

Research on Evolution Process and Countermeasures of E-Government based on Supply Chain Theory

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Abstract: With the rapid development of Internet technology, many traditional industries and departments are experiencing an information revolution, and e-government based on the Internet has gradually grown up with the development of the Internet. Originally, the supply chain was designed to solve the problems in the production process of enterprises. E-commerce was produced based on the supply chain technology, which greatly improved the production efficiency of enterprises and created considerable social wealth. When the supply chain technology is applied to other fields, it also shows great vitality, which provides new ideas for solving problems in other fields. On the basis of reviewing the evolution of e-government, and analyzing the characteristics and functions of e-government in each stage, this paper concludes the development process of e-government from "digital government" to "intelligent government" and finally to "intelligent government", and finds out the existing problems in e-government. The theory of supply chain is introduced into the field of public management, and the enlightenment to solve the problem is obtained. Finally, the corresponding suggestions are put forward. Thus, e-government can be continuously optimized in the era of rapid development of Internet technology, and relevant departments can also provide more perfect public services.


1 INTRODUCTION


With the exquisite application of computers and the rapid development of information technology, the traditional departments and industries that have undergone a long evolution process are hard to resist, and they are forced to make digital changes in order to adapt to the new social ecological environment. The same is true of government departments and operation modes based on bureaucratic organization theory, which has been confirmed in the change of "traditional government affairs-office automation-e-government affairs". As early as 1980s, the phenomenon of using computers to process documents and manage archives has appeared in Chinese government departments, that is, the embryonic form of the concept of "office automation". Although it is not really e-government in essence, the transformation of its way of realizing government affairs from "paper age" to "electronic age" should belong to the category of e-government

and start the journey of development and research of e-government in China.

After more than 30 years' efforts, especially the comprehensive and rapid development in recent fifteen years, China's e-government has achieved remarkable results in information disclosure, mobile government affairs, online service, electronic participation, new technology application ability, business and regional coverage. As shown in Figure 1 (Bertot 2010).

In the development process of China's e-government, both Max. Weber's bureaucracy, what Hu De called "new public management", Robert B. Denhardt and Janet V. Denhardt's new public service, and Goldsmith and Egers' network governance, all provide guidance for its development in a certain period of time. E-government in the digital age is no longer a problem at the level of information technology, or simply a problem of system management and information management. It is necessary to study it with reference to the theoretical system of public management, and explore how the

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public departments and institutions with the government as the core can use modern information technology and governance theory in the digital age to improve the way of handling government affairs and improve the efficiency of public services. This is not only a realistic task for government governance, but also a necessary way to achieve a higher level of public services, and it is also a forward-looking move to scientifically develop China's e-government.

At present, the understanding of e-government is not sufficient, and there is no specific means to solve the problems. On the basis of reviewing the world's e-government research literature, this paper analyzes the characteristics and functional characteristics of e-government in each stage, summarizes the development process from "digital government" to "intelligent government" and then to "intelligent government", finds out the existing problems of e-government, and focuses on how e-government obtains enlightenment and solves problems with the aid of supply chain.

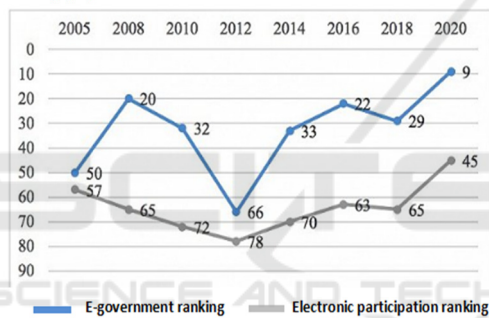


Figure 1: China's Ranking in UN E-government Survey.

2 EVOLUTION AND EXISTING PROBLEMS OF E-GOVERNMENT

2.1 E-Government Development Process

In the process of e-government development, technology will become more and more complex, so the difficulty of integration will also increase. It can be roughly divided into four stages: the first stage is

the document cataloguing stage, in which the government releases information to the outside by establishing a website. The second stage is the transaction stage, in which the government can conduct online transactions through the Internet. The third stage is the stage of vertical integration of government functions. The fourth stage is the horizontal integration stage. The first two stages focus on the development and establishment of an electronic interface for government information, which belongs to the digital government stage. The latter two stages are the integration of e-government under the existing government structure, so they belong to the intelligent government stage and the intelligent government stage respectively.

2.2 E-Government Problems in the Development Process

2.2.1 The Service Capability of Government Websites Needs to Be Strengthened

The construction of government websites has not received sufficient attention. In November 2003, the United Nations Bureau of Economic and Social Affairs inreleased the survey report Global Public Sector Report 2003: E-government at Crossroads. The report assesses the e-government level of the 173 UN member states that have launched government websites from key indicators such as the accessibility of government websites, the construction of network infrastructure and the level of e-government. It released the ranking by way of "digital government completeness index", ranking China at 74th. The report also evaluated the residents' convenience in obtaining government information and their enthusiasm in participating in government decision-making by measuring "electronic participation index", ranking China at 86th. As can be seen from the comparison of the average value of the first-level government service capability index of the provincial government websites in China from 2017 to 2020, as shown in Figure 2, the online service maturity index and online processing maturity are relatively low, which further illustrates the problem that the government website service capability needs to be strengthened.

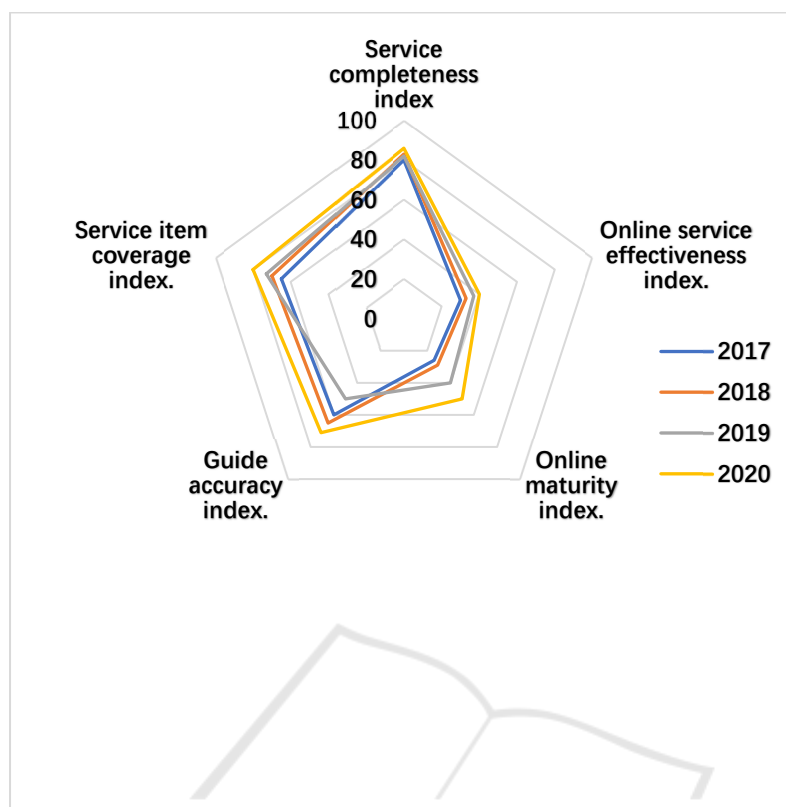


Figure 2: 2017-2020 comparison of the average value of the first level index of government service capacity of provincial government websites in China, Data source: <https://publicadministration.un.org/egovkb/en-us/data-center>.

2.2.2 The Low Efficiency of Electronization

Many government websites show that they have the function of handling affairs online, but when users click on it, the system is usually being maintained, or there is only one flow chart, which does not really have this function. This is the typical low efficiency of electronization. We can see that many government websites only hang the names of the businesses they handle on the front page, but they do not have this practical function and can only be regarded as a simple open process. This cannot be done by electronic means to improve administrative efficiency. This reflects the current form of electronic government affairs in China.

2.2.3 E-Government Projects Lack Uniform Standards

At present, China's e-government is developing rapidly. Most of the provincial, municipal and county government departments have their own websites. However, problems such as repeated construction, unreasonable website design, unclear website objectives, poor operability and nonstandard security

management have become obstacles that hinder China's e-government to move to a higher level. For example: `< font >` tags have been listed as deprecated tags by the W3C as early as April 1998 in the HTML4.0 standard, but many websites have little code like `< font color=blue >` on their home pages. In fact, most of the large-scale websites fail to pass the W3C's strict correctness verification. There are many reasons for this situation, such as the adoption of the old information release system, and the lack of skills and awareness of web designers. However, the root cause of this problem is the lack of standardization and standardization of our government websites. "In the average score table for website monitoring of the third and fourth level cities in the Research Report on China's Prefecture-level Cities' E-government, the highest score is 7.1819 and the lowest score is 0.52 (there are 27 cities with zero scores), which shows the large gap.

2.2.4 Lack of Integrated Government Supply Chain

In the traditional sense, the government business process usually starts from the actual operation of the department, and lacks of unified coordination and overall planning between departments. This directly results in the actual operation of each department and the formation of a government supply chain with the department itself as the center. In the final analysis, the formation of this supply chain is due to the specific business processes between departments. The motive force for the development of e-government in China came from all levels of government departments at the earliest. While carrying out e-government activities, all levels of government departments often have a fragmented situation and lack of macro-control and unified planning, which results in the lack of large-scale unified integration of all e-government supply chains. In solving the above problems, many scholars have found that in the actual operation process of e-government, there are many characteristics similar to

supply chain, and they have the idea of obtaining inspiration from supply chain theory and looking for countermeasures.

3 E-GOVERNMENT BASED ON SUPPLY CHAIN THEORY

3.1 The Introduction of Relevant Concepts

Supply Chain (SCM) refers to an enterprise that considers the upstream suppliers and downstream distributors of the core enterprise as a whole in order to maximize the enterprise's revenue. It runs through the whole process of raw material procurement, product processing, distribution and distribution, terminal sales and customer service, as shown in Figure 3. It pursues the minimum circulation cost among the processes and seeks the maximum circulation benefit.

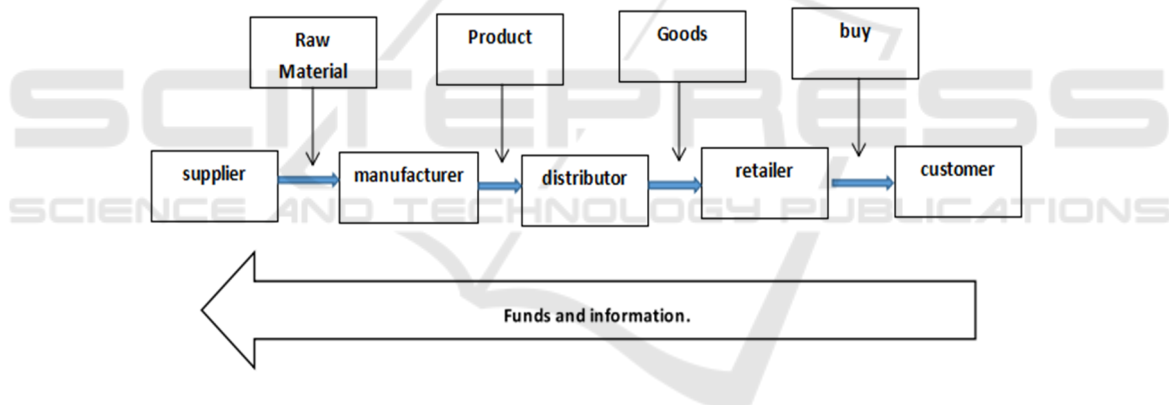


Figure 3: Circulation in supply chain.

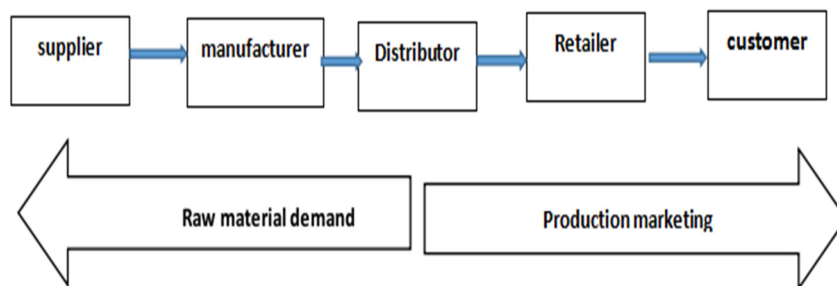


Figure 4: Push Supply Chain Model.

According to the different leading direction, the supply chain can be divided into push supply chain and pull supply chain. The push-type supply chain is production-oriented and is suitable for the "production-fixed-sales" production model. The pull-type supply chain is customer-oriented and suitable for the production model of "fixing production by sales". In the actual production management process

of push-type supply chain, the enterprise will first make the necessary forecast and planning for the market to determine the quantity and type of products produced by the enterprise, and then determine the production planning on this basis, and then promote the optimization of the entire supply chain. The push supply chain model is shown in Figure 4.

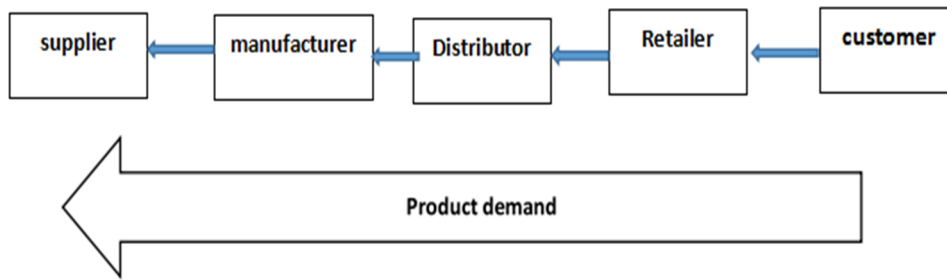


Figure 5: Pull Supply Chain Model.

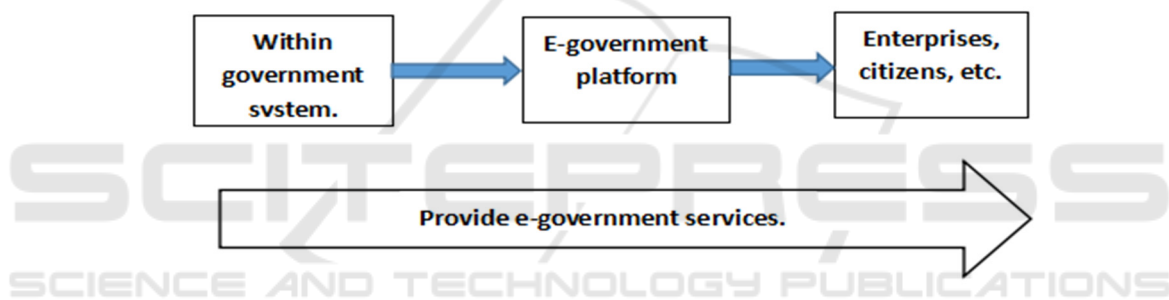


Figure 6: Push e-government SCM model.

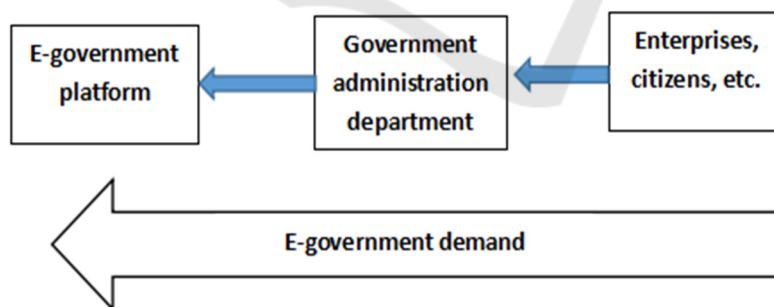


Figure 7: Pull e-government SCM model.

The entire process of the pull-type supply chain is driven by the customers, the customers generate demands, information is transmitted to the manufacturers through intermediate channels, the manufacturers transmit to the material suppliers, and the material suppliers determine the material supply plan. The pull-type supply chain can make production

planning based on customers' demands, and can better respond to changes in customers' demands. However, this model greatly increases the response cost in the back office and reduces the profit of the enterprise to a certain extent. The production model of the pull supply chain is shown in Figure 5.

3.2 The Enlightenment of Supply Chain Theory to E-government

Based on the explanation of enterprise supply chain theory above, we divide the e-government SCM model into push e-government SCM model (Fig. 6) and pull e-government SCM model (Fig. 7).

The push-type e-government SCM model and the pull-type e-government SCM model have their own advantages and disadvantages. However, careful study shows that with the continuous development of society and economy, both the push-type e-government SCM model and the pull-type e-government SCM model will increasingly expose problems. In the push-type e-government SCM model, the government's long-term planning is not compatible with the changing needs of enterprises

and citizens. In the pull-type e-government SCM model, the government can better take into account the changing needs of citizens and enterprises, but it will affect the government's long-term development planning. It is necessary to establish a comprehensive e-government SCM model, which can not only ensure the government to establish a long-term development plan, but also allow the government to take into account the changing material and cultural needs of enterprises and citizens.

Comprehensive e-government SCM model: refers to the alternative use of pull-type e-government SCM model and push-type e-government SCM model in the process of e-government construction. In different stages, push-type and pull-type respectively play a leading role, and the government can make choices according to specific conditions, as shown in Figure 8.

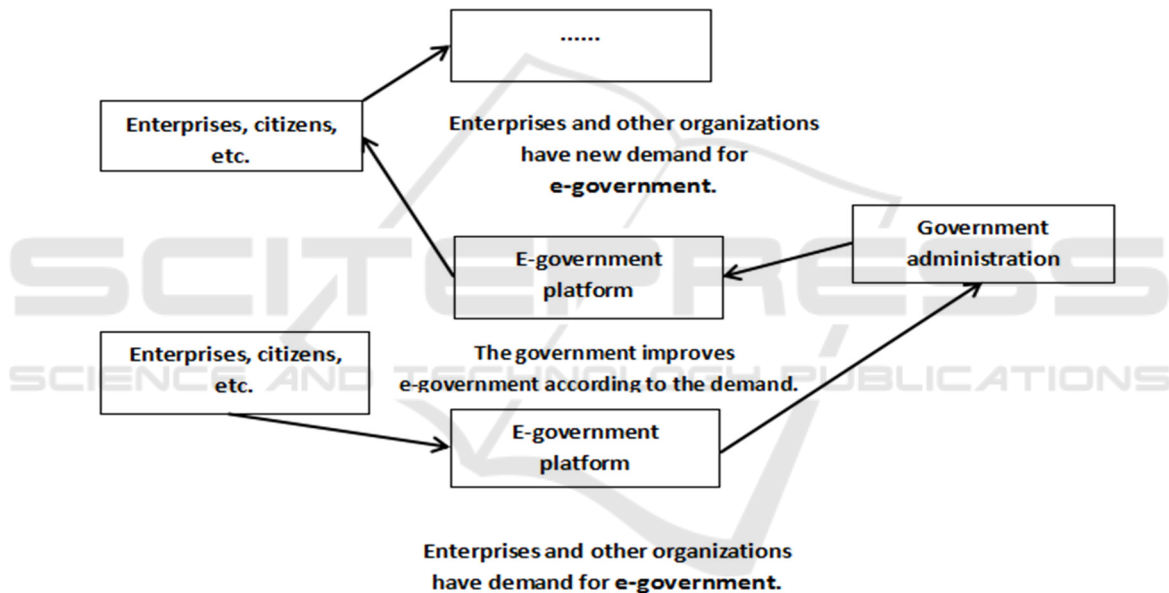


Figure 8: Integrated e-government SCM model.

4 COUNTERMEASURES AND SUGGESTIONS BASED ON SUPPLY CHAIN THEORY

4.1 The Government Portal Website Group Technology Implementation

Enterprise supply chain is often built around a large enterprise. E-government supply chain has increasingly manifested this development trend, in which the concept of government portal website

group is a concrete expression of this theory in e-government. Therefore, how to effectively provide public services through government websites and how to improve the public's awareness and satisfaction of the construction of government websites have increasingly become hot issues in the new stage of e-government construction. The establishment of the government portal website group system is supported by the content management system. Through the distributed information maintenance mode and audit mechanism, the hierarchical management of information and resource sharing are achieved. Technically, the implementation

of content management of government portal websites is divided into the following six parts:

The first is the data layer, which schedules and stores structured data and unstructured data, including XML and DBMS. Unstructured data includes: text files, audio and video files, graphics and image files and files in other formats such as PDF. Web Service modular components are supported on the data interface. At the same time, the data service also provides its upper layer with an application programming interface API for a large number of data operations. The second is the support layer, which provides strong support to the system application layer through the application server, including: information capture, data conversion, search engine, unified users, workload and access statistics, WAP management, process definition, data submission and sharing. And through API, PORTLET, WEBSERVICE, JMS, MQ, DI, URL, DBMS and other interface services, external resources are supported to integrate the basic data of content management and the application data of content management to external data resources (Shen 2008).

The third is the application layer, which is a very important part of the government portal website group and an important part of information processing. According to different functions, it can be divided into: information release management, website group management, system management, plug-in component management, single sign-on, personalized customization, content aggregation RSS. The fourth is the performance level. The final performance of the government portal website group is a group of website group systems with the same standards and the same standard system. It covers the government master station, all levels of government sub-websites and all kinds of special sub-websites. At the same time, the system provides information resources support for different applications of the application layer. For example: web, wap, portlet, rss, E-mail, SMS. Fifth, the access layer. Customers access the performance layer through devices (such as mobile phones, PDA's, browsers.) to obtain information resources. Finally, external public interfaces provide a large number of application interfaces for the management layer, application layer and presentation layer of information resources, including API, PORTLET, WEBSERVICE, JMS, MQ, URL, DBMS (Carter, 2015).

4.2 Clear Management Objectives and Principles

The goal of e-government supply chain management is to take the government website as a platform, to achieve perfect government services and resource integration, to provide perfect services for the public, to continuously enhance the innovative services of the government website while meeting the increasing trend of public personalized demand, and to make timely and effective anti-fast response to the trend of users' personalized demand. In order to reduce the operation cost of the whole e-government supply chain, the construction cycle of the supply chain for e-government is shortened while the service is realized (Liu 2014).

4.3 The Establishment of Standardized E-Government

"E-government Standard System" and "E-government Standardization Guide" mark the official start of China's e-government standardization. The e-government standard system consists of general standards, application standards, application support standards, information security standards, network infrastructure standards, management standards, etc. Under the basic framework of the "E-government Standardization Guide", the E-government Standardization Group commissioned different agencies to carry out and complete the work of formulating six e-government standards. The six specific tasks include: format specification of electronic official documents based on XML. XML Application Guide in E-government. General specification for design method of e-government business process. Code for information engineering supervision. E-government data element. E-government thesaurus. From the overall framework, the standard system has covered all aspects of the whole e-government construction. This has pointed out a basic way for the development of e-government standards, or basically completed the "meta-standard" for each item in the e-government application standards (Snyder 2011).

4.4 Establish an "E-Government Supply Chain" based on Internet Technology

While pay attention to that technical standards, special attention is now bee paid to the quantitative research and management of government affairs, and on this basis, the construction of most government

management projects and link is standardized, the local and national standards of government process links are formulated, and the non-arbitrariness of government management and the transparency of government processes are realized. In the practical work involving the management of e-government supply chain, manual and traditional information exchange methods have failed to meet the requirements of efficient management. Developing various related systems and software based on Internet technology is the only way to build an e-supply chain (Nations 2008).

5 CONCLUSION

After more than 30 years' construction and development, the overall situation of China's e-government can be summarized as a late start and rapid progress, which has achieved remarkable results in many fields and faced bottlenecks in various aspects. Now, it has entered a rising period of rapid take-off and a critical period of deep application. E-government is an "imported product", from hardware to software, without exception, it comes from abroad, but it can quickly integrate with China's reality and make continuous breakthroughs and innovations in theory and practice. In 1980s, Chinese traditional government departments introduced computers to assist in simple government affairs, such as text editing, file storage, data statistics. which started the process of reforming the way of realizing government affairs. In the true sense, it marked the germination of Chinese e-government. Due to the restriction of technical equipment, administrative environment and other factors, it mainly served the government rather than the public, resulting in weak public service capacity of e-government in this period. In 1990s, with the popularization and application of information technology and Internet in China, government departments actively provided favorable conditions in terms of capital, science and technology, policies and ideas, focused on guiding and promoting the leap-forward development of e-government, initially explored the great potential of e-government, and showed its convenience and efficiency in government affairs processing, making e-government an indispensable tool for government departments. At the beginning of the 21st century, the emerging information technologies such as "internet plus", cloud computing, big data, all-media and intelligent mobile, on the one hand, create a broader development space for e-government, on the other hand, make great changes in the administrative

ecology of the government, and the existing governance theories encounter difficulties in practice. The e-government based on the operating mechanism of government organizations and information technology is also placed at the crossroads of where to go.

By analyzing the evolution of e-government, this paper finds that the service capacity of e-government government website needs to be strengthened, and by studying the supply chain model, it gets enlightenment and finds out the corresponding solutions (Layne 2002).

However, there are some shortcomings in this research. The development plan that relies on the digital age and combines with the supply chain tends to the theoretical level and needs to be further refined and deepened in practice. In addition, as a new theory, like other theories, it will be criticized in the process of development, in order to improve and surpass the follow-up research (Ding 2004).

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