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Analysis on the Realistic Difficulties in the Communication of Philosophy of Science and Technology in the Era of Big Data

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***Abstract*—It is well known that science and technology are the primary productive forces, but the discipline of philosophy of science and technology has been faced with the serious problem of how to better communicate its content to the public since its establishment. Now, in the era of big data with information explosion, how to combine the communication of philosophy of science and technology with the times background has become a new problem need to be addressed urgently. This paper tries to analyze the realistic difficulties of the communication of philosophy of science and technology in the era of big data, and puts forward some targeted suggestions from the aspects of the subject, form and content of communication, and finally puts forward the improvement strategy of diversified parallel paths, aiming at facilitating the better communication of philosophy of science and technology in the current era.**

Keywords—big data; philosophy of science and technology; science and technology communication

I. INTRODUCTION

Discovering knowledge, disseminating knowledge and learning knowledge are the eternal themes in the process of human civilization. With the continuous evolution of human society, the media that spread knowledge and tradition are also evolving, from the human genetic system itself to the emergence of characters and symbols, to the invention of printing, then to the popularization of the Internet, and now to the wide application of big data. In the era of big data, as a receiver of knowledge, we have no shortage of knowledge sources for a long time, but as a spreader, we are faced with great challenges.

As the primary productive forces, science and technology play an essential role in the social development and human progress. Along with the deepening of the process of knowledge-based economy society, the rapid development of science and technology and modern emerging science and technology have deeply affected all aspects of society, resulting in a series of new problems, such as ecological damage, ethical imbalance and so on. Therefore, the study and communication of philosophy of science and technology knowledge has become particularly urgent. The communication of philosophy of science and technology knowledge not only closely connects with the development of scientific and technological knowledge itself, but also profoundly affects the progress and development of human civilization.

II. BACKGROUND OF BIG DATA ERA

The first to propose the arrival of the era of big data was the world-renowned consulting firm, McKinsey & Company. It said that "data has penetrated into every industry and business function area and become an important production factor, and people's excavation and application of massive data indicate a new wave of production growth and the arrival of consumer surplus." After that, the concept of big data has swept through major industries and fields based on the wave of Internet and information development. But until now, there has been no unified definition of the connotation and concept of big data in the academic circles.

With the deepening of the theory research of big data, more and more academic researchers begin to extract the core characteristics of big data. Nowadays, the industry usually uses four Vs (volume, variety, value and velocity) to summarize the characteristics of big data, that is, huge data volume, various data types, low value density and fast processing velocity.

From here we see that the challenges posed by big data era are reflected not only in how to deal with massive amounts of data to obtain valuable information, but also in how to make better use of big data to improve the quality of communication and reduce its cost. Information is an external objective fact, and knowledge is a summary of external laws, while wisdom and ability are the application and understanding of knowledge. However, what big data can really give us is only information, and what is really valuable is the application and analysis behind the information, as well as the wisdom and ability in our brain. This kind of information must be screened and judged, and reused and assimilated by us.

Based on the real life and science and technology, in such a background, the philosophy of science and technology knowledge should communicate the related problems of science and technology at the level of subject knowledge. What is more urgent to be solved is how to make the public learn to screen and select the relevant scientific and technological philosophical knowledge with high value density during the communication. Massive and fragmented data provided by big data alone can neither enhance citizens'

scientific literacy, nor advance the progress and development of science and technology. On this basis, the essential thing is to combine ways and modes of thinking of traditional scientists and philosophers. In this way, the public can retrieve and screen information on their own, and truly digest the so-called science- and technology-related knowledge, so as to stimulate the development of science and technology in China.

III. The Discipline Connotation of Philosophy of Science and Technology and Its Importance of Communication

In the international community, philosophy of science and technology appears as an important branch of philosophy. It is not only related to the specialization of scientific and technological research itself and the increasing social influence of science and technology, but also inseparable from the specialization of philosophy disciplines. However, China's philosophy of science and technology has its own special tradition, and this tradition mainly involves the past thinking and perception on the "dialectics of nature".

Furthermore, the philosophy of science and technology in China is an academic field that studies the relationship between man and nature in science and technology from the perspectives of philosophy and social science. Although we mainly study the basic issues including the general rules of nature, and basic methods of scientific and technological activities, up to this day, there is no clear distinction between the two. The philosophical problems in science and technology and their development, the restriction and management of scientific and technological research, the interaction between science and technology and society, and other problems have increasingly appeared in our research contents. This involves a large amount of knowledge of history, management, sociology and other disciplines. It is a multi-angle and even cross-disciplinary discipline, and has the characteristic of both arts and sciences.

After the reform and opening up, China has made high achievements in its cause of science and technology, and then the science and technology begin to permeate into all aspects of people's daily life. It includes not only theoretical problems of methodology and epistemology, but also the practical problems of the nature changed by science and technology. During knowledge capitalization, science and technology, as the primary productive force, have gone so far as to alter genes and alter the human race itself. In this case, the ethical problems caused by cloning, surrogate mothers, gene editing and other new things are worthy of our deep discussion in the thinking mode of philosophy of science and technology. In the face of this kind of big top affecting the future development of all human beings, it is far from enough to only make discussions in the academic research discipline construction. The famous philosopher Bacon once said that the power of knowledge depends not only on the size of the value of its own, but also is decided by whether it is disseminated, as well as by the breadth and depth of communication. This shows that the more we emphasize the importance of scientific and technological development, the more we can highlight the significance of the dissemination of scientific and technological philosophy.

IV. Challenges of Philosophy of Science and Technology Communication in the Age of Big Data

With the continuous advancement of the Internet waves, big data technology is closely related to our daily life. Under particular background of the times, the communication of philosophy of science and technology has undergone enormous changes in terms of content, subject and form of communication. Although the academic circles are constantly studying the inestimable value of big data, challenges and dilemmas that come with it are rarely noticed.

A. It Is Unavoidable to Neglect the Value Density When Blindly Pursuing Massive Data Accumulation

As everyone knows, the most remarkable feature of big data is the large amount of data. After analyzing and integrating the original scientific and technological information, we can get an amount of information that is even larger than the original one. However, what we see is only the conclusion of scientific and technological information, while the processing steps and principles cannot be shown. As a result, the audience cannot effectively identify the effective information they need when receiving data, or spend a lot of time in information screening, or it is even difficult for them to distinguish the authenticity of relevant scientific and technological information.

Through searching the academic journals including China National Knowledge Internet, and papers network database (more than 37 million documents have been included), papers published in most academic journals in China have been easier to access and use. However, all these papers are scientific and technological research results. Data produced in the course of their research are often not displayed, and the raw data are the resources of scientific research. We may draw different conclusions from different perspectives when studying the same set of raw data. This is one of the most critical parts that big data of science and technology can advance the progress of scientific research. The conclusions without data analysis can easily lead to the emergence of "pseudoscience". Moreover, as public participation increases and information spreads instantaneously, the data of true and false science and technology theory will soar wildly. As a result, the public's scientific and technological literacy will not only be not improved, but the people are lost in the sea of scientific and technological information.

B. The Subject Knowledge with Famous Doctrine, Hot Spots and High Economic Benefits Is More Likely to Be Sought After and Disseminated Under the Market Economy

First, from the perspective of the audience, the selection of mass media information is usually based on their own needs. As far as the reception of scientific and technological information is concerned, there are generally two types: one is conscious reception. It is mainly due to objective reasons such as interests and hobbies or academic majors. Such receivers tend to independently choose media contents based on their purposes and absorb targeted scientific and technological knowledge in a planned way, and most of them have high scientific and technological literacy. The other is unconscious

acceptance of scientific and technological information for other reasons. For example, they may occasionally receive them when they focus on major news events and are attracted by the content of the program in their pastimes. Generally speaking, the former is the stable audience group of scientific and technological information. While the latter is a large fluctuation group and they account for the majority who need to be radiated by the current popularization of scientific and technological knowledge.

Second, from the perspective of the communication subject of knowledge related to philosophy of science and technology, in the field of science popularization and science communication, apart from researchers in related fields, most of them are journalists of science and technology news and media of science and education channels. However, under the shock of the Internet economic tide, more and more media workers are caught in the pursuit of traffic and economic benefits. Compared with the research of economics, management and other disciplines, the process of value transformation of philosophy of science and technology knowledge is longer, and audiences prefer to absorb the communication content with immediate effects. Consequently, media workers constantly provide some conclusive scientific and technological knowledge that seems to have immediate effects, but ignore the most basic and critical things. In content innovation, they easily lose the specialty, authority, and even the real bottom line.

C. "Eyeball Effect" Easily Leads to Deviation of the Actual Content and Form of Science and Technology Communication

Content innovation is the driving force of information dissemination. However, formal changes to popular science articles or science and education programs are far simpler than content-based innovations for the vast majority of today's media. After all, "philosophical perception" and "scientific thinking" are not a simple element but represent researchers' philosophical foundation or even their scientific and technological literacy. It is the knowledge foundation and philosophical thinking mode training accumulated by communicators in the long-term training of philosophical thinking. Undoubtedly, this will take a long time. By contrast, formal innovation requires only certain knowledge of communication and some creative ideas after brainstorming. Meanwhile, with the increasingly fierce competition for media resources, the audiences indulge in information with high entertainment value, and their interests in intellectual and scientific works are declining. In this kind of media environment, communicators of scientific and technological information attach great importance to the interestingness and entertainment of scientific and technological knowledge rather than the soul of scientific and educational programs, scientific and technological information itself. This also makes the communication of scientific and technological information, which stresses the principle of scientificity and rigour, face more severe challenges.

V. DIVERSIFIED PARALLEL PATHS CALMLY DEALING WITH THE REALISTIC DIFFICULTIES

A. Promoting the Multi-layered Communication Subject

The organizations of science and technology communication connect the supply and demand of scientific and technological knowledge in an effective way, and have the function of rational allocation of scientific and technological resources. Along with economic prosperity, advance of science and technology and social development, a large number of civil social organizations aiming to communicate scientific and technological knowledge and provide scientific and technological services have been spontaneously established and become an important part of the modern science and technology communication system. In the era of big data, the communication subjects of philosophy of science and technology are mainly divided into four parts: the scientific community, the government, non-governmental organizations and individuals interested in philosophy of science and technology. In the era of big data, the communication subject of philosophy of science and technology mainly include four parts of the scientific community, government, non-governmental organization and individual lover of philosophy of science and technology. Different groups, with their own different characteristics, should also play a corresponding role during science and technology communication.

First of all, as a traditional and main communication subject, the scientific community should develop its advantages of "academic specialization". Although the times are changing, the status of scientific community in science and technology communication is unshakable. For one thing, they have different philosophical ways of thinking from ordinary people after long-term study and research, for another, they also master scientific data that is truly significant. These data are obtained through continuous analysis and comparison integration after the research, and they have the ultimate power of interpretation.

Second, the government should retain its authoritativeness in the course of communicating the philosophy of science and technology. Because of the development of network, everyone can become the communicator of science and technology. Most citizens do not have the ability to discriminate and select the philosophy of science and technology information in the face of massive data. At this time, we require an absolute authority to identify the truthfulness of different popular science information for the masses, and give a powerful answer, so that the masses can quickly distinguish true and false science, rumor and truth.

In today's society, if an individual wants to widely communicate his own knowledge related to science and technology philosophy, one simple method for him is to form a specific organization for science and technology communication, and the other method is to release relevant information on the platform of "We-Media". With the increase and standardization of science and technology communication organizations, China's science and technology communication system can also be more perfect, and the communication

function and efficiency of information related to science and technology philosophy can be truly enhanced.

B. Keeping up with the Times, Paying Close Attention to the Demands of People and Developing Economic Benefits

It is a very hard thing to engage in the study of philosophy of science and technology. No matter whether it is in academic pursuits or in material rewards of real life, there is no way to compare with these people who engage in the fields of "prestigious doctrine", "reality" and "hot spots". With the continuous deepening of the modernization process, the masses have gradually adapted to the fast-food culture. The basic knowledge information which has long-term guidance meaning and can guide people to form right values is often ignored. Although we have always advocated that researcher should not rely too much on material stimulation and should have "intellectual impetus", and at the same time, the government should pay more attention to the real income of researchers.

Only content innovation can revitalize the communication of philosophy information of science and technology. While communicating specialized information, we can also add some interesting knowledge to it. For example, Guokr, a famous we-media platform of science and technology communication, is good at combining the complex scientific knowledge with social hot spots, and we can get a glimpse of them and learn about something. For instance, The Sweetness of Volume Production: Why Can't We Stop Eating Sugar and Getting Fat firmly seizes the female psychology of pursuing a slight figure, reasonably represents the related scientific principles behind the element of sugar, and applies a large number of hot words and humorous writing techniques, which are popular among the masses. Based on mastering masses' entertainment psychology, it does not lose the original intention of scientific and technological knowledge, which realizes the double benefits of economy and technology communication.

Although this is an era which regards entertainment as supremacy, in terms of audience psychology, they still pay much attention on the scientific information knowledge. The reason why the science and technology communication is unsustainable is not because the demand of masses is low, but because the knowledge of science and technology has some obscure characteristics in the process of communication. Only the painstaking analysis and method can make people understand the knowledge, and only on the basis of understanding can the knowledge be spread. As long as we firmly grasp the characteristics of our hands, we can achieve corresponding economic benefits on the basis of the communication of scientific and technological knowledge, and achieve the effect of killing two birds with one stone.

C. Adhering to the Principles of Leading by Innovation and Basing on Professional Knowledge of Philosophy of Science and Technology

We should strengthen people's content awareness on the media technology communication, on the basis of ensuring professional, authoritative and straightaway content, we should introduce more interesting and useful scientific products, and the scientific stories that the masses love to see and hear, which is an important way that achieves the technology communication in multi channels and all media and improve the level of science and technology communication of the mass media.

No matter what the development degree of traditional media and emerging media is, to make the media stronger, we should have the "focus" in the chaotic field, must take the content as the core. Applying strengthened content to lead fashion and reinforce main stream, we should stay patient, keep a level head and insist on producing competitive products under the impetuous society. At present, after integration and reform, the teams of some media which were engaged in content production reduced the scale and the teams which made form and channels became bigger, and such unbalanced phenomenon should draw attention from related departments. If we do not put the content as the core, the forms with various gorgeous appearances will become castle in the air, and the little click rate, reading quantity and transloading number that attracts attention may become a flash in the pan. Looking back at the road of integration or technology communication road that we have already passed, advanced technology is the scientific and technological support of communication, content construction is the fundamental, and keeping the content is the bottom line. It can be seen that the more emphasis is placed on innovation, the more content producers in the media need to maintain sufficient confidence, sobriety and determination, and keep what we should firmly hold, and make various explorations based on content innovation, and provide future profits and "selling point" with more foundations and possibilities.

VI. CONCLUSION

In general, the supply and demand of science and technology in China has been seriously unbalanced, and science and technology communication has developed into an area where social demand continues to flourish. Therefore, China must constantly tackle the problems existing in the communication of philosophy of science and technology, flexibly adjust the policies and strategies according to the times background, and promote science and technology communication to better serve the socialist modernization.

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