

On Legal Regulation of the Alienation of Science and Technology

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ABSTRACT

The alienation of science & technology is a kind of abnormal phenomenon coming from the research or use of science & technology. It makes science & technology from the tool that serves and brings benefit to human into the power that controls and harms human, so the regulation of the alienation of science & technology is the requirement of the sound development of science & technology, and the socio-economic progress, as well as the improvement of people's living standards. Law is the primary measure to regulate the alienation of science & technology. The legal regulation is the fundamental way because it provides the value orientation, the norms of behavior, the rational allocation of resources and the reward and punishment mechanism for the control of the alienation of science & technology. In China, The alienation of science & technology has gradually come into being and has increasingly been serious with the development of science & technology since the reform and open policy has been implemented. The legal regulation of the alienation of science & technology is an important component of the modernization construction, its promotion asks to be guided by scientific concept on development, firm the legal foundation, strengthen the responsibility of the government and bring the corrective function of judicature into full play.

Keywords: *The Alienation, The Alienation of Science & Technology, Legal Regulation*

1. Introduction

Albert Einstein, a great scientist in 20 century, once told people: "Science is a powerful tool. How to use it and whether it is brings happiness or disaster depend on human himself, not on the tool. A knife is useful in the human life, but it also can be used to kill." [1] This admonition is enough to arouse our attention to the dual character of science & technology! While promoting social progress and human emancipation, science & technology also brings the alienation phenomena that harm human survival and development. The alienation of science & technology deviates from humanistic spirit, and reverses the relationship between human and science & technology, endangers human survival and development. Today, the control of the sci-tech alienation is a common task facing all countries. The alienation of science & technology in China are not as serious as they are in the western countries, but they have arisen and have been spreaded. To strengthen the legal regulation of the sci-tech alienation is not only the objective requirement of the achievement of the coordination and unity between the scientific & technological progress and the socio-econo-

my and human developments, but also it is the fundamental significance of the construction of a country under the rule of law.

2. Theoretical Annotation on the Alienation of Science & Technology

Science & technology results from the human social practice; it is the correct knowledge on the essence and the law of nature that human obtains in the process that human transforms nature. Karl Marx pointed out: "Nature does not create any machine; it does not manufacture locomotives, railway, telegraph, and spinning machine and so on. They are the product of human labor..... and the organs of the human mind created by human hands, as well as the materialized knowledge power." [2] Science & technology is a cultural phenomenon that presents human survival and development, a knowledge system created by human based on their own needs, and a manifestation of human to live, as well as the characterization that human quest for free and comprehensive development. A scholar said: "In essence, science & technology is the embodiment of

the external help and the externalization of human nature, an aspect of its own existence, and one of the performances within its own functional activities, it not only manifests but also realizes an aspect of human nature. Science & technology is deservedly to become object and tool of humanity, to serve the healthful and harmonious existence and the promoting evolution of human nature itself. The value of science & technology is precisely derived from such relationship between itself and human nature.” [3] All in all, Science & technology having people-oriented spirit and the function of serving and benefiting human, can enhance human’s capacity of transforming nature and society, and can make nature and society develop in the direction beneficial to human survival and development.

However, science & technology not only has the “goodness” to serve and benefit people, but also has the “viciousness” to constrain and harm people. With the development and widespread use of science & technology, the “viciousness” has gradually shown that the alienation of science & technology has been increasingly serious. By the alienation of science & technology, we mean a special phenomenon that the scientific & technological activities and the use of its product deviate from the human intentions and purposes, and in turn, rule and harm people as people find its power difficult to control. In western countries, a lot of scholars pay attention to the alienation issue of science & technology; they reveal the connotations of the alienation of science & technology from different respects. Let me just list some examples. Jean-Jacques Rousseau regarded moral degradation as by-product of the development of science & technology. He said: “As the light of science and art rise above our horizon, the virtues disappear.” [4] For Karl Marx, in capitalist society, “Science is an alien, hostile and governing power to the labor” [5]. Max Weber deconstructs the rational of science & technology into two dimensions--means rational and value rational, and thinks that the means rational has expanded with the advance of modern industry, consequently has resulted in the negative effects such as the domination of object to person, the bureaucrat, and so on. Martin Heidegger develops his idea of the alienation of science & technology based on “gestell”. In his opinion, “gestell” nature of science & technology makes them become the strong force that is beyond human control. Herbert Marcuse used the word “one dimension” to support his “socio-critical theory”, and pointed out: in the developed countries, science & technology has been a new ruling form; the culture, with technology medium, the politics and the economy blend into a omnipresent system, so as to create “one dimensional man”, “one dimensional society” and “one dimen-

sional mind” [6].

The alienation of science & technology is by no means without foundations. Its advent involves a variety of reasons, among which it can mainly be summarized as follows. (1) The limit of human knowledge. Friedrich Engels said: “We can make cognition only under the conditions provided by our times, to what extent these conditions reach, to what extent we know.” [7] When human uses his limited knowledge to transform infinitely nature and society, it will lead damage to nature and society. (2) The impact of the utilitarianism. Utilitarianism and industrialization are closely linked, as Bertrand Russell said: “The rise of industrialization has made human stress on the utilitarianism to some degree.” [8] The utilitarianism has made some people regard material and money as the fundamental purpose of the activities of science & technology, and then recklessly develop and use science & technology for minority interests, immediate interests, and partial interests. (3) The expansion of the means rational that treats science & technology as tool. The development of science & technology and its widespread application in the production and living make human needs be better, and then results in the rise of the means rational that treats science & technology as a tool. The means rational has weakened and suppressed the function of science & technology on criticizing society and penetrating and caring for the future and destiny of mankind. When science & technology are used as a tool to transform nature and society, people will ignore consciously or unconsciously the negative effects of science & technology. (4) The lack of the powerful rules on scientific & technological behaviors. The ethic and the policy have a certain regulatory function, but they can only play a “flexible” role because of the lack of the national mandatory support. Law is a powerful means to regulate the sci-tech behavior due to its national authority and mandatory; however, the legislation is not perfect, and the deflection in the legal system makes the regulatory function of law be inhibited.

In fact, the alienation of science & technology is the shadow of the development and application of science & technology, and it has different forms and levels because of the difference of the development level, the application breadth of science & technology in different historical period. As early as the 18th century, there were signs of the alienation of science & technology on the horizon, appearing the alienation phenomena such as “strange mixture of various foods, flavor inimical to health, spoiled food, adulterated drugs, the fraud of quack medicine seller, the error of a doctor’s prescription and the vessels for the preparation of various toxic agents.” [9]. In the 19th-century, the development of science & technology improve the productive forces that the

bourgeoisie created more massive and more colossal than all created by preceding generations together, In the meantime the problem of the alienation of science & technology had intensified, which prominently presented as follows, “the forces of nature in the machine industry, the application of science and labor products in the production, and all of these are used as some kind of alienated material things, and also purely a kind of existence that do not depend on workers and dominate the means of labor, which are opposed to any individual worker.” [10] Since the 20th century, the alienation of science & technology has been grown in intensity with the soaring development of science & technology. So far, it has been a formidable force that does harm to the survival and development of mankind. Firstly, science & technology has become an autonomous system, forcing the human to adjust their biological personality to meet the needs of technical equipment. As a result, mankind becomes the accessory tools, and his subjectivity loses. What caused is not only the physical deformity but also the psychological deformity. Secondly, science & technology have become the tools of plundering natural resources and destroying ecological environment, so as to lead to the disequilibrium of ecosystems where people survive. Rachel L. Carson told us that the accompaniment of science & technology and industrial civilization is a poisoned environment; consequently it causes the eco-crisis arises: “There was no the chirp of birds, only silence lay over the fields and woods and marsh; the brook was no longer living because all fishes died.” [11] Thirdly, science & technology has been used to break the law and commit crime by some people. In real life, the alienation phenomena, such as the right infringement in cyberspace, credit card fraud, and unauthorized entry into computer information system, are nothing new. The consequence of this is that the legal rights have been infringed upon and the social harmony has been destroyed. Finally, science & technology have become a threat to human security, so humans facing today’s risks are far more beyond the past. Constantly improved robots might one day be “awaken” and scramble for the power to rule the earth, the development of nuclear technology will put humans under the perilous conditions that the nuclear war may break out and may make human be destroyed.

In China, generally, the development level of science & technology is not high and the strength of science & technology is not strong. Therefore, to promote the scientific & technological progress is the theme of the scientific & technological work. However, this does not mean that it is unnecessary that the attention is given to the alienation of science & technology, the reasons are listed below. (1) Science & technology is a “two-edged sword”,

having the inherent duality. Especially, modern science & technology has a stronger power. Once abused, mis-used or immoral used, its negative effects will be more serious. This is the case for the western countries, also for China. (2) The modernization is a systematic engineering that is composed of the modernization in industry, agriculture, national defense and science & technology, among which the modernization in science & technology is the key and the core. Deng Xiaoping explicitly pointed out: “Of the four modernizations, the key is the modernization in science & technology. Without modern science & technology, we should not develop a modern agriculture, a modern industry, and a modern national defense. Without high-speed development of science & technology, there would be no high-speed development of national economy.” [12] The alienation of science & technology goes against the modernization objective, so we must take strict precautions against and strengthen the regulation of it. (3) The alienation of science & technology has emerged and has been spread, and it has become a strong force to restrict economic development, social stability and people’s life security. For example, the development of network technology results in public hazards such as internet pornography crime, fraud SMS, and so on; the acceleration of the industrialization makes ecological environment go worse, as a scholar points out: “During the 1970s, the emissions of coal smoke was characteristics of Chinese industrial cities; in the 80’s, many southern cities suffered serious damage of acid rain. In recent years, the emissions such as NO_x, CO exhausted from automobiles and the subsequent formation of photochemical smog, are making the deterioration of air quality in many major cities.” [13].

3. The Necessity of Legal Regulation of the Alienation of Science & Technology

The alienation of science & technology is of great harm to people and society, and it turns science & technology from the “for-human” tool into the “anti-human” power, controlling human actions, damaging human freedom, threatening human safety, destroying human living environment, at last posing a grave menace to human existence and development, so the control of the alienation of science & technology is a major task that must be dealt seriously with by all countries. Both theory and practice indicate that moral constraint, policy adjustment and legal regulation are the basic methods to control the alienation of science & technology; these methods are in different positions and play different roles because of their own characteristics. Moral constraint relies on the scientific & technological subject’s intrinsic faith and the condemnation of social opinion; policy ad-

justment depends on the scientific & technological subject's policy acceptance and political discipline. They both can only play a limited role in controlling the alienation of science & technology because of their characteristics as follows: strong in principle but weak in concreteness, much variability but less stability, superabundant guidance but inadequate coerciveness. The legal regulation legalizes and institutionalizes the scientific & technological activities through the operation of state power, and with the help of the state coercive power, these laws and institutions are followed by the scientific & technological subjects. The legal regulation has its several features such as concreteness, universality, stability, and national mandatory etc. So it can remedy the shortages of moral constraints and policy adjustment and offer a fundamental guarantee for the regulation of the alienation of science & technology. John Rawls said: "In a developed society, law is the final and effective tool to control the society." [14] Similarly, in modern society, the legal regulation is the ultimately effective means to control the alienation of science & technology.

Firstly, the legal regulation provides value orientation for scientific & technological activities, and then prevents that the scientific & technological activities from developing in the direction of harming human survival and development due to the bias of their purpose. Friedrich Engels said: "Who carry out an action in the domain of social history are people who can think, act cogitatively or with passion and for some purpose; whatever happens, happens for conscious intention or expected purpose." [15] To prevent scientific & technological activities from going astray due to the bias in purpose, it is necessary to strengthen legal value orientation to those activities. Law is not the cold institutional framework, but the warm institutional design with rich value. As Edgar Bodenheimer said, any institution deserving to be called the legal system must pay attention to some fundamental value beyond the relativity of particular social structure and the economic structure. Laws of different times have different values; the legal values in modern society consist of freedom, equality, order, security, fairness, efficiency, human rights, justice, and so on. These values can both upgrade the legal quality and ensure the right direction of human activities. For example, the desire for freedom "forces a person to engage in the activities that can develop his capacities and promote his individual happiness", the pursuit of equality "forces a person to combat with the unequal treatments caused by legal or regulatory measures which should have been equal treatments according to reasonable and accepted standards". [16] In the scientific & technological field, the legal values can guide scientific & technological activities so as to inhibit the alienation of science & techno-

logy. Based on the legal values, the activities like the reckless research, the abuse or the misuse of science & technology have no legitimacy, because they aggress upon human freedom, do harm to human health and safety, undermine the social order, lead to social injustice. The legal values are strong constraints on irrational research and inhuman use of science & technology, also the strong correction in excessive emphasis on means rational which would lead to the objectification of human. Under the guidance of the legal values, the human being is sure to "effectively monitor the implementation of scientific & technical achievements by means of national coercive power, strictly prevent and control high intelligent crime and terrorism, protect social peace and security, and regulate ignorantly blind behaviors before the harm brought out, thus achieving the purpose of safety" [17].

Secondly, the legal regulation provides the behavior standard for a scientific & technological activity, and prevents the irregularity of a scientific & technological behavior from the alienation of science & technology. A scientific & technological activity is one with the subjectivity, and the scientific & technological subject is one who hunts for self-interest. Numerous facts indicate that nothing would be accomplished without norms or standards; if there is no external constraint, the scientific & technological subject could focus on self-interests and then would go into misconducts. Law is the behavior norms or standards of the scientific & technological subject; it can play the roles of guidance and normalization on a scientific & technological activity, and can prevent the misconducts in a scientific & technological activity. On the one hand, law converted the interests of the scientific & technological subject into rights and obligations, not only effectively record those interests given recognition and protection, but also faithfully record those interests rejected and excluded, and the limitation that a certain benefits are recognized. Through the work of the mechanism of rights and obligations, law combines the interests and the behavior of the scientific & technological subject together to achieve the adjustment of the behavior. By the interest-oriented mechanism, the rights guide and motivate the subject to constantly promote the scientific & technological innovation and convert the scientific & technological achievements into the practical productive forces for their legitimate interests; by the interest-restricted mechanism, the obligations constrain and inhibit the subject to be engaged in a scientific & technological activity for his illegitimate interests. On the other hand, law sets the responsibility and the authority for the government departments in the scientific & technological management so as to coordinate the relationship between government, the scientific & technological

workers, and the users of scientific & technological achievement, and as a result, not only the abuse of government power is checked, but also the government functions such as the organization, the guidance and the coordination are realized.

Thirdly, the legal regulation rationally allocates the resources for scientific & technological activities, and prevents the resources from flowing to the activities harmful to human survival and development. A scientific & technological activity is a kind of process that human as the subject and the things as the object interact with each other, it takes manpower, material resources and financial resources as the prerequisite, the sound development and the favorable operation of science & technology depend on the rational allocation of these resources. Law can promote the rational flow of resources to achieve optimal allocation of resources. A scholar pointed out: "From the substantive law to the procedural law, from the fundamental law to the common law, from the statute law to the unwritten law, all laws in modern society have or should have their inherent economic logic and purpose: to allocate resources in a way that can improve efficiency, and to optimize resource allocation and utilization by setting rights and obligations." [18] The legal regulation rationally allocates the resources by following methods so as to provide effective safeguards for the regulation of the alienation of science & technology: (1) To lay down the national strategy for the development of science & technology, to build a series of systems concerning with the management of research fund and equipment, and the collection, the storage, the communication and the use of research information, so as to make sure that the resources flow to scientific & technological activities conducive to socio-economic and human development, to prohibit the scientific & technological resources from flowing to activities harmful to the interests of others and the society. (2) To build a resource allocation mechanism combining market adjustment and government regulation, so that not only the advantages of the market and government in allocating resources can be exerted, but also the disadvantages of the market and government in allocating resources can be remedied. All these provide the convincing system guarantee for the optimizing the allocation of scientific & technological resources. (3) To set a rule of prescription for the monopoly right that the subject enjoys for his innovative achievement, so that the innovative achievements beyond the statutory time will belong to the society, whereby some other subjects could learn about the status of the development of science & technology, then determine an appropriate research direction, avoid wasting resources because of repeated studies.

Fourthly, the legal regulation provides the reward-punishment mechanisms for scientific & technological

activities, so the lawful scientific & technological behaviors can be confirmed while the unlawful scientific & technological behaviors can be curbed. The development of science & technology brings people a new way to change the world, but also generates some new access to delinquency. Therefore, in the legal regulation of the alienation of science & technology, to confirm the lawful behaviors and to curb unlawful behaviors complement each other. The projecting manifestation of the former is that major achievements of scientific & technological research are given rewarded according to law; the projecting manifestation of the latter is that unlawful scientific & technological behaviors are investigated for legal liability according to law. The legal liability is a mandatory responsibility that a violator should bear for his illegal act; it is of an extremely important role in the regulation of the alienation of science & technology. the executive branches investigate administrative responsibility to a citizen, a corporate body or a civil servant who violates the legal order of the scientific & technological management; the judicial branches give criminal sanctions to scientific & technological criminal behaviors such as the production or sale of counterfeit food or drugs, the violation of intellectual property, the internet theft and fraud and so on, give civil liability to the infringement upon trademark, patent, network technology etc. All these make illegal behaviors deserve punishments and sanctions, hence both the offender himself and others are educated so as to do R&D and its application in accordance with law. It should be noted that the legal liability is not only a reliable legal way to punish illegal scientific & technological behaviors, but also a reliable legal means to protect and preserve the rights of the subject of the legal relationship. When the legal rights are infringed and interfered, the legal liability provides effective means of relief. Hence the rights being infringed can obtain remedies.

4. The Way to Improving Legal Regulation of the Alienation of Science & Technology

The legal regulation is not only the fundamental way but also the ultimately effective means to solve the problem of the alienation of science & technology, thus it has been advocated by the international community. Back to November 1975, the General Assembly of the United Nations passed the "Declaration on the Utilization of Scientific & Technological Progress for the Peace and the Good of Mankind", emphasized a full use of science and technology for the benefit of mankind, the promotion of human rights, the realization of fundamental freedoms and the promotion of world peace, in addition specifically requested that all states shall take effective measures including legislative measures to prohibit to in-

fringe upon human rights due to the use of scientific & technological achievements. Nowadays, In order to control the sci-tech alienation, many countries have enacted and improved rules and regulations, international organizations have issued and perfected international treaties, then the legal regulation of the alienation of science & technology has been the common actions of the international community. Keeping pace with the times, the Chinese Government takes the legal regulation of the alienation of science & technology as an important part of the rule-by-law construction. Now China has won tremendous success in the legal regulation of the alienation of science & technology, while there are some problems to be further solved. The following measures should be taken to improve legal regulation of the alienation of science & technology.

Firstly, the legal regulation of the alienation of science & technology should be guided by the scientific concept on development. The scientific concept on development has been developed under the circumstance that the rapid spread of the alienation of science & technology has resulted with the increase of population and resources and environment problems in China since the end of the 20th century, it is rich in content, consisting chiefly of following aspects: "The first essential is to develop; the kernel is people-oriented; the basic requirements are comprehensive, coordinated and sustainable development of economy and society, the cardinal approach is overall consideration." [19] The scientific concept on development is the guiding ideology for the legal regulation of the alienation of science & technology. On the one hand, the people-oriented concept has to be applied into the enactment and implementation of laws, that is to say, the enactment and implementation of laws must keep to the direction that science & technology serve the socio-economic and human development, combine closely the scientific & technological innovation with the improvement of people's living quality and scientific-cultural quality as well as health quality so as to make the fruits of the scientific & technological innovation benefit the broad masses of the people, overcome the ideology of local protectionism, departmental or vocational protectionism and individualism in R&D and utilization, and prevent the phenomenon local departments or vocation from abusing science & technology to damage the interests of the majority. On the other hand, the enactment and the implementation of law should "take sustainable development as the starting point, and restructure the relationship between man and nature with the concept of ecological law" [20], co-ordinate the relationships between people and people, human and nature, contemporary people and future generations. Through the stipulation and the performance of the rights and obligations as

well as the legal liabilities of the subject, law affirms and encourages people to use science & technology to "reasonably regulate the material exchange between man and nature, and put it under their common control, and by consuming minimal power, conduct such material exchange under the condition that it is most worthy and most suitable to human nature" [21], while it negates and combats R&D and its application that unlimitedly exploit nature for the interests of minority.

Secondly, the legal foundation of the regulation of the alienation of science & technology should be firmed. The prerequisite of the legal regulation is that there are laws to go by, so to strengthen the legal regulation of the alienation of science & technology, first and most important work is to improve scientific & technological legislation, and to firm the foundation of the legal regulation of the alienation of science & technology. (1) To modify the provisions concerning science & technology from the Chinese Constitution so that the promotion of the progress of science & technology and the control of the alienation of science & technology are laid down side by side in the Chinese Constitution. "The state guarantees security of science & technology, and controls the alienation of science & technology" may be added in article 20 of the Chinese Constitution and may fall abreast with the original provision: "The state promotes the development of the natural and social sciences, propagates knowledge of science & technology, and commends and rewards major achievements in R&D"; "The state denies and prohibits R&D and its application that endanger national security, harm the public interest, harm the human health, violate the ethics" may be added in article 47 and may fall abreast with the original provision: "The state encourages and assists creative endeavors conducive to the people". (2) To enact "the Law on Prevention and Control of the Alienation of Science & Technology". At the present time, "the Law of the Science & Technology Progress" has been there, although some scholars call it the "mini-constitution" in the scientific & technological field, it is only the basic law on the progress of science & technology and can not provide adequate and effective legal backing to the regulation of the alienation of science & technology due to the singleness of its value orientations and other faults. So it is necessary to lay down "the Law on Prevention and Control of Alienation of Science & Technology" and make it as the basic law to harness the alienation of science & technology. (3) To improve the separate laws in the regulation of the alienation of science & technology, namely, to review, amend, repeal or enact a series of specialized separate laws for the regulation of the alienation of science & technology so as to perfect the concrete legal systems for the regulation of the alienation in specialized scientific & techno-

logical areas. (4) To improve the subsidiary scientific & technological legislation. Traditional legal categories such as civil law, commercial law, economic law, intellectual property law and criminal law should be amended and be complemented; consequently, their function controlling the alienation of science & technology will be strengthened.

Thirdly, the legal responsibilities of the government in the regulation of the alienation of science & technology should be enhanced. The government is not only the policy maker, but also the organizer and the manager of the scientific & technological activities, whether its responsibilities can be implemented is directly related to the efficiency of the legal regulation of the alienation of science & technology, and also directly related to a sound development and the regular operation of the scientific & technological activities. A scholar said: "The recent public food safety events and other public events concerning the safety of people's lives and property are the responsible events in essence. These events show the lack of the sense of responsibility of some officials in our government and their insensitiveness and indifference to the major issues related to the life safety of the masses. In a deeper level, these events also reflect the problem that the responsible government construction is delayed in the construction of the nation ruled by law and the service-oriented government." [22] So, to enhance the legal responsibility of the government is the only way to promote the legal regulation of the alienation of science & technology. The government must earnestly transform its functions based on the need of the promotion of the progress of science & technology and the prevention of the generation of the alienation of science & technology, and the government must exercise its statutory powers and duties in accordance with following basic requirements: the legal administration, reasonable administration, right procedure, unity between powers and duties, diligence and pragmatism, efficiency and convenience, honesty and trustworthiness. To this end, it is necessary to intensify the government's sense of responsibility for law, but also to improve the government liability system. By improving the decision-making procedures, macro-coordination mechanisms, the evaluation mechanisms of the scientific achievements and the performance of public investment in science & technology, the government accountability system for the decision and management, and so on, it is insured that the government can consider whether the decision and management related to R&D and the application are in conformity with law. In this, all scientific & technological activities will be conducted in accordance with the law.

Lastly, the correction function of the judicature to the alienation of science & technology should be brought

into full play. It is indispensable for the legal regulation of the alienation of science & technology to prefect the legislation and to enhance the enforcement, but it is inadequate for the solution of the alienation problems of science & technology only to prefect the legislation and to enhance the enforcement alone, then the judicial intervention is essential. Just as Karl Marx said: "The law is universal; the case determined according to law is individual. If we make individual phenomena come down to common phenomenon, judgment is required; however, judgment is a tricky thing. Judges are needed to enforce the law. If law can operate by itself, then the court would be unnecessary." [23] Judicature has the correction function to the alienation of science & technology; this function is realized by the way that the judicial organs apply law to deal with the concrete case of the alienation of science & technology. The judicial treatment of the case in the alienation of science & technology has some basic requirements as the same as one of the general cases, for example, judicatory independence, and procedural justice, fair to adjudicate, and so on. Meanwhile, because the cases in the alienation of science & technology are different from the ordinary cases, for instance, having their own features such as the specialty in science & technology, the complexity of the victims, the diversity of the causal relationship between the trespass and the damage, and so on, the judicial treatment of the cases in the alienation of science & technology has some special requirements are different from one of the judicial treatment of the general cases, these special requirements mainly include the inversion of the evidential burden, the appropriate application of expert appraisal, the application of the principle of no-fault liability in the identification and investigation of legal liability for the tort resulting from scientific & technological behaviors, the development of public-interest litigation and so on.

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