Research on technology environment improvement of related industries based on internet governance

Jing Zhang¹ and Zhongliang Guan ¹
¹ Management Science and Engineering, Beijing Jiaotong University, School of Economics and Management, No.3 Shangyuan Village, Haidian District, Beijing, China.
Email: 447680873@qq.com

Abstract. The technology of Internet is an important factor of industry’s development. Constructing a good technical environment is the foundation of the Internet and related industries’ development. This paper demonstrates the necessity of the construction and improvement of the Internet and the related industries technology environment through comparing the current situation of the related industries. It also points out that China needs to improve the environment of the Internet technology urgently. The paper establishes the technology demand pattern of different related industries, and explores strategies of the different Internet technology environment’s construction and perfection according to the different demand of the strong related Internet and the weak related Internet to the industries environment. This paper analyzes the factors that threaten the security of the Internet, and fully demonstrates the methods and tactics of establishing and improving the technology environment Internet hardware, the Internet and related industries in China under the basis of the framework of comprehensive management of Internet. This paper also studies the construction and improvement of the comprehensive management technology environment based on the Internet industry in China.

1. Introduction
The construction and perfection of the Internet technology environment is a kind of effective way to control the Internet and related industries, which can effectively protect the policies and regulations and the effect of self-discipline in the industry. Technical supervision plays an important role in the construction of Internet technology environment. It can use information technology to protect the information system and information resources on the Internet, prevent the infringement, and provide effective network technical support for the development of Internet and related industries. Continuously development and innovation of Internet technology and the creation of a good technology environment is the basis of developing the Internet and related industries.

The Internet technology of US maintains a leadership in the world, which thanks to a good support of Internet technology environment. In the process of Internet application, the federal government and the state government fund building the industry development of the Internet application system and technical support environment. In the support of governmental financial, a unified Internet application technology support environment, which covers all industries, was formed, which achieves standardization and systematization. Its technical support and services areas related to various industries and business applications. Focus on Internet technology innovation, the next generation of Internet IPv6 protocol is a new Internet technology environment model, which makes e-commerce, online media, finance and other industries’ Internet application achieve a smart link and dynamic
support. At the same time, it also makes the construction and application of the Internet breakthrough its key technical bottlenecks.

German Internet technology environment and exchange capacity are at European leading level. According to the development of the Internet and the demand of domestic economic development, the German government has been increasing the Internet infrastructure and technology research and development investment, improving the network technology legal protection, paying attention to the development and management of Internet technology, carrying out the Internet dynamic label recognition technology environment with the United Kingdom, and the "Internet labelling Technology" interconnection of the two countries, which aims to strengthen the control of the Internet bad information.

The construction and application of Internet in China started later than developed countries, such as the United States. In the process of Internet operation, network security is often threatened and attacked, mainly manifested in: the information in the network transport process was intercepted, the transmission of documents were tampered, forged the e-mail, fake the identity of others, fake the identity of others, endangering the economic interests of others. These security problems seriously affect the Internet related industries to use the efficiency of the Internet, not only hinder the normal development of related industries, but also hinder the development of the Internet itself.

In order to create a good technical environment for the development of the Internet and related industries and complete the technology environment, China has taken some measures in the construction of Internet technology standards, the integration of Internet operation environment, Internet application, the construction of new generation Internet, the prevention of network hackers and the management technology of Internet. However, in the rapid development of the Internet, the challenge of implementing security management is further increased, and the difficulty of Internet content management is increasing. The development of the Internet technology environment and related industries in China faces some new security and social problems, mainly including: imbalance of Network technology security management and trade, imbalance of management and department linkage, network hardware technology and software application system development is slow, which hinders the healthy development of China's Internet and related industries. Therefore, the establishment of a green, sustainable network technology environment is the current problem that Internet and related industries need to solve.

2. The Demand Analysis of the Technology Environment

The construction and improvement of technology environment in Internet and related industries including network hardware technology environment and management technology environment construction are indispensable, as it shown in Figure 1. Therefore, the technical environment demand analysis of the Internet and related industries needs to be carried out from two aspects simultaneously.

Due to the different degree of use and dependence of the Internet in different industries, there is a certain difference in the demand for the technical environment. In this paper, through the cluster analysis, the Internet-related industries are divided into strong related industries and weak related industries. According to the classification of this article, e-commerce, online media, finance, information and communication industry and software industry belong to the strong correlation industry; equipment-manufacturing industry, mining industry, metallurgy industry, construction industry, logistics industry and other industries have low application of the Internet. These industries are weak related industries. This paper analyzes and compares the technical environmental requirements of strong and related industries.

2.1. The Technology Environment Demand of Strong Related Industries

In the field of network hardware technology, the development of strong related industries is technically more dependent on computer technology, communication technology and Internet technology. The construction of strong related industry technology environment focuses on the reform and innovation of information technology, and constantly develops the hardware, network topology and related technologies.

In terms of network management technology, the strong related industry are closely linked to the Internet, which face more security problems. In addition, its regulatory task is arduous. There is a
strong demand for management technology. In the management process, managers or management departments must refine the management process, the implementation of the management of the responsibility to ensure that the Internet can be safe and efficient for the development of related industries.

**Figure 1.** Internet and related industries comprehensive management technology environment to build the model map

2.2. **Weak and Related Industries of the Technical Environment Needs**
Weak related industries have less demand to the specialized information technology in the development process, but it rely on Internet network security environment very much. Most of the weak related industries are not related to the computer technology. Only the sales, supplier search, customer service and so on rely on the Internet for information dissemination, access and analysis. So ensuring the safety of information transmission process is the focus of the industry's technical environment needs.

Comparing with the Internet-related industries, weak related industries’ demand of the management of technology is at a low level, the industry development faces less security problems. Regulatory task is relatively simple, the management process is clear, the management of the responsibility is relatively clear. It can ensure that the Internet for the development of the industry safe and efficient through the effective regulation.

2.3. **Comparative Analysis of Technical Environment Demand**
Due to the characteristics of the development of the industry itself and the depth of using the Internet, there is a different in technology environment between the strong related industries and the weak related industries, which is mainly in the following areas. It is shown in Table 1:
Table 1. Comparison of technical environmental requirements for different industries.

| Strong related industries | The basis of industry management | The requirements of technology environmental | The influence degree of technical environment on the effect of the industry |
|---------------------------|--------------------------------|--------------------------------------------|---------------------------------------------------------------|
| Weak related industries   | Based on traditional production and operation | Improvement of network security, Innovation of management technology | General                                                   |

2.3.1. The basis of industry management. The basis of industry management is the different industry background of the Internet. For the Internet strong related industry, the management and development of the industry are generally based on information technology, such as E-commerce industry, network media industry, information and communication industry. Internet technology is the effective driving force for its development. Therefore, the development of Internet information technology will have a significant impact on this kind of industry.

The Internet weak related industry is the traditional industry of production and management, such as manufacturing, metallurgy, construction and logistics industry, the improvement of competitiveness of these industries mainly depends on the production of technological innovation and production equipment. The role of the Internet technology environment in these industries is only as an application system network platform for ancillary production or marketing, the innovation of Internet technology has brought less improvement to the industry than the way of production and the change and innovation of production process equipment. So the innovation of Internet technology will not bring about great improvement of business condition for such enterprises.

2.3.2. Technical environmental requirements. Regardless of the strong related industry or the weak related industry. Because it is produced in the Internet environment, it has the technical environment demand. The demand of the strong related industry for the technical environment is mainly embodied in two aspects of the research and development of information technology and the innovation of management technology. The innovation of technology makes the production and operation of this kind of industry have changed remarkably, the competition ability of the industry has obviously improved. The demand of the weak related industry to the technology environment is mainly embodied in the need of the Internet as the security of the communication platform. The level of Internet security will directly affect this kind of industry in the Internet access to information, exchange information and improve the overall ability to operate and sell.

2.3.3. The influence of technology environment on the industry. The construction of the technology environment is often the technology improvement and innovation, which is based on the security of Internet network. The construction of the technology environment of the weak related industry should be based on the network security, and the influence of the technological environment changes on the weak related industry is quite remarkable. In addition to the construction of the technology environment, the guidance of policy and the management of the law are equally important, and the improvement of the pure technology environment has less influence on the strong related industries than the weak related industry.

By comparing and analyzing the difference of correlative degree industries’ demand of Internet for technology environment, which can provide reference for our country's Internet and related industry to implement different technical strategy, and improve the technology environment of applying Internet in relevant industry.
3. The Improvement of Internet and Related Industries’ Management of Technology Environment

This paper analyzes and studies the improvement of the governance technology environment of Internet and related industries from two aspects of network hardware technology environment and management technology environment.

3.1. Perfecting the Technology Environment of Internet Hardware

The improvement of network hardware technology environment should be carried out from the following aspects:

3.1.1. Establish our own root domain server. The domain Name System is a typical tree structure, the United States early occupy the "root" part. When other countries join the Internet, they can only join in the tree "branch" or "leaf" part. The safe operation of the Internet is very dependent on the root domain server, which is controlled by the United States alone, and it poses a great hidden danger to the safe operation of the Internet in our country.

If there is no domain root server, when the country's domain name server resolve a domain name at the first time, it need a foreign domain name root server to obtain a top-level index. Our country has introduced the domain name root server mirror server and.COM/.NET server's mirror server. Internet users’ network speed and security performance problems are expected to improve. After introducing the root domain server. How to manage it, ensure its orderly and efficient use and operation, will be an important issues that China's relevant departments will face. In addition, the country must accelerate the promotion of top-level domain names. The registration and use of CN. Registered country. CN domain name can improve the international competitiveness of national domain names, change the status that domestic users had registered foreign domain names too much, maintain network security and national interests, and increase our voice in Internet domain name supervision.

3.1.2. Environment Construction of Internet Infrastructure. The construction of Internet basic environment refers to the construction of basic network facilities and related network equipment. In view of the current development trend of our country, a variety of network integration has been or is becoming a reality, in recent years by the industry's popular "triple-play" (telecommunications network, Internet and radio and television network) mode has been widely regarded as the inevitable trend of China's Internet development.

On this basis, China's relevant industry institutions and associations put forward the establishment of a new Internet operation and management mechanism. That is the concept of "digital network competition". It is based on the integration of telecommunication network, Internet and broadcast television network. The country relaxes the policy of network integration, and allows the market of Internet information service to be further opened because of long-distance telephone, local telephone, wireless telephone, cable TV, data transmission network and open competition of service.

3.1.3. Urge Internet operators to establish high reliability Internet. The Internet operators must improve the Internet service environment and improve the credibility of the Internet business according to the real network security and business demand. Operators should enhance the function of network support system, improve Internet performance, standardize business quality test, optimize management system, realize the effective management of user terminal equipment, and resolve the perception and judgment of the whole Internet service quality. At the same time, the government and suppliers should jointly establish the Internet Information flow, the information protocol analysis and management system to implement the management and control of the business flow. In the construction of Internet support special network in China, the network management information is separated from the service bearer network, which gradually forms the three-layer integrated Internet management mode of basic network element layer management, IP service Internet layer traffic and performance management and IP service quality management, and realizes the intellectualization of three layer management Internet.
3.1.4. Promoting technological innovation, facilitating "triple-play", building a unified network technology platform. "Triple-play" refers to the integration of computer network, telecommunication network and CATV Network, that is, the traditional telecommunication network, computers and CATV network will tend to infiltrate and fuse with each other, the key technologies need include:

- Digital technology. So that all kinds of information content can be exchanged and transmitted between telecommunication network, computer network and cable TV net. \[1\]
- Access Network technology. This is the main difficulty of triple-play, responsible for the transmission of telecommunications business transparently to the user. \[2\]
- Broadband transmission problem. The broadband transmission of backbone network is the basis of triple-play. The optical communication network based on DWDM (dense wavelength division multiplexing) is bound to dominate the whole backbone network, and the three networks will be merged on this basis.
- Parallel computing and distributed systems. From the aspect of computer architecture, it has become the main means and technical way to improve computer's performance, and distributed system provides process communication and computer resource sharing as well as parallel computing ability, and provides users with transparent access to resource multi-element computing and service on other computers.
- Software technology. It provides a guarantee for the realization of "triple-play". The growth of large-scale service requests, the development of soft switching platform system with good scalability and fault-tolerant effect makes the three networks and their terminals can be transformed through software, ultimately supporting the characteristics, functions and services required by various users.

Telecommunications network, CATV Network, computer Internet in the course of the development of different shortcomings, cannot meet the user's various needs, the triple-play become an inevitable trend. Our country already basically has the technical condition that constructs triple-play fuses, network Foundation and market space, accelerate the integration of triple-play has entered a critical period, should be integrated planning, to determine the rational, advanced and applicable technical routes, to promote network construction, business applications, industrial development and supervision and management of the coordinated development of all work, to explore the establishment of a triple-play model that conform to our country’s national conditions.

3.2. Improvement of the Management Technology Environment

With the development of the Internet hardware technology, the Internet has become more and more difficult to supervise the Internet in various industries and departments. We must build a good internet management technology environment to improve the Internet and related industry management system, implement the supervision mechanism, straighten each link management process, clearly the responsibility and promote the development of the Internet and related industries. The construction of Internet management technology environment can be started from the following aspects:

3.2.1. Improving the collaborative management and dynamic technology management. Strengthen the leadership of the organization, integrate the power of all relevant departments, clarify the power and responsibility of each functional department, unify the organization of the Internet and related industry governance action, form the mechanism of cooperative management and joint enforcement.

Continue to improve the site search system for the record and require the domestic access of all industries and enterprise sites are recorded compulsively to ensure the accuracy of the record information; Speed up the construction of website isolation technology, the quarantine of unregistered websites, illegal websites, etc., in order to combat network piracy, control harmful information dissemination and other Internet management measures to provide effective technical support; Accelerate the construction of network search technology, set up a website information search system to meet the information needs of Internet related industry, and provide the effective information of industry development in time.
3.2.2. Perfecting the Internet Information Security emergency system. Establishing the Internet information security emergency management system of unified two-layer structure and the "Unified" means that the state should set up the emergency coordination agency to be responsible for the emergency management of Internet information security; "Two-layer structure" means to exert the advantages of the industry and the provincial government and strengthen the emergency management. For the emergency of Internet Information security involving national security or economic development, the government must unify and coordinate the command to prevent the further deterioration of the situation and restore the normal operation and normal social order of the Internet as soon as possible. The government is in possession of a large number of network security information, should be at the critical time to start emergency plans to ensure the normal operation of the national infrastructure.

Internet information security emergency system should achieve five aspects to ensure the security of Internet information:
- Controlling the further actions of illegal intruders by removing the authority to safeguard the confidentiality of the system.
- Establishing the necessary mechanism to ensure the integrity of the information transmission.
- Ensuring the basic availability of information systems in the event of a catastrophic attack by establishing a minimal disaster backup system.
- Establishing the network blacklist to exclude the users of the information system from the legitimate use of the information system.
- Through using the blocking mode to ensure the controllability of the system in order to isolate the spread of the virus in time and avoid the network traffic anomaly caused by the further congestion.

3.2.3. Improve information security management technology environment. Because of the network communication security problem in the Internet, it is necessary to establish and perfect the technical environment of Internet Information security management in the light of the factors that threaten the security of Internet information transmission, including the following aspects:
- Establishing end-to-end secure communication protocol -- SSL protocol. SSL protocol has the characteristics of data confidentiality, identity authentication and data integrity.[3]
- Popularizing the use of secure transaction protocol -- set in the process of electronic commerce. Set protocol is an internationally recognized standard for secure electronic transactions, which deals with the issue of electronic shopping and electronic payment through the network, which is the core of credit card holders, merchants and banks. Set technology can be used to further regulate the transaction process of electronic commerce in China.[4]
- Building virtual private network -- VPN technology. VPN technology is the Internet data transmission tunnel encryption security technology, which can guarantee the industry and the organization internal distributed (local area network) the special information in the interconnection on-line exchange, prevents and protects against the possible hacker attack and the network harm. VPN technology is mainly based on the security technology of IP layer, it is the combination of network encryption, key management, certificate and access control, and it is the ideal choice for the large-scale enterprise group in our country.[5]
- Security certification center--CA system. Digital certificates can solve the most critical identification problem in network security. The CA system consists of a series of certificate servers, which are generally divided into enterprise-level certificate server system and common certificate server system. CA system has played an active role in the authentication security of Internet application, electronic commerce and other management in our country.

3.2.4. Construction of network security management technology environment. In addition to the security technology above, network security management also needs the support of enterprise management. Building a good internal management of enterprises is the basis of network security
management. The following aspects can be used to promote and supervise the management of the enterprise Internet security management:

- The network security management needs the leadership's high attention. Internet security management is a dynamic system engineering; the work of technical personnel cannot be completed. It needs Internet managers to work together.

- According to the status of enterprises to determine the network security management strategy. The construction of an enterprise's network security Service cannot rely on the security services provided by the external Internet professional company, but also take appropriate protection and prominent management strategy according to the current situation of Internet application.

- Establishing a strict network security system file. The document of network security system mainly includes network construction plan, computer room management system, all kinds of personnel responsibility division system, security secrecy system, security policy document, etc. Because the network security management system of the Internet is not sound enough, the file management of the respective Internet security system is difficult to unify, and it is suggested that the unified file management system and mode be popularized and popularized in order to perfect the file management system of Internet security system in China.

4. Conclusion

The construction and improvement of Internet technology environment is an effective way to govern the Internet and related industries, which can effectively guarantee the effect of policy and regulation and self-discipline. Continuous development and innovation of Internet technology, to create a good technical environment is the Internet and related Industry Development Foundation. Compared with the construction of Internet technology environment abroad, China's Internet construction and application start late and there are some problems in the process of Internet operation, which hinder the development of related industries and the internet itself. Learn from the successful experience of foreign Internet technology environment construction, combined with the actual situation of Internet and related industry in our country, this paper analyzes and contrasts the technical environmental requirements of different related industries, and puts forward the technical strategies suitable for the construction of technology environment in China's Internet and related industries.

The improvement of network hardware technology environment is mainly from four aspects: establishing our own root domain server, paying attention to network infrastructure construction, urging Internet operators to establish a high reliability of the Internet, promoting technological innovation, facilitating "three-network integration", building a unified network technology platform. The improvement of management technology environment is mainly from perfecting collaborative management, strengthening the construction of Internet dynamic management technology, perfecting the emergency system of Internet Information security, perfecting the technical environment of information security management, and constructing the technology environment of network security management.

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