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Information Industry Security: An Ecological Point of View

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Abstract

There is great similarity between the information industry security and ecosystem of information industry. Therefore, using the theory and methods of ecology and system science, we studied the issue of information industry security in detail based on the theory of ecosystem from the level of individual, cluster, and so on, and take China's information industry security as an example of empirical research, then provided a range of effective policy suggestions for relevant Chinese government departments to control and guide China's information industry security.

Keywords: *Information Industry Security, Ecosystem of Information Industry, Niche, Ecological Chain, Ecological Correlation*

1. Introduction

In the rapid development of economic globalization and regional economic integration in the 21st century, the industry security has become the common problems of countries in the world. Economic globalization not only through trade globalization intensifies the competition of global industry, making all kinds of traditional national industry facing the impact of the international market, more importantly, it also fundamentally changed the traditional pattern of international division of labor through the globalization of production and financial globalization, leading revolutionary changes of internal division of labor pattern, the industrial chain and the corresponding ecology environment. Under the impact of the economic globalization, many countries not only lost the normal industry chain and industrial ecology of economic development, but also lost the control of core technology and major industry of the national economy and people's livelihood. The industry security has become a core problem restricting the development of the national economy. Since the information industry as an important pillar industry in the industrial countries, so in this context, the study of information industry security is of great significance

Currently, the research about information industry both inside and outside mainly focuses on the following aspects:

(1) Research of basic theory, including the definition and classification of the information industry [1-3]. This kind of research is very common. But because of the different angle of analysis and different criteria and statistical caliber, there isn't a unified standard yet.

(2) The economics research, including the research of leading role of the information industry on national economy and level measurement of information industry's contribution to the national economy, etc [4-6]. Though it is very important, the research

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of how the information industry influences the development of national economy is not deep and lacks mechanism analysis.

(3) The research of development law, which is a new research hotspot at home and abroad [7-9]. In general, there still exist the following problems: Firstly, research literatures of its development law are rare with the theory of industry economics. Furthermore, it seldom reflects the industry characteristics of the information industry; Secondly, there is different focal point of research, but most scholars study on parts of information industry, which couldn't get the integrity and is difficult to reflect the basic connotation of the information industry. Furthermore, it can't reveal the basic rule of inner constitute in information industry; Thirdly, there are number of qualitative analysis and less of quantitative analysis; Lastly, the existing research lacks deep research.

However, the research on the information industry security both inside and outside at present, especially research on the supervision of information industry security, is still in the exploratory stage, and has not yet formed a systematic theory. Therefore, we intend to study the issue of information industry security from the perspective of ecology, economics, and other interdisciplinary industry using the theory and method of complex system.

The organization of this paper is as follows. In Section 2, on the basis of defining the concept of information industry security and ecosystem of information industry, we compare and analyze the relationship between them and think that there is a great similarity, so we propose that we can study the information industry security from the perspective of the ecosystem of information industry. Then, in Section 3, we study the issue of information industry security in detail based on the theory of ecosystem from the level of individual, cluster, and so on. And finally in Section 4, we take China's information industry security as an example of empirical research, and provided a range of effective policy suggestions for relevant Chinese government departments to control and guide China's information industry security.

2. Information Industry Security and Ecosystem of Information Industry

2.1. Information Industry Security

According to the definition of industry security given in the 'Research on the industrial security theory' [10], here we try to give the definition of information industry security. The industrial security refers to the state that the survival and development of specific independent industry staying away from the threat, so the information industry security refers to the state that the survival and development of information industry staying away from the threat, including survival security and development security of information industry. At the same time, according to the theoretical framework of Industrial Economics, we can divide the information industry security into the layout security, structure security, organization security and policy security, as shown in Table 1.

Table 1. The Concept of Information Industry Security

			Meaning
Information Industry Security	Characteristics	Survival Security of Information Industry	The information industry has a certain market or market share.
			The information industry can achieve a certain level of profitability.
			The information industry must have its own survival characteristics.
		Development Security of Information	It must be to improve or increase the value of the information industry market share from a quantitative point of view.

		Industry	It must be to improve technological content of existing products of information industry or develop new products from the quality point of view.
			It must be able to keep up with the pace of development of similar industries abroad, and to achieve industrialization beyond when necessary.
	Contents	Information Industry Layout Security	
		Information Industry Structure Security	
		Information Industry Organization Security	
		Information Industry Policy Security	

2.2. Ecosystem of Information Industry

The organism inextricably interrelates and interacts with the other organisms and the environment. They constitute a unity through the interconnection of energy, materials and information, and this special unity is an ecosystem. The concept of ecosystem was first proposed by Arthur George Tansley, a British ecologist, in 1935. Ecosystem is a broad concept, and the unity of any group of organisms and their environment can be considered as an ecosystem.

As the human and natural environment constitute the biological ecosystem, the Internet public opinion subject, the subjects of information industry and the resources and environment of the information industry also constitute the Ecosystem of Information Industry. It is made up of natural subsystem, social subsystem and economic subsystem. According to the needs of economic and social development, it designs and builds the linear sequence for material cycle and energy cascade utilization. And through the different work of producers, consumers and disintegrators, its many internal ecological subjects (includes individual information industry, information industry and information industry cluster) form the relationship of interlocking dependence, which is on the basis of ecology, systematic, economics and industrial scientific principle. Comply with the general characteristics of ecosystem, the Ecosystem of Information Industry consists of a number of elements that mutually influence with each other, and has some functional goals. There is a certain boundary between the Ecosystem of Information Industry and the outside world, and it emphasizes the linkages between the various elements and the overall unity in this large-scale system.

Similar to the natural ecological system, as shown in Table 2, the Ecosystem of Information Industry is also constituted by the following four levels from low to high, namely species, population, community and ecosystem. Therefore, the logical structure of Ecosystem of Information Industry is as shown in Figure 1.

Table 2. Structure Comparison between Ecosystem of Information Industry and Natural Ecosystem

Natural Ecosystem		Ecosystem of Information Industry	
Structure	Meaning	Structure	Meaning
Species	The basic unit that constitutes the natural population.	Information Industry	The basic unit that constitutes the population of information industry.
Population	All the individuals of the same species that occupy a certain space within a certain period of time.	Population of Information Industry	The aggregation consisting of information industry with similar craft or technology in the same area.
Community	The regular combination of a variety of biological populations with direct or	Cluster of Information Industry	The aggregation of a variety of information industry populations with direct or indirect business

	indirect relationship.		relationship.
Ecosystem	The unified whole of biological community and natural environment.	Ecosystem of Information Industry	The unified whole of information industry cluster and the external environment.

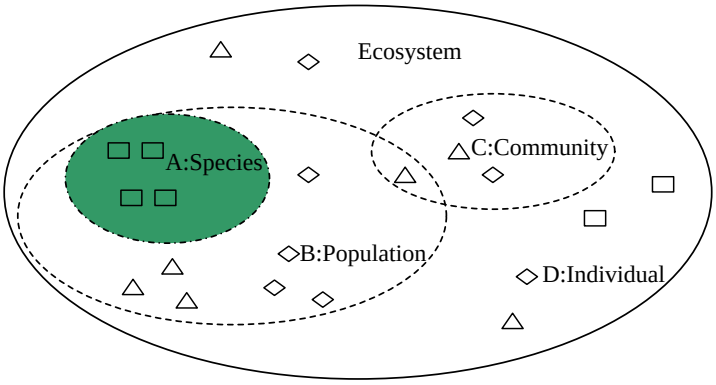


Figure 1. The Logical Structure of Ecosystem of Information Industry

2.3. Similarities between Information Industry Security and Ecosystem of Information Industry

The similarity comparison between Information Industry Security and Ecosystem of Information Industry is shown as Table 3. From the perspective of characteristic and content, the survival security of information industry refers to the stability of Ecosystem of Information Industry, and the development security of information industry refers to the dynamic development of Ecosystem of Information Industry. The four aspects of Information Industry Security can be measured using different indicators of Ecosystem of Information Industry. The stability of the Ecosystem of Information Industry is the stability under dynamic equilibrium, and it is also the stability which is developing and relative. Just because of the presence of dynamic stability of the Ecosystem of Information Industry, the environment of the Ecosystem of Information Industry can be constantly updated, and the relationship between the subjects and objects of the Ecosystem of Information Industry evolves from simple to complex. And because of the eternity and irreversibility of the development process, it makes the Ecosystem of Information Industry evolve and develop toward the direction of more complex and advanced. Only to get rid of the old stable development, there will be a new stable. It is clear that there is great similarity between the information industry security and ecosystem of information industry, so we can study the information industry security from the perspective of the ecosystem of information industry.

Table 3. The Similarity Comparison between Information Industry Security and Ecosystem of Information Industry

	Information Industry Security	Ecosystem of Information Industry
Characteristic similarity	Survivability	Stability
	Can be developed	Dynamic development
Content similarity	Information Industry Layout Security	Niche
	Information Industry Structure Security	Ecological chain
	Information Industry Organization Security	Ecological network
	Information Industry Policy Security	Ecological environment

3. Analysis on the Information Industry Security Based on Ecosystem

3.1. Analysis on the Individual Security of Information Industry Based on Niche

3.1.1. The Niche of Information Industry and the Information Industry Security: The concept of niche was first proposed by Grinnell, and defined as the last one unit happens to be occupied by one species or one subspecies. Similarly, any business located on any one of the ecological chains in the Ecosystem of Information Industry also has its own niche, and they play different roles in the Ecosystem of Information Industry. Using the niche theory, the niche of information industry can be defined as the position occupied by the information industry in the information industry market environment and the role it played. It is similar to the concept of "market positioning", but it has the ecological meaning better than the "market positioning".

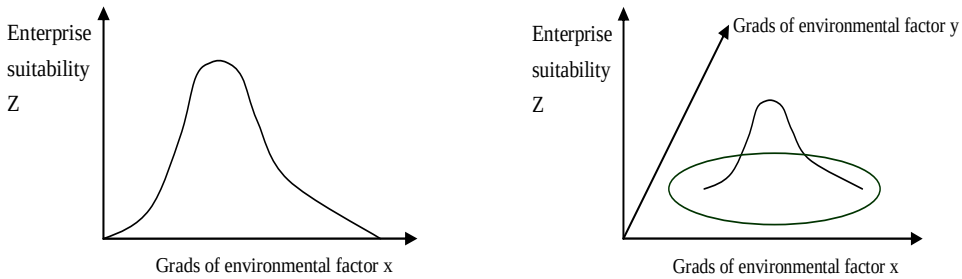
The niche of information industry can be expressed with the formula as:

$$N = f\left(x_1, x_2, ..., x_n\right)$$

Here, N represents the value of the niche of information industry.

x_i represents the factor that influences the niche of information industry, namely the niche factor.

The niche of information industry is a multidimensional concept that influenced by a variety of niche factors. Its niche model is similar to the biology niche model with n dimensions that put forward by Hutchinson, shown as Figure 2. If we consider each environmental resource condition (such as the customers, capital, etc.) that affects the information industry as a dimension, then there will be an existence range for the information industry on each dimension, and we can draw a bell curve that looks like normal distribution if we construct using the suitability of certain information industry to each dimension and the grads of this environmental resource condition, shown as Figure 2-(a). The axis x refers to a certain information industry's environmental resource gradient, such as the customers, and the axis z refers to the information industry suitability on this gradient. The space that has the highest suitability is most suitable for the information industry existence. If we add the gradient of another environmental factor y (such as human), then we can get Figure 2-(b). We can also get the information industry's niche model with n dimensions if we construct using the gradient of n environmental resource conditions at the same time.



(a) The two-dimensional model (b) The three-dimensional model

Figure 2. The Multidimensional Model of the Information Industry Niche

The niche of information industry is an important symbol of competitiveness. It not only reflects that information industry occupies an important position in ecological factors among natural resources, social resources and so on, but also reflects its necessary role in the process of information exchange of material, energy, and information. What's more, the competitiveness of information industry also determines its safety degree. The

stronger the competitiveness, the information industry will be more safe. As a result, how to deal with and adapt to the influence of surrounding environment, how to find their own direction and make reasonable position while using their own advantages are keys to the survival and development for information industry. Only to find the most suitable niche for their own can avoid unnecessary vicious competition, can help co-evolutes with the other information industries in the ecosystem, maintain the stability of ecological system and strengthen the competitiveness of the whole ecological system, thus ensure the safety of the ecosystem of information industry.

3.1.2. The Breadth of Information Industry Niche: The breadth of information industry niche refers to the sum of a variety of resources that the information industry can take advantage of, which not only reflects the ability of an information industry using the resources, but also reflects the status and role of the information industry in the social economy [11]. The information industry has multiple ecological dimensions, so the breadth of information industry niche can be represented using the intercepted width on each ecological dimension of information industry.

The formula of the breadth of information industry niche is as the following:

$$B_i = \sum_{j=1}^{R} \left(p_{ij}, q_{ij} \right)$$

Here, B_i represents the breadth of information industry i 's niche;

p_{ij} represents the ratio of the information industry i using resource j to the total number of the species;

q_{ij} represents the ratio of the available resource that the species i can use to the whole available resource.

The wider the information industry niche, the more important role of information industry plays in the ecosystem of information industry, which means the greater position and more rich resources it occupied, the more likely to be a generalization owning a strong ability to use resources. And the stronger the ability, the more competitive of the information industry; On the contrary, the narrower the information industry niche, the less important role of information industry play in the information industry ecosystem, which means the smaller position and less resources it occupied, the less likely to be a specialized industry using specific resources. And the weaker, the less competitive of the information industry.

3.1.3. The Overlap of Information Industrial Niche: When the information industry and other information industries occupy the same resource, the same kind of talent or possess certain environment variables together, there will be niche overlap, as shown in Figure 3, which can lead to the competition between the information industries and then threaten the safety of information industry. The greater the overlapping part is, the more intense the competition, and the more unsafe the information industry. The information industry niche of different nations will overlap in the dimension of product or market share, and present the state of competition between the information industries.

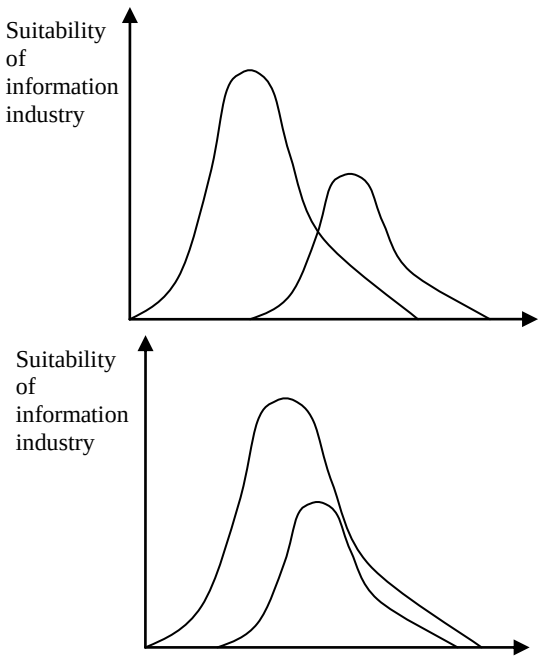


Figure 3. The Niche Overlap of Information Industries

The niche overlap of information industries can be formulated as the following:

$$N.O = \left(\sum_i p_{ki} p_{hi} \right) \Big/ \sum_i p_{ki}^2$$

Here, p_{ki} and p_{hi} represent the utilization state of resource i by species k and species h respectively. It measures the overlap extent of the utilization curve of species k with the resource utilization of species h.

3.1.4. The Trend of Information Industry Niche: The niche of species has the property of "state" and "potential", similarly, the properties of information industry niche can also be divided "state" and "potential". The "state" of information industry is the status of information industry, which is the result of the development of information industry in the past, such as the resources, professional talent, patented technology, market share, the total output value and so on that the information industry actually have, namely the survival security of the information industry. The "potential" of information industry refers to the influence and force of the information industry on the specific environment, which is the change and development trend of the information industry, such as the growth of professionals, the growth rate of patent technology, the growth speed of market share, the change rate of total output value and so on, namely the development security of information industry. The information industry niche is the comprehensive of the "state" and "potential" of information industry, which jointly affect the security of information industry.

Reference the calculation of biological unit niche, the information industry niche in the ecosystem of information industry can be formulated as：

$$N_I = \left(S_I + A_I P_I \right) \Big/ \sum_{j=1}^{n} \left(S_j + A_j P_j \right)$$

Here, N_I is the niche of information industry;

S_I represents the state of information industry niche;

P_I represents the potential of information industry niche;

S_j represents the state of information industry j;

P_j represents the potential of information industry j;

A_I and A_j are the dimensionless conversion factors.

3.2. Analysis on the Security of Information Industry Cluster Based on the Ecological Chain

3.2.1. The Ecological Chain of Information Industry Cluster and the Information Industry Security: The theory of ecological chain was proposed on the basis of analysis and summary the theoretical ideas of food chain in ecology [12]. Similarly, there are also a number of ecological chains of information industry cluster in Ecosystem of Information Industry. One information industry can exist in multiple ecological chains at the same time, and these ecological chains intertwine with each other, and thus constitute a complex network of Ecosystem of Information Industry.

(1) The ecological chain links of ecosystem of information industrial have the characteristics of added value difference.

The ecological chain of information industry cluster has different links, including the activities of standards development, technology development, manufacturing, marketing and management and so on that create value. And the added value and profit space of different links is different. In the whole, the added value of the information industry cluster chain obeys the distribution rule of "smile curve". "Smile curve" was first proposed by Mr. Zhenrong Shi, the founder of Acer Group., whose middle is the manufacturing sectors, the left is the R & D links, and the right is the marketing link. In the ecological chain of the information industry cluster, the high added value more embodied in the design sector and the sales link, which is known as both ends of the "Smiling curve" and the added value of the manufacturing sectors which is in the middle position is the minimum. The theory is very practical and it points out the development strategy and the future development direction of the ecological chain of information industry cluster. In the guidance of the added value concept, the information industry can obtain sustainable development only through keeping moving and positioning to the higher value-added sectors.

(2) The ecological chain links of ecosystem of information industrial have the characteristics of cooperative evolution.

Among the closely related species, one party can become the selection forces of the other party, and then develop the characteristic of mutual adaptation in the evolutionary development. This phenomenon of mutual adaptation is known as the cooperative evolution, which is ubiquitous in nature. For example, the phenomenon of symbiosis is the result of the biology taking the cooperative evolution to achieve the mutual adaptation. The different populations on the ecological chain of ecosystem of information industrial also use the way of cooperative evolution to build mutual symbiotic relationship between each other. It emphasizes to improve the efficiency of comprehensive utilization of environmental resources through the cooperation of different industry populations, enhance each other's ability to survive, and thus improve the adaptability of the overall information industry cluster to the external market.

3.2.2. Analysis on the Ecological Correlation of the Ecological Chain of Information Industry Cluster: The ecological chain of the Ecosystem of Information Industry is not only a material recycling chain and energy cascade flow chain, but also a collection of ecological value chain and the ecological supply chain of the

information industry. We use the "ecological" to explain the relationship between the internal chains of Ecosystem of Information Industry, since that there is indispensable relationship of win-win between the upstream and downstream enterprises in the internal information industry cluster. Once one of the links appears the absence of role, it will damage the benefit of other roles in the information industry cluster. It is similar to the relationship of "a prosperity, a loss for both" existing in the natural food chain formed by nature [13]. Therefore, on the basis of the identified niche of information industry, the information industry cluster needs to construct reasonable ecological chain, namely business cooperation process. Otherwise, there will be ecological chain rupture, and existence of information industry and even result in the collapse of whole ecosystem.

Using the biological communities' correlation to measure the reasonable degree of the ecological chain of the Ecosystem of Information Industry, that is the biological communities' correlation equals to the ratio of the actual food chain number observed in the communities' food net to the largest food chain number, expressed by the formula as the following:

$$C = \frac{L}{S(S-1)/2}$$

Here, C refers to the correlation between the biological communities, which is also the correlation between the enterprises in the information industry cluster; S refers to the richness of species, which is also the potential richness of the correlation between the enterprises in the information industry cluster, that is to say the saturated state of the correlation; L refers to the actual observed number of food chain contained in the food net, which is also the real correlation between the enterprises within the information industry cluster.

The parameters of the ecological correlation between the enterprises within the information industry cluster can be divided into the following categories:

$C = 1$, shows that the correlation has reached saturation, and this is also the ideal operation state of the information industry cluster;

$0.5 < C < 1$, shows that the correlation between the enterprises within the information industry cluster has reached a certain rate, and this is also a good operation state of the information industry cluster;

$C < 0.5$, shows that there seriously lack of coordination in the possession and utilization of resources between the enterprises in the internal information industry cluster. There are relationships of overlap, cross-ties and mutually inclusive between the enterprises' niches, and these relationships will directly lead to unreasonable competition between the enterprises in the information industry cluster. The business was chaotic and this is the most unsatisfactory operation state and need to improve.

4. Empirical Research of China's Information Industry Security

4.1. Analysis on the Current Situation of China's Information Industry Security

In the case of impact of the global financial crisis on the real economy is not over yet, and the information industry as a pillar industry of China's industry, to promote the information industry to a new level, and achieve development by leaps and bounds are essential to promote China's economic and social development, safeguard China's security and enhance the competitiveness of China. In the period of Twelve Five, the scale of China's information industry maintained steady growth. Major projects have been started. And industry gathering trend has been initially formed. They made outstanding independent innovation achievements, and improved resource utilization significantly. However, it should be noted that the security problems faced by China's information industry is also very prominent.

(1) The structure of ecosystem of China's information industry is not complete and its niche is vacant.

The scale of China's information industry is large but not strong. And some of the key basic technology is still relatively backward compared to developed countries and the gap of technology continued to widen. In January-July 2014, the amount of China's electronic information products exports is 425.2 billion dollars, down 3.4%. The decline narrowed 2.5 percentage points compared with January-June, 33.3% of the country's exports. But information industry is still in the stage of processing and assembly. 73% of revenue comes from foreign-funded enterprises. The amount of foreign-funded enterprises exports is 310.5 billion dollars, increase 0.1%. The amount of foreign-owned, joint venture and foreign cooperative enterprises exports are 232.9 billion, 74.9 billion and 2.7 billion, increase 0.8%, -0.9% and -23.5% [14]. Meanwhile, in Chinese information technology utility patent application, foreign companies accounted for 92%. This not only determines the vulnerability of China's information economy, which is vulnerable to external shocks, but also decided that China's information industry is largely controlled by foreign information industry body. The shocks and controlling are often directly reflected in the information security industry.

(2) The structure of ecosystem of China's information industry is irrational.

① Irrational industrial structure

Global information industry development shows softening trend. The proportion of software and information services increases. Currently, the growth rate of related industries in global software and information services is much higher than the growth rate of electronic products manufacturing industry, and the focus of the value has changed. In the industrial profit splitting, the service industry is better than the manufacturing sector as a whole. From the internal structure of China's information industry, the traditional industry still at the dominant position, while the proportion of emerging industries is low, and develops slowly. Emerging industries generally include resident services, leasing services, tourism, entertainment services, information consulting services, computer services and other applications. Although the proportion of traditional industry in the information industry decreases year by year, but the traditional industry continues to hold the dominant position. In particular, the development of information consulting service industry on behalf of the latest developments direction in the information industry is slow, and innovative of information services are the important driving force in demand growth for electronic information products.

② Irrational personnel structure

At present, in staffs of China's information industry, general staffs are excess, while senior staffs are apparent short. Enterprises are general lack of leaders who can occupy the forefront of technology and markets, and organize and lead the major projects and PR programs. Management personnel with high-level, inter-disciplinary, combined with excellent morals and academic skills has lower proportion. R & D personnel of integrated circuit design, software engineering, and key components is very short. The specialized personnel engaged in the manufacturing process serious short. The international talents who have ability of management in large company and are good at capital operation are deficient.

③ Unbalanced regional development

It is an important indicator for measuring the level of development of information industry that the proportion of Information industry accounts for GDP. In 2011, this proportion was 8.9% in China. China's information industry development is not balanced. The gap between regions of the level of information industry development is obviously large. The development of information industry is better in Guangdong, Beijing, Jiangsu and Shanghai, and is worse in Jilin, Guangxi, Gansu. Compared

with the information industry in developed countries, it is significantly lower than the level of developed countries.

(3) China's information industry is at the bottom-end of the world's ecological chain of information industry.

From the status of the international division of labor system in information industry, Chinese information equipment manufacturing industry develops well, which is labor-intensive, and has low technology content and low value-added. The gathering area of Chinese information industry doesn't form a complete information industry chain, the aspects of knowledge-intensive, technology-intensive information industry is weak. The information services in the gathering area whether in capital, technology, personnel and industrial scale are greatly lagging behind the information manufacturing industry. The phenomenon of laying more emphasis weight on hardware but less on software exists in information industry development. Enterprises in the gathering area are obviously at the end of the global business information industry chain, and being dominated position in the global value chain.

4.2. Policy Suggestions to Promote China's Information Industry Security

Certainly, the Chinese government and relevant authorities has perceived issues on the above information industry security, and has taken some measures. For example, in terms of trade, the Commerce Department and other departments use anti-dumping, industrial security warning mechanism, the analysis of industry competitiveness and other means through the establishment of Industry Injury Investigation Bureau to protect industrial security. However, there are still a lot of controversy and defects on how to correctly understand China's information industrial security issues and how to take proper measures to solve the problem and so on. Thus, only by scientific judgment and accurately grasping the information technology and the trend of industry development, accelerating the transformation of the development mode of information industry, comprehensively enhancing the core competitiveness of industries, can we protect the safety of China's information industrial security in order to provide more effective support for the economic and social development.

(1) Strengthen and improve macro guidance and give full play to the guiding role of government.

To achieve sound and rapid development of information industry, the government departments must strengthen macro-control and planning guidance using the means of economic, legal, information dissemination and financial guidance to improve the level of development the industry. In connection with the implementation of the national "Thirteenth Five" plan and information development strategy, the government departments should earnestly implement the information industry "Thirteenth Five" planning, regional planning, special planning and functional planning, formulating and implementing the supporting policies related to industry development, implementing industrial and technological major projects. The government departments should give full play to the information guiding role of government, improve economic statistics, analysis, forecasting and monitoring, timely release important information about market supplying and demanding, products investment guiding, major products trend of development and so on. The government departments should build communication and exchange platform, regularly publish and exchange information, create conditions for the development of operation industry, manufacturing, software industry and various sectors of the industry chain, in order to gradually form a mechanism of market as a link, mutual benefit and win-win, interactive development.

(2) Increase science and technology investment in information industry and expand the information industry niche.

Although there are some similarities between the information industry niche and biological niche, there are also significant differences. The biological niche is the result of natural selection which is passive and relatively stable, while the information industry niche is decided by market competition and industry initiative selecting, which is relatively unstable, and time-sensitive, and the maximum capacity of information industry niche can be expanded by scientific technological progress and social development. Therefore, China can develop new information industry niche space through increasing investment in science and technology, such as developing new technologies, opening up new market, cultivating new talents, promoting the government to develop new regulations and so on. At the same time, China need control the speed of expansion, and avoid over-exploitation of resources and blind pursuit of speed, so as to ensure the continuity and sustainability of ecosystem development. Different information industries should develop new niche space in the different ecological dimensions based on their strengths.

(3) Improve the ecological chain of information industry cluster and strengthen the high value-added sectors of information industry.

China should put building and improving the information industry ecological chain in a prominent position, accelerate the development and introduction of policies and measures to promote the development, promote the formation of closer information industry ecological chain which includes basic telecommunications, value-added telecommunications, equipment manufacturers, system integrators, content providers and application services, and guide the information industry to correctly handle the beneficial relationship, promote mutual benefit and interactive development. Meanwhile, combining the characteristics of information industrial clusters ecological chain, the scientific development of China's information industry must make full use of the concept of added value to the process of building the ecological chain of information industry cluster, focus on the creation of intellectual property rights-oriented development cycle and customer-oriented marketing and service sectors, and thus speed up the development process of China's information industry cluster, occupy a favorable position in the global information industry competition and achieve long-term and scientific development of information industry.

(4) Promote the restructuring and upgrading of information industry and improve the structure of the Ecosystem of Information Industry.

The structure restructuring is still the main task in "Thirteenth Five" information industry development. To promote the structural adjustment, the government should combine closely with the investment expand, innovation capability enhancement and coordinated regional development, around the determined task of information industry "Thirteen Five" plan, effectively change the mode of growth, continue to expand the agglomeration advantages of information industry cluster, prominence to upgrade the technical level, and thus promote the transformation of the information industry from the speed and scale to innovation and efficiency.

5. Conclusions

The information industry security refers to the state that the survival and development of information industry staying away from the threat, including survival security and development security of information industry. It is similar to the stability and dynamic development of Ecosystem of Information Industry. Using the theory and methods of ecology and system science, we studied the issue of information industry security in detail based on the theory of ecosystem from the level of individual, cluster, and so on, and take China’s information industry security as an example of empirical research, then provided

a range of effective policy suggestions for relevant Chinese government departments to control and guide China's information industry security.

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