingly become an important issue.

1.3 Characteristics of new ethical collision

The ethical issues posed by new technologies are closely related to social aspects of technology. When these new technologies are applied in social life, their uncertainties will inevitably cause tension and conflicts. Especially when new technologies and products are not fully understood by public, concern about their impact on the environment and health would be commonplace. But it also reflects people's doubts about new technologies. Revolutionary technologies often mean fundamental innovations and breakthroughs, while social ethics are relatively stable. The former has a huge impact and challenge on the latter, causing deep conflicts. For example, Herman's analysis of development in computer science and related issues show that there is a close relationship between new technology development and social ethical issues (see Table 1).

Table 1 Technologies and resulted ethical problems

Phase	Years	Technologies	Ethical Problems
1	1950－1960	Large central computer	AI and data privacy
2	1970－1980	Small computers and ARPAnet, desktops connected by private network	AI and data privacy, IPR infringement，computer crimes and communication privacy
3	1990 to present	Internet, global information network, application in "Web. 2.0", environment and forum	AI and data privacy, IPR infringement，computer crimes and communication privacy, free speech, anonymity, jurisdiction, behavioral code
4	Future	Thanks to Nano-and bio-technologies, many IT technologies and automated systems have been developed.	AI and data privacy, IPR infringement，computer crimes and communication privacy, free speech, anonymity, jurisdiction, behavioral code, automated decision-makings, Nano computing, bio-information and smart environment

1.3.1 Major aspects and manifestations of ethical collision

First of all, the computer revolution is the most important technological revolution in the contemporary era. The development of computer networks has gradually expanded people's living space. The virtual and digital interactions have completely changed the traditional way of life, and public safety and personal privacy have become the key concern in social activities with computer as an intermediary. Especially since the 1990s, computer ethics has

become an important topic in the field of ethics. Network supervision, software piracy, intellectual property, data privacy, and hacking are serious problems. In this situation, people from all walks of life are calling for consensus on computer ethics. (For example, the American Computer Society has formulated "Ten Commandments of Computer Ethics" and "eight professional standards"). The technical ethics related to computers and the Internet also constitute a key link in the ethical issues caused by new technologies, providing a new platform for solution of many ethical issues and conflicts.

Second, medical and biotechnological fields are easy targets for ethical conflicts. With the development of biological sciences and medicine, breakthroughs have been made in cloning, gene, 3D printing, synthetic biology, and other technologies, which have caused controversies. For example, significant advances in cloning have caused fundamental ethical issues. Cloning life means a break from traditional concepts about people's biological connection. These technological advances and applications must bring about a tremendous impact on traditional social ethics, especially family ethics. When these biotechnologies mature, they will be commercialized, which undermines or even break traditional values of the sacredness and dignity. Using life as instruments is also questioned by ethics.

Thirdly, the ethical issues that arise from artificial intelligence and big data are also prominent in recent years. Artificial intelligence and

robots pose a series of important ethical choices. In this regard, the Boston Consulting Group's "Replacement or Improvement: The Impact of Artificial Intelligence on the Financial Job Market" analyzes the impact of artificial intelligence on economic ethics thoroughly. Another controversial development is the Deadly Autonomous Weapon System (LAWS). In addition, the issue of robotic ethics (roboethics) is also on the agenda. Asimov has long proposed the three laws of robots as the basic ethical principles for dealing with human-machine problems. The first international robot ethics conference has been held in 2004. The "Trolley Problem" in automated driving is also attracting attention. It should also be noted that new technology developments (such as e-commerce) have a significant direct impact on traditional economic ethics, especially about data security and user privacy, as more data is stored in the cloud. These problems will only be more serious by the widespread use of technology. It is foreseeable that the new technology will have a greater impact on society, and will undoubtedly challenge the traditional ethical norms and values.

1.3.2 Ethical dilemma and controversy of new technologies

a. Instrumentalism vs. humanitarianism. The new technologies serve as instruments in helping people meet their needs. However, the cold science of these tools take people away from their ultimate goal of humanity. For example, WeChat, qq and other social media

platforms facilitate communication and interaction among people, but reduce chances for face-to-face talk or any emotional exchange. As a result, cold technologies drift people apart. Convenience of communication and emotional connections seemingly become two sides of the coin in the development of science and technology.

b. Uncertain ethical effects of new technologies. New technologies pose great uncertainties to traditional ethical relations between those judging or being judged. For example, whether individual or a social group should be judged by ethics. Due to the uncertainty of technical consequences, ethical assessment and judgment are opaque.

c. Complete change in people's way of life. New technologies have had a dramatic impact on the entire modern life, on people's way of life and values. Both material and spiritual world carry hallmarks of new technologies. The mechanization and formalization of science and technology profoundly change the forms and contents of people's life. Modern values are reinforced by developments of new technologies. Therefore, modern technologies play a key role in modern ethical crisis.

d. Serious threats on privacy and information security. Privacy and information security threats bring the widest impact and most serious potential consequences. People generally feel insecure about their privacy and personal information because of new technologies. Protecting people's information and privacy in the technological era has become a starting point to solve many new ethical issues.

Ethics of technology is becoming a hot topic in academic research. Instead of overturning modern values, they even strengthen some, such as formal rationality and utilitarianism. But the time compression and space extension brought by the new technology make traditional ethical contradictions prominent. New fields are constantly emerging, which makes it difficult for ethics to follow their pace. In this sense, the ethical conflicts and contradictions caused by new technologies should not be taken as excuses to reject traditional ethics. New ethical development should carry forward traditional ones, which serves as a prerequisite for resolving ethical conflicts caused by new technologies.
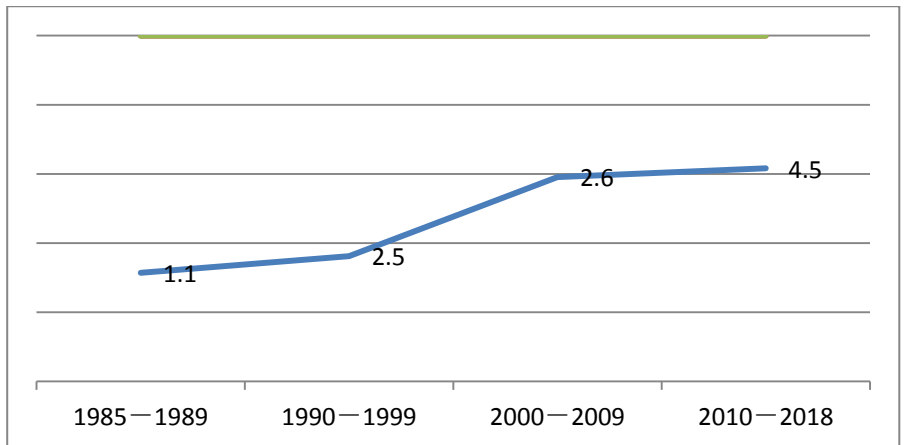

Figure2 Research trends on new ethics of technology

2 Reasons behind new ethical problems

In fact, it is natural that technology application brings conflicts to

traditional ethics, society and culture. Many problems have existed long ago. Technologies only make them more prominent. The characteristics of modern technology and traditional ethical conflicts show that this contradiction mainly stems from inconsistency between technology and social structure. As modern technology becomes more and more complex, their social responsibilities and ethical controversies have also become more complicated.

Technology development inevitably exerts both positive and negative impact on society. No one can make accurate predictions about this. Therefore, we cannot fully control all the social consequences. Moreover, the social development of technology is neither single-dimensional nor fully predictable. There are many uncertainties. According to Moore's logical malleability, uncertainty is a prominent feature of technological development. Equipment is logically malleable because they can be used in all aspects of social structure for various purposes. The development of new technologies can also be seen as a process of growth and realization of logical malleability, which means that people have limited control over technologies.

People may have oversimplified technologies and overlooked logical malleability, because people generally take technology as a device only. It is important to note that technology is multi-dimensional. According to Paul Sollie, technology includes four dimensions of activity. Technology is first and foremost a

material object, which is the most common understanding. Secondly, it refers to knowledge. Thirdly, it is the activity of manufacturing and using technical tools. Last but not least, technology is a social power. If you only pay attention to one aspect of technology and overlook its close connection with society, logic malleability may not guarantee adequate plan for its social impact. In short, lack of experience results in inadequate judgment of the actual effect and possible social risk of technologies. The multidimensional structure and logical malleability of technology determine that its social applications face uncertainties.

As a basic moral standard regulating behaviors, ethics has a unique and important social role compared with other social norms, such as law, politics, etc. Ethical forces show their powers through various channels, namely public opinion, people's beliefs and customs, especially through people's ideas about certain moral norms. The ethical norms, based on self-discipline and morality, are important guarantees for social order. Being more universal than laws, they rely on social structure and simple traditional social models. A basic feature of social culture is that ethical norms take a long time to take shape, and stays stable. As a result, it is difficult to change ethical norms and moral values.

Traditional ethics regulate social relationship, which is expanded by the development of new technologies. More social interactions and activities carry certain symbols. A typical example is virtual

interaction, which creates a virtual space for people's activities. People tend to get rid of traditional ethics and indulge in virtual spaces, leading to less face-to-face communication, indifference and misinformation. This calls for new ethics as well as changes in traditional ethics.

In comprehensive application of technology, the complexity and uncertainty are core reasons for many problems. Meanwhile, the restrictions of technology have often been ignored amidst technological progress. Consequently, Feenberg notes "technology users are also shaped by technology, which is not what users intend for. Meanwhile, when objects are integrated into the technological system, they change from a natural one to a social one with intermediary. On the basis of technology and ethical culture, this paper will analyze why new technologies has posed continuous challenge to traditional ethics.

2.1 Inappropriate interpretation of traditional ethics

Big data- and AI-based new technologies such as search engines, map navigation, shared bicycle services, spam filtering, social media, and the Internet of Things, have brought unexpected impact on people's lifestyle and social structure. Some unprecedented technologies have created new fields like the virtual space on the Internet. The emergence of artificial intelligence products (such as automated driving, robotics) has created a new way of life. Ethics

intends to identify the good value and set standard for decent behaviors and institutional justice. Therefore, new fields call for new ethical norms.

New technologies lead to new ethical issues, which call for new ethical norms urgently. However, before new ethics are in place, old ones will inevitably try to fill the gap. Therefore, ethical collisions are inevitable when old ethics are ill fitted for new issues. This is exactly the uncertainty described by logical malleability. Even technological applications are not as certain as they seem. According to D. Pimple, popular new technologies can change social practices in many unexpected ways. For example, the United States invented oral contraceptives in 1960. Their use not only increase women's control over reproduction, but also influenced women's health, reproductive tendencies, law and politics, religion, interpersonal relationships, family, women's occupations, gender relations, and so on. In other words, social practice drives technological innovation, which in turn changes social practice. Another problem that traditional ethics can't handle arises from virtual world created by computer networks. In traditional society, any behavior not up to moral standard carries risks and consequences. In the virtual world, however, absence of risk or consequence means that people don't need to observe moral obligation. The dignity and sensitivity of others are made irrelevant by the anonymity and lack of social morality on the Internet. If human beings are creatures bounded by

norms and responsibilities, then technologies change concepts of morality, freedom, and self-esteem. The vacuum caused by changes in people's behaviors inevitably calls for new norms.

2.2 Conflicts between stable ethics and revolutionary technologies

The ethical issues arising from new technologies often mirror the conflict between new values and traditional ones. As we have mentioned, technologies are forward-looking and revolutionary, while ethics are conservative and change little, so they are inevitable inconsistent. On one hand, traditional ethical norms will be applied automatically to deal with new problems. On the other hand, new problems reveal the inadequacy of traditional ethics. Therefore, when old rules can't solve emerging problems, we need to develop new policies -- not just for the current challenges -- but also for the future. What's more, we need new insights into traditional ethical paradox. For example, "Trolley problem" can no longer be debated only at the logic and theoretical level in the era of artificial intelligence.

The root causes of new ethical problems lie in the gap between space created by technologies and culture. Therefore, the philosopher of technology feenberg have this to say. In traditional society, social identity is stable because the society changes little. However, modern society and associated identities change according to the pace of technological changes. Social and cultural concepts in ethics lag behind such changes, which is not a serious problem in traditional

societies. But the intervention of new technologies has made collision between old and new ethical thoughts prominent. Facing problems brought by new technologies, traditional ethics often find that their values and norms powerless, which calls for changes in ethical rules.

2.3 Problems from social integration of technologies

The "dilemma of Collingridge" indicates that technology has never been integrated with society overnight. Collingridge believes that it is very difficult for people to control technology. In the early stage when technology can be controlled, its harmful social consequences are not fully understood. But when the consequences are fully shown, control becomes costly and slow. This dilemma well describes the integration of new technologies in society. In the early days of new inventions and applications, people are unfamiliar with their functions, potential values and impacts. In other words, when society hasn't fully recognized the technology, its control is relatively easy. This is exactly the case of mobile phones and computers. Before their social impact and logical malleability are fully revealed, it is difficult to predict people's addiction into them. But when technology is fully integrated into society, its consequences are difficult to control, among which cultural and ethical issues with far-reaching impact are often neglected dimensions. Especially in the modern results-oriented evaluation

system, technology's functions are valued more than their social meanings, making ethical conflicts a natural result.

As technology is integrated into society, technological operations are gradually put under social management. But this cannot rule out adverse consequences because social activities are also uncertain. Moreover, the integration of technology into society needs recognition from values. Ethical issues appear because technology is connected with value. Ethical values are reflected in both the motivation and application of new technology. This has been intensified by the spread of computer technologies. In the network era, the development of new technologies has overwhelmed people's imagination. However, cultural development has lagged behind. Therefore, new technologies bring both benefits and risks. For example, daily use of technology has weakened human care. According to Brusoni's chart, people's use of technology is divided into internal and external aspects, which are influenced or even determined by certain values. In such cases, the results are not only purely technical, but also value-loaded with social consequences.
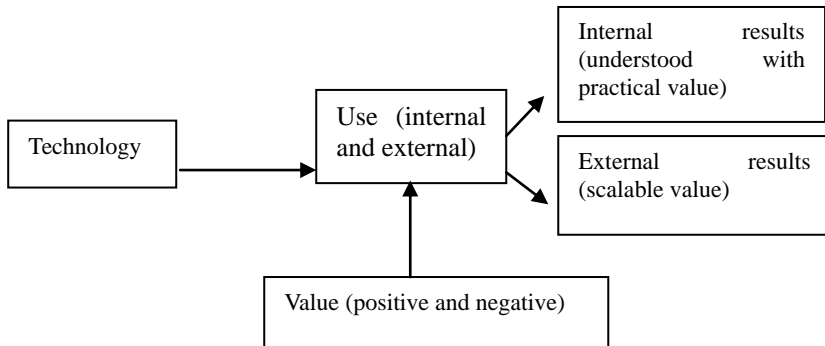
Figure3 (quoted from Stefano Brusoni)

In short, modern technology has dominated today's society with its unique development logic. Instead of being a simple instrument, technology is the core factor of modernity. According to Ellull, technology in contemporary society has become an autonomous and ubiquitous world that follows its own rules, which is different from all traditions. New technology relies on previous ones instead of tradition. The fast evolution of technology is unsettling for people to integrate it with tradition. This is an important reason for the constant conflicts between technologies and ethics. Traditional ethics cannot escape the impact of technology when it infiltrates every aspect of social life and culture, accelerating collisions between traditional and modern values.

3 Principles and measures to tackle ethical problems posed by new technologies

As new technologies are integrated in societies more rapidly and

deeply, both its positive and negative impact on traditional ethics have been intensified, which changes the role and significance of traditional ethics profoundly. The application and development of new technologies are vital to the progress of society, because it expands the scope of people's lives and provides a solid foundation for people's freedom, progress and overall development. New technologies have driven progress in culture and ethics. The integration of science, technology and society establishes a production-consumption cycle driven by technological innovation. Compared with traditional culture and ethics, the technological framework of social operation is diversified, complicated and uncertain. These characteristics determine the difficulty of any ethical change in response to new technologies. Science and technology are not only promoters of culture and ethics, but also carriers of advanced, progressive civilization and ethical practice.

On one hand, modern societies need high quality, rich and personalized technological resources urgently, so we need to offer safe and reliable technological products in a timely fashion, as well as better soft environment and more people-oriented services. The development of new technologies not only sets higher requirements for culture and ethics, but also provides a foundation for their development. On the other hand, soft environments are critical in the development of new technologies. It guarantees effective and high-quality social integration of technologies and lays the

foundation for new technology to realize its value, contributing to the further development and application of new technologies.

However, China's ethics of technology has not developed effective guiding norms and the gap between theory and practice still remain. Especially in the information era, people still face problems of underdeveloped core technology, weak development of cutting-edge technologies, and inadequate soft environment of laws and ethics. Therefore, technological progress alone cannot answer all the problems, and the right soft environment of culture and ethics is necessary for technological development. In the new economy of computer networks and information technology, people have enhanced awareness of IPR protection. The rational use and development of new technologies and products are closely related to the entire social market and cultural demands, so that economic interests and professional ethics are integrated with new technologies. If handled properly, economic interests and professional ethics will be conducive to the harmonious and stable development of the whole society. Otherwise, even a small technical problem may lead to serious social and cultural problems.

3.1 Principles in handling conflicts between new technologies and traditional ethics

3.1.1 Global vision

As modern technology transcends the boundaries between regions

and countries, both technological innovation and applications are global. Therefore, we need to design innovation and technology policies in light of global issues and needs. Innovation is a double-edged sword, so it's critical to take global issues into account in designing scientific and technological policy, especially when resources and funds for innovation are in limited supply. Cultural and ethical conflicts posed by new technologies originate not only from ethical differences, but also from the cultural ones among regions. In the global village of modern technology, we need to deal with related issues with global vision.

3.1.2 Common but differentiated principles

Research on ethics of technologies at home and abroad has been mature in many fields, such as ecological ethics, medical ethics, and bioethics, laying a good foundation for the development of comprehensive ethics. However, the impact of new technologies on traditional ethics is all round, so that people need to establish comprehensive ethic norms on the basis of development in individual fields. Researchers and engineers need to consider both ethical implications and economic efficiency in designing and planning for new technologies. They must be aware of the social responsibility of their design because application of their products will bring various uncertain outcomes. As a result, we need to combine theoretical research with empirical evidence in ethics, so that theories are

relevant in answering specific problems.

3.1.3 Be open-minded and dialectical

Be open-minded and optimistic about new technologies, be dialectical about ethical issues arising from technology, and avoid over-simplified judgment of yes or no. On top of existing problems, new technologies will bring about more ethical issues. This is a challenge brought by technological development as well as an important source of social progress. Moreover, as technology becomes more complex, so will be responsibility. Ethics and moral philosophy have to raise awareness about the possibilities of technology. This does not mean that we overturn the basic rules of ethics and morality. On the contrary, technology and ethics should be as consistent as possible in the future. The differences and diversity of new technologies must be recognized with basic respect of basic laws of technological and social development, so that values can be more open, enlightened, and inclusive. This is also the basic requirement for the development of ethics of technology.

3.1.4 Analysis within the context of "technology and society"

The impact of new technologies on both society and ethics is concrete. Therefore, the relationship between new technologies and ethical issues should be set in the context of "technology and society". The impact of new technologies on theoretical issues of ethics is concrete and contextual, so research should also focus on specific

problems and main contradictions to find practical answer to problems.

3.2 Policies in developing new ethics

The conflict between new technologies and traditional ethics is an inevitable problem. In developing new ethics, we need to build cultural architecture and assess producers and users of technology as well as ethical issues. (See Figure 4).
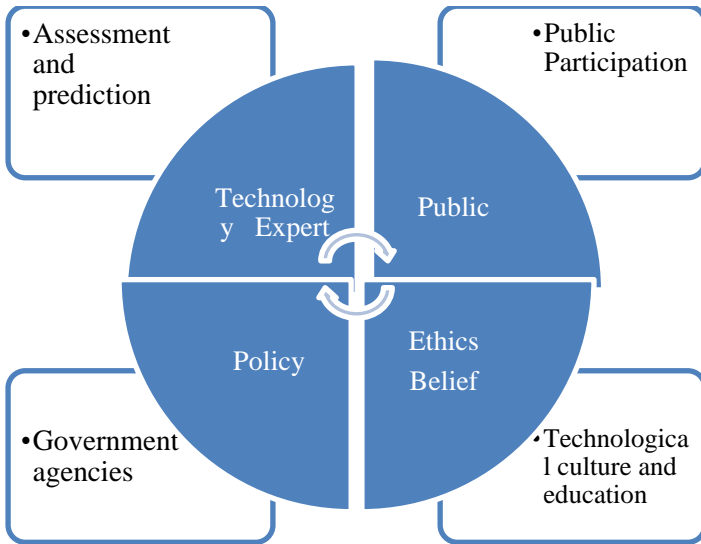

Figure4 Policies for ethics of technology

3.2.1 Better assessment system

Given the complexity of technology's social integration, systematic assessments through living labs or social experiments are important. Safety and fairness are key factors, so involvement of the

public, experts and ethicists are indispensable for assessment. Scientists and engineers cannot shoulder complete social responsibility for all the technologies, so a sound assessment system is indispensable for new technologies' social integration. In establishing this evaluation system, we should treat all patents and technologies equally, make overall strategic plan for technology development, formulate plans in line with national conditions, and establish ethical and political principles compatible with technological development. This is the starting point for establishing the ethical framework and concepts. It is also the right way to fully recognize and foresee new social problems caused by technologies, so as to effectively prevent and control ethical risks based on correct understanding.

3.2.2 Public involvement

Encourage and guide the public to actively participate in activities concerning technological innovation, so as to raise their awareness of both technology and social responsibility. Public participation is a key link in the social assessment of new technologies, which should not be the exclusive rights of experts. Of course, information will not be fully disclosed due to professional, commercial, confidential and other reasons, but limited participation of the public is still necessary. And consensus between different classes and groups is the key to technology assessment and expansion. Institution that promotes

public participation is the top priority. Because effective and full participation of the public is so important for both public awareness and sound operation of the technology, the design and planning must take it into account. Therefore, mechanism facilitating public participation is indispensible for solving technological problems.

3.2.3 A combination of ethics and laws

In modern society, law and ethics are complementary and indispensable for healthy and standardized development of society. Ethical principles are ideals of fairness and justice, which are achieved by moral self-discipline and public opinion supervision. Because observation is not guaranteed, the support of binding social rules is needed, making ethics and law a complementary pair. In developing new ethics of technology, law can reinforce the role of ethics.

3.2.4 Greater effort in coordinating ethics by social organizations

Ethical practice should involve social organizations, especially in emerging fields where social norms and public attentions are weak or even absent. Ethical norms alone cannot regulate these fields. Under this circumstance, governing department and relevant social organization play a crucial role in providing rational framework for technological development. As big data has multiplied information, relevant organizations (websites, hospitals, etc.) have more ethical obligations, because they are in a good position to handle these data.

3.2.5 Emphasis on ethical education

Traditional education mainly focuses more on knowledge than social, cultural and spiritual wellbeing. Inadequate balance between scientific and humanistic education has resulted in many ethical issues. While emphasizing knowledge, scientific education should also focus on cultivating well-rounded talents. In evaluating new technologies, we must also consider the cultural environment of their social integration and raise awareness of the "Snow problem", so as to prepare people culturally and ethically for new technologies. Technicians and engineers are the major force of technological development, so their sense of social responsibility is more meaningful than theoretical lecturing. Otherwise, ethics without vision will always lag behind technologies. In China, education of technological ethics is either inadequate or absent. For example, few medical practitioners are involved in medical ethics, which is the same for other fields. Through technological ethics education, more scientists and technicians should be aware of their responsibility in shaping and spreading soft culture of technologies.

3.2.6 Practice of new ethical norms by new technologies

New technologies do not always conflict with traditional ethics. Some rationalized new technologies can also serve as an ethical benchmark. For example, the supermarket's coin lock cart reminds us to return these cars. The rotary gate tells us to buy tickets before

boarding. Information technology clearly shows the ethical requirements, and smart environment and persuasive technologies begin to correct people's behaviors in a subtle way. The development of traditional ethics also needs new impetus. New technologies can also exert positive effects on social ethics, so that ethicist can be open-minded and actively use new results to enrich the connotation of ethics. Therefore, using new technology to guide people towards a better moral style should be an important goal of technology application, which may also be a way to bridge any social gap that new technologies may bring.

3.2.7 Avoiding moral anomie through extensive testing

New technologies bring uncertain social impact, which is the biggest problem we face in ethics. It can be solved through social experiments and extensive testing, which is possible because of big data and artificial intelligence. Due to limited capacity of artificial intelligence algorithms, the most effective way to reduce unpredictable risks is extensive testing, which overcome the biggest challenge of safety and control by extending from the closed laboratory to the open world. As a result, we can avoid as many ethical issues as possible and develop predictive ethics of new technologies.

In short, in developing an ethical system in response to the impact of new technologies, technology designers and users must be aware

of their ethical responsibilities and bring ethics to public attention. Attitudes toward new technologies and ethical issues are important for future technological developments and social progress. In dealing with ethical challenges, we must find a solution through innovation and adhere to fairness and inclusiveness in creating a balanced development model. Development is for the people. If we want more balanced development, more equal opportunities, and shared results, we need to improve concepts and promote fairness, effectiveness, and coordination in development. As new technologies keep emerging, conflict between new technology and social ethics will be normal. Therefore, striking a balance between them is an important task of our time.

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