

Suggestions on Enhancing Chinese Scientists' Institutionalized Participation in Law Making

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The report of the 19th National Congress of the Communist Party of China stated that the comprehensive rule of law is a profound revolution in national governance. We must adhere to the rule of law, promote scientific legislation, strict law enforcement, fair law enforcement, and compliance with law by all people (Xi, 2017). The “Decision of the Central Committee of the Communist Party of China on Several Major Issues of Comprehensively Promoting the Rule of Law” adopted by the Fourth Plenary Session of the 18th Central Committee proposed that “law is the most important tool for governing the country, and good law is the prerequisite for good governance.” According to modern jurisprudence, legislation should be democratic, procedurally-appropriate, constitutional and scientific (Guan, 2007). The scientific nature of legislation refers to facts and elements that lead to objective and reasonable legislation (Fang, 2017). With the rapid development of science and technology, more scientific and technological elements or related professional expertise are featured in laws. The application of new technologies has presented more challenges to the rule of law. The development of technology and innovation is in need of more legal

regulations and safeguards. Based on the legislative experience of various countries, it is a trend to have institutionalized participation in law making by the scientific and technological community to ensure scientific legislation. From the perspective of China's legislative practice, although relatively sound institutional arrangements have been established in the drafting, argumentation, and review of laws, the scientific and technological community has played a limited role compared with legislatures, national ministries and the legal community. In response to this issue, research is conducted to draw upon international experience based on investigation on current legislative practice in China. Policy recommendations are proposed to strengthen the institutionalized participation of scientists in law making and promote scientific legislation.

I. The Main Problems in Scientific Legislation

1.1. Insufficient scientific proof and support in legislation processes

Thanks to the development of science and technology, technical rules take a growing proportion

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in modern laws. More digital means, indicators and standards are involved in binding laws. It takes scientific and technological expertise to ensure that the regulatory standards, indicators, and data to be reasonable, objective, and reliable. The development of science and technology has also led to expanded new areas of legislation. An increasing number of legislations involve scientific and technological expertise, such as the “Food Safety Law of the People’s Republic of China”, “Law of the People’s Republic of China on the Prevention and Control of Atmospheric Pollution”, “The Seed Law of the People’s Republic of China”, “Cybersecurity Law of the People’s Republic of China”, “Defense Traffic Law of the People’s Republic of China”, “Surveying and Mapping Law of the People’s Republic of China”, “Law of the People’s Republic of China on Traditional Chinese Medicine”, and the “Electric Power Law of the People’s Republic of China”. It takes scientific and technological expertise to support the formulation of these laws.

Faced with an increasing number of scientific and technological elements in the law, insufficient scientific argumentation and support are identified and controversies in science are presented in the legislative process in China. For example, when the “Food Safety Law of the People’s Republic of China” was revised, consensus was reached on the prohibition of highly toxic pesticides, but controversy arose in terms of whether and when it could be prohibited at this stage while ensuring agricultural production and food supply. As a result, such prohibition provisions are not listed in the law. The promulgation of the “Law of the People’s Republic of China on the Prevention and Control of Atmospheric Pollution” also led to scientific controversies about the concepts of “air pollution” and “air pollutants”. The main contention is whether carbon dioxide is a type of greenhouse gas and whether the change in atmospheric temperature could be regarded as atmospheric pollution. It is difficult to reach a consensus with so many different opinions in the scientific and technological community. Therefore, it is hard for such laws to have specified provisions in these regards. Another example is the lack of scientific support for the relevant standards and assessment of environmental and ecological damage compensation. As a result, multiple environmental protection laws such as the “Marine Environment Protection Law of the People’s Republic of China” and the



“Law of the People’s Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste” have simply adopted an upper limit of penalty. Although some laws have imposed penalties that are multiples of the damage incurred in value, this provision was rendered useless without scientific and actionable calculation rules.

The effective support of science and technology to legislation is a prerequisite for the efficient integration of science and the rule of law. The “Clean Water Act” of the United States is one of the prime examples of the effective integration of science and the rule of law. The law has been implemented for nearly 50 years, which leads to remarkable results in the prevention and control of water pollution in the United States. The core of the law is to adopt an emission limit based on pollution control technologies (technical standard) and a National Pollutant Discharge Elimination System (NPDES) permit that takes water quality standards into consideration. With the development of science and technology, the relevant technical standards, governance tools and law enforcement monitoring indicators are continuously adjusted. Pollutant discharge is regulated based on legislation with scientific support.

1.2. Lack of response in legislation to the challenges brought about by rapid technological development

Science and technology are a “double-edged sword”. While driving the growth of social wealth and civilization, they may also bring painful disasters and damages if abused or misused, leading to grave challenges to social security and ethics. For example, technologies such as genetic engineering could be

used to develop unique and unpredictable pathogens. Similar biotechnologies may be used by criminals with ulterior motives to manipulate life processes and even human behaviors. The development and application of information technology has made information security a prominent issue. Information about violence, pornography, anti-government instigation, and spam, as well as crimes that infringe upon personal information privacy or violate laws by means of information technologies should be regulated. Therefore, attention has been focused on the utilization of technologies as well as the risks and harms of scientific and technological development. All these pose new challenges to the governance of science, technology, and society. The development of science and technology should be regulated and guaranteed by law in particular.

The inherent procedural requirements of legislation lead to longer cycle and lower efficiency, which lag the speed of technological development. It is urgent for the legislature and the scientific and technological community to carry out timely and in-depth institutionalized cooperation to respond to the legal challenges of new technologies in a timely and effective manner. Only in this way can we promote scientific and technological development while preventing risks. The contemporary science and technology are

highly-professional, complex, uncertain and exert extensive influence into social life. The limited technical background of legislators makes it difficult for the legislature to accurately grasp the impact of technology on laws, therefore it is urgent to involve the scientific and technological community in legislation. Compared with the legislative practices of the United States, the European Union and other developed countries and regions in the fields of biotechnology and information technology, there is still much room for improvement for China in this area.

In terms of biotechnology, the United States, the European Union, and Japan have enacted multiple important laws, covering important areas such as food and drug safety, bioterrorism prevention, regenerative medicine regulations, agricultural safety, and plant resource protection. In contrast, China lags behind in legislation in this regard. Taking stem cells and gene resources as examples, at least the following important issues need to be resolved urgently by legislation: First, the legal regulation of the application of gene editing technologies such as the production of organs *in vitro*, the use of haploid stem cells to achieve homosexual reproduction, the acquisition of new artificial cells across species, and customized babies ; The second is the legal regulation of the inconsistencies in the source and characteristics of the clinical applications of stem



cells in regenerative medicine, the lack of uniform standards for production and preparation methods, and the treatments in violations of regulations; the third is the lack of relevant legal protection and regulations on the loss of genetic resources with huge potential economic value in the protection of human genetic resources in China.

With regards to information technology, the United States, the European Union, and Japan have also enacted several laws to ensure cybersecurity and protect data rights. Among them, the European Union has formulated General Data Protection Regulation (GDPR); the United States regards information security as a part of national security, and regulated leaks of confidential information, terrorism, pornography, and fraud on the Internet. China did not enact the “Cybersecurity Law of the People’s Republic of China” until 2016, and legislation related to personal information and data protection is still lacking. The current laws cannot cope with the more arduous challenges in cutting-edge technologies such as the Internet of Things, artificial intelligence, and big data. These challenges include, but are not limited to: the “substantial” threat brought by the Internet of Things to information security, the legal regulation of new issues such as the violation of “location privacy” brought by radio frequency identification (RFID) technology; the legal challenges of industrial application of artificial intelligence and big data, such as the legality of artificial intelligence judgments, discriminatory algorithms, threats to privacy and data security, intellectual property protection of artificial intelligence generated products, the legal status of intelligent robots, and the difficulty of applying traditional legal liability rules.

1.3. Insufficient system guarantees for institutionalized participation in legislation by the scientific and technological community

Although scientists have participated in certain legislations in China, an institutionalized mechanism for efficiently obtaining scientific and technological support is absent in the legislatures, and the participation of scientific and technological community in legislation represented by a few individuals is fragmented and dependent.

To begin with, individuals participate in the

legislation without attaching to a particular group. Experts participate in legislation mostly in their personal capacity. The fundamental difference between individual participation and institutionalized participation lies in the degree of integration of scientific consensus and the corresponding responsibilities. Although individual experts can make professional recommendations, extensive differences and discrepancies may arise due to limitation in expertise, horizon, and perspectives, making it difficult for the legislature to make judgment and integrate different opinions; institutionalized participation facilitates the comprehensive integration of individual scientists’ recommendations to reach consensus. Individual experts usually do not bear corresponding responsibilities for their recommendations; while institutionalized group bears corresponding responsibilities at the expense of the reputation of the collectivity. Therefore, in comparison, the recommendations put forward by institutionalized group are more valuable, while the individual opinions are less likely to be adopted and taken seriously. Moreover, long term and continuous participation by individual experts cannot be sustained without incentives, systems, and resources from organizations. In recent years, legislative research institutions or bases have been established in some regions, which have shown an initial trend of organizational cooperation between people’s congresses in local regions and law schools, laying a foundation for the scientific and technological community to participate in legislation in an institutionalized manner.

Secondly, the participation by scientists is limited and fragmented. The participation by individual experts in legislation is often limited to a certain stage rather than the entire process, and their recommendations only apply to a certain area of the law rather than the whole due to limited coverage of individual expertise. The fragmentation of expert participation cannot provide necessary scientific evidence for the objectivity and rationality of legislation. In addition, compared with jurists, the proportion of scientists participating in legislation is very low with limited forms such as legislative argumentation meetings, forums, and legislative investigations. The limited form of participation leads to fewer opportunities and means for scientists to participate in legislation in an

institutionalized manner.

Finally, the participating scientists are more passive and dependent. In the process of expert selection and agenda setting, the participation of the scientific and technological community in legislation is still subject to the will of the legislative or decision-making institutions. Experts can only participate in legislative processes such as seminars and argumentation meetings held by the legislature only when they are invited, and they cannot participate if they are not invited; the scope of discussion and argumentation is usually limited to topics determined in advance by the legislature. This is very likely to be turned into argumentation for the “legitimacy and rationality” of the law or endorsement for what already set by the legislature (Li, 2016).

II. The Experience of Institutionalized Participation in Legislation by the Scientific and Technological Communities in Developed Countries

Based on the practice of developed countries, we can observe in-depth and extensive interactions between the parliaments and the scientific and technological communities (UNESCO, 2019). The institutionalized participation of the scientific and technological communities in legislation includes three progressive stages: understanding of science by the parliaments, legislation based on science, and legislation response to science. Each stage features multiple forms and mechanisms.

2.1. An institutionalized communication platform between the legislature and the scientific and technological community

In order to inform the parliaments of the impact of new technologies, the parliaments of many developed countries have adopted various forms to build an institutionalized platform for communication between the parliaments and the scientific and technological communities, mainly in the form of informal organizations and institutionalized forums.

2.1.1. Informal organization

In order to promote interactions between parliamentarians and scientists, the parliaments of some countries connect parliamentarians and scientific

researchers with common interests through clubs or associations and hold regular exchange events. For example, the United Kingdom established the Parliamentary and Scientific Committee (P&SC) in 1939 while the Association of MPs and Researchers of the Swedish Parliament (RIFO) was found in Sweden. These informal organizations have effectively promoted mutual understanding between parliamentarians and scientists. In recent years, the European Parliament has initiated five rounds of the “Science meets Parliaments MEP-Scientist Pairing Scheme”, which aims to strengthen the connection between the Parliament and the scientific and technological community and leverage the supporting role of science in legislative decision-making. The scheme intends to recruit scientists who are interested in legislation and form pairs with members of relevant committees to strengthen communication and understanding.

2.1.2. Institutionalized forum

Institutional exchanges between the parliaments and the scientific and technological community are also highly valued. On the one hand, the parliaments of some countries regularly hold forums on the impact of new technologies on laws and policies. For example, the European Parliament holds annual lectures to discuss the impact of new technologies. The forums of the past three years have focused on the impacts of quantum technology, space technology and artificial intelligence on laws and policies. Seminars are held by the European Parliament with keynote speeches delivered by well-known scientists, supplemented by group discussions and open debates. On the other hand, academies of sciences, engineering academies, societies, medical research organizations, environmental protection organizations, technology alliances, chambers of commerce and even large technology companies of many countries have recognized the importance of dialogue with parliaments and have established “parliamentary liaison offices”.

2.2. Participate in the legislative process through institutionalized scientific and technological evaluation

After extensive and in-depth exchanges with the scientific and technological communities, the issues that

require legislation will be identified. If the Parliament recognizes that it is necessary to establish legislation to promote the development of science and technology in certain fields or prevent its risks, it will conduct further assessments of the impact of relevant technologies. Evaluators could be categorized as those who are relatively self-sufficient or dependent on think tanks based on their different status.

2.2.1. Relative self-sufficiency: carry out scientific and technological evaluation through internal institutions

The reason why the evaluation institutions set up in the parliament is defined as relatively self-sufficient is that it may also invite external institutions or experts to provide some assistance when necessary. There are two different models of the evaluation institutions in the parliament:

The first is represented by internal special committees set up by Finland and Italy. The Parliament established special committees with professionals to conduct research and deliver evaluation reports on its own. Its responsibilities include advising other committees and reviewing long-term government policies involving scientific and technological issues.

The second is represented by the internal independent institutions established by the United States. The U.S. Congress once established the Office of Technology Assessment (OTA) with technical experts to provide technical evaluation services to the Congress. In contrast to the President's Scientific Advisory Board, OTA does not participate in decision-making. It only provides policy options for decision-makers to judge for themselves. After the US Congress withdrew OTA on the grounds of budget cuts in 1995, it mainly obtains scientific and technological advice through the Congressional Research Service (Library of Congress) and the National Research Council (NRC) from the National Academies of Sciences, Engineering, and Medicine.

2.2.2. Reliance on think tanks: obtain scientific and technological evaluation services through external institutions

Based on the relationship between parliaments and external think tanks, it can be divided into three types: the first is a close relationship, represented by Germany. The German Parliament and the Office of

Technology Assessment (TAB) enjoy a long-term close cooperation. The Parliament establishes the Committee on Education, Research and Technology Assessment to formulate plans for TAB. TAB is located at the Karlsruhe Institute of Technology and is run by the Institute for Technology Assessment and Systems Analysis (ITAS). The committee reached a long-term fixed contract with TAB, entrusting TAB to undertake scientific and technological evaluation projects. The TAB report is submitted to Parliament through the committee.

The second type is the semi-close relationship, represented by Denmark, Norway, and the Netherlands. The parliaments of these three countries obtain technology evaluation services for legislation from external institutions. The main source of funding for the evaluation institutions comes from the parliamentary evaluation project funding, but they can also carry out research for the government or carry out other research projects. This is obviously different from the TAB in Germany who solely focuses on serving the parliament. The relationship between the U.S. Congress and the National Research Council can also be classified as semi-close. The US Congress often requests the National Research Council to provide advisory reports on scientific and technological issues of its concern.

The third type is a loose relationship, represented by the European Parliament. The European Parliament has established the Science and Technology Options Assessment (STOA), which is composed of representatives appointed by various special committees of the Parliament with the STOA Bureau as the executive body to manage science and technology evaluation projects. The European Parliament has not formed a close relationship with any research institutions like that of the German Parliament and TAB. Instead, it selects research institutions, universities, laboratories, consulting companies, and even individual researchers to undertake evaluation projects through public bidding.

2.3. Provide scientific argumentation for legislation through hearings

After the legislative evaluation on relevant technologies, the review of the act will start if the Parliament finds it necessary to establish or amend laws. There are roughly three ways for parliaments to review

on scientific and technological issues. The first type refers to the review on scientific and technological issues by parliamentary science and technology committees. Such a committee enjoys a position equivalent to that of other standing committees and oversees review of all scientific and technological issues. But this does not mean that other committees will not review scientific and technological issues. For example, issues related to national defense technology must be reviewed by the national defense committee. The second type refers to the review on scientific and technological issues by the trade and industry committee or education-related committees. This is a more traditional approach. The third approach is to set up special committees or groups to review specific scientific and technological issues. This kind of temporary organization has a fixed duration and is expected to deliver research reports on specific scientific and technological issues. During the review, the parliament usually initiates hearings based on actual needs, inviting scientists or scientific and technological organizations to participate in legislative hearings and provide scientific evidence on related issues.

In a nutshell, the interactions between the parliaments of developed countries and their scientific and technological communities features partnerships for information communication, contractual relationships for legislative evaluation, and social contractual relationships based on social division of labor. In the process of these interactions, the pursuit of parliaments to maximized social interests and the aspiration of the scientific and technological communities for truth are better integrated, thus ensuring the legislation to be scientific and fair.

III. Related Suggestions

While continuing to improve relevant systems and involving scientists in legislation as experts, significance should be attached to the institutionalized participation of the scientific and technological community in legislation in order to advance scientific legislation. The so-called institutionalized participation of the scientific and technological community in legislation refers to rules, mechanisms, and specific rules for the scientific and technological community to participate in legislation, that is, there must be institutional and



organizational guarantees. In light of the experience of developed countries and the status quo in China, we propose the following suggestions to strengthen the institutionalized participation of the scientific and technological community in legislation.

3.1. Improve legislative procedures to provide institutional guarantees for institutionalized participation by the scientific and technological community

In order to advance scientific legislation and improve the quality of legislation, the legislative review of legal acts involving important scientific and technological issues should be improved, and relevant systems should be established to attract scientists from scientific research institutions and scientific organizations in related fields, including scientists with different views to involve in the whole process of legislation, fully inform the legislators about the impact of technologies, so as to make rational legislative decisions and formulate high-quality laws. The specific suggestions for improving the legislative procedures are as follows.

3.1.1. Expand the participation of scientific research institutions in the preparation stage of relevant legislation

Legislative preparation involves two stages: the first is to formulate legislative schemes and annual legislative plans, and to identify legislative programs;

the second is to draft legal bills. For the formulation of legislative schemes and annual legislative plans, the relationship between planning and flexibility should be balanced, so that legal proposals relevant to technologies with certain urgency can be included in the annual legislative plan in time though they are not listed in the legislative schemes. Regarding legislation involving science and technology, the opinions of the scientific and technological community should be solicited in a targeted manner during the drafting stage.

3.1.2. Enhance the participation of the scientific and technological community in the argumentation stage of the relevant legislation

Involve the scientific and technological community in legislative argumentation on technologies. Suggestions for specific measures are as follows.

i) Involve the scientific and technological community in the argumentation and consultation on relevant legislation

Article 36 of the “The Law on Legislation of the People’s Republic of China” stipulates that the law committee, relevant special committees, and the bodies of the standing committee shall adopt various forms such as seminars, argumentation meetings, hearings for legal bills included in the agenda of the Standing Committee meetings to solicit opinions from all areas. The “Working Standards for Argumentation and Consultation on the Adjustment of Major Interest Involved in Legislation” reviewed and approved at the first meeting of the 19th Central Leading Group for Comprehensively Continuing the Reform stipulates that if the drafting, approval and revision of a draft law involve adjustments of major interest, relevant personnel could be invited to argumentation and consultation activities such as argumentation meetings, hearings, commissioned research, and consultation. We suggest to involve scientific and technological community, especially relevant scientific research institutions or groups in argumentation and consultation for adjustments of major interest relevant to science and technology.

Compared with argumentation meetings and symposiums, hearings are a less frequently adopted method of argumentation and consultation during the legislative review stage. The inherent novelty and

complexity of scientific and technological issues often lead to certain controversies in adjustments of major interest involving science and technology. It is necessary to identify and adopt scientific evidence through the legislative hearing process to ensure legislation to be scientific and objective. Therefore, we suggest that the legislative hearings should be strengthened during the review by the special committees, and scientists should be invited to participate in the hearings for adjustments of major interest involving science and technology.

ii) Entrust scientific research institutions to undertake the assessment of important legislative programs

The “Working Standards for Argumentation and Consultation on the Adjustment of Major Interest Involved in Legislation” reviewed and approved at the first meeting of the 19th Central Leading Group for Comprehensively Continuing the Reform stipulates that the Legislative Affairs Committee of the Standing Committee of the National People’s Congress may designate certain parties or conduct bidding to entrust a third party to carry out evaluations. We propose to establish a science and technology evaluation system for legislation based on this working standard. Relevant scientific research institutions, science and technology associations or think tanks should be selected to carry out science and technology evaluations through designation or bidding to provide high-quality, independent, and impartial evaluation and argumentation on important legislation involving science and technology, thereby promoting scientific and democratic legislation.

The assessed items in the “Working Standards for Argumentation and Consultation on the Adjustment of Major Interest Involved in Legislation” are limited to important legislative items that are more controversial in legal bills at the review stage. The Legislative Affairs Committee of the Standing Committee of the National People’s Congress is advised to set up forward-looking assessment projects on the impact of cutting-edge technology development on laws and policies in addition to setting up science and technology assessment projects to serve the current legislative plan, so as to identify legislative needs and prepare for future legislative planning.

3.2. Establish an exchange system between the legislature and the scientific and technological community to overcome information asymmetry

In-depth communication between the legislature and the scientific and technological community is an important way to understand the impact of science and technology, and an institutionalized exchange platform and mechanism should be established between the two parties. Specific suggestions are as follows.

i) The exchanges between the National People's Congress and the scientific and technological community should be strengthened, such as establishing strategic partnerships with national scientific research institutions including the Chinese Academy of Sciences and the Chinese Academy of Engineering, jointly setting up legislative research bases, regularly co-organizing forums or seminars, and inviting well-known scientists to present the impact of the latest scientific and technological developments on laws and policies, and pairing up members of the

Standing Committee of the National People's Congress with famous scientists.

ii) Give full play to the role of science sector and its members of the Chinese People's Political Consultative Conference (CPPCC) in legislation, and promote their exchanges with the legislature.

iii) Encourage the scientific and technological community to take the initiative to carry out research on the relationship between technology and law, and put forward legislative suggestions.

It is expected that the legislature could be better informed about the impact of scientific and technological progress on economic and social development while the scientific and technological community could understand the need for science and technology by legislation through the above-mentioned institutionalized and routine two-way communication, thus providing strong support for scientific legislation.

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