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EVALUATION AND RESEARCH ABOUT THE EVOLUTION AND EFFICIENCY OF CHINESE TELECOMMUNICATION INDUSTRY VALUE CHAIN

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ABSTRACT

In order to explore the mechanisms of the telecommunication industry value chain value growth and promote the Chinese telecommunications industry's better and faster development, this article ,on the basis of segmentally dividing the evolution of China's telecommunication industry value chain, finds that the efficiency of China's telecom industry value chain evolution had been significantly improved by using DEA model to estimate and comparatively analyze the efficiency of China's telecommunication industry value chain integration, competition , coordination and value growth, which is due to the main competitors of telecom industry value chain, the increase of links as well as the weakened surveillance ability of telecommunication operators resulting from market reforms, loosen surveillance and technology progress and other factors, contributing to the integration, competition and collaboration of the upstream and downstream enterprises of the industry value chain.

Keywords: *Telecommunications Industry， Evaluation Of Industry Value Chain， Efficiency Of Integration， Efficiency Of Competition And Collaboration， Efficiency Of Value Growth*

1. INTRODUCTION

After the rapid growth of the late 20th century, Chinese telecom industry entered a stable stage of development till the 21 century .At this point, the traditional business of the telecommunication operators has been constantly squeezed by the new-born business, the value created by traditional business continues to decline and the profit-making space is decreasing. With the gradual acceleration of the adjustment of the Chinese telecommunication industry structure as well as the entrance of application software providers, information providers, entertainment companies, and media and other new main parts, the telecommunication industry value chain are continuously spread in both breadth and depth [1]. Telecommunication service has also evolved from basic telecommunication services to value growth telecommunication services. Therefore, in the face of the changes in the market environment, telecommunication operators must change the traditional monopoly business model into broad and active cooperation with other actors within the industry, extending the existing value chain while continue to create new value chain, hereby increase the overall value of the telecommunication industry value system in order to compensate for the loss of the traditional value chain through the expansion and re-allocation of the value of total. In this context, the traditional telecommunication industry value chain has been unable to meet the needs of the development of modern telecommunications industry and must explore a new telecom industry value chain to promote the continuous development of the telecommunication industry. Therefore, on the basis of segmentally dividing the evolution of China's telecom industry value chain, the DEA method is used in the text to evaluate the efficiency of the different stages of its evolution in order to provide the appropriate reference for the sustainable development of Chinese telecommunication industry, making the industry value chain grow further in the premise of a store of value.

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2. THE EVOLUTION OF CHINESE TELECOM INDUSTRY VALUE CHAIN STAGE

With the development of new telecommunication technologies and new business, the Chinese telecom industry value chain has expanded greatly and made fission interdependently, and spawned a closer collaboration value network. According to the characteristics of the telecom industry value chain, we can roughly divide it into several evolutionary stages.

2.1 "Three-step" development stage of the value chain of the telecommunications industry

From 1980s to the early 21st century, the development of Chinese telecommunications industry level was quite low as a whole. The government has implemented a more stringent regulatory policies to telecommunications industry. Combining with immature telecommunications technology, the telecommunications business was limited to voice calls, so the shape of the telecommunications industry value chain was simple, showing the characteristics of the "three-step". That is to say, there were only three value creating main body in the whole industry, equipment suppliers, telecommunications carriers and end-users. At this stage, the telecom operators in the industry value chain were the absolute core position, hold the network and user resources and almost were the sole provider of a variety of information services, which produced a more reliant relationship and strong dependencies and determined its control power over the allocation of entire value chain system.

2.2 "Multi-stage" development stage of the value chain of the telecommunications industry

From 2002 to 2007, with the further relaxation of government control policy, fast development of telecom technology, the increasingly fierce competition in the telecommunication market and the needs of individual users, the development trend of Chinese telecom business gradually shifted from voice services to value-added data services. The telecom operators gradually changed the operation way of the industry value chain system and began extensive cooperation with service providers, which evolved into a "multi-stage" of the telecom industry value chain system. Compared with the traditional telecom industry value chain, the refinement of the business and the increasing number of information services provider made an increase in the industry value chain and had chain extended. The overall value of the industry value chain continued to enhance and promote. In the morphology of the industry chain, the core competitiveness of the telecom operators gradually was reflected in the ability to control the industry value chain, which can not rely solely on their own business to meet the market demanding, but to make an collaboration with other partners and an integration of all the power in order to survive in the telecommunications market better. Taking Common telecom data value-added services for an example, the value of the multi-stage value chain is shown in Figure 1.

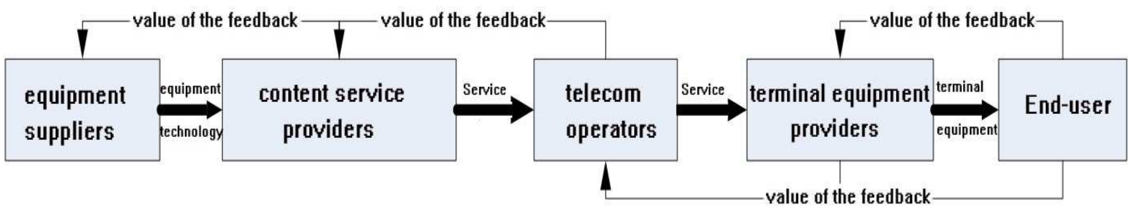

Fig.1. "multi-stage" value chain of the telecommunications industry

In Figure 1, the telecommunication (network) operators occupy the central position of the entire value chain because of owning customer resources, network strength and brand advantage, Telecommunication operators turn into a strong position from the first dominant core position. Meanwhile, the existence of the other links can not be ignored and should both compete and cooperate with the parties. Because telecommunication operators have customer resources, they have rights to connect the end-user and to distribute the value. The value of the entire value chain comes from the end-user, so other links must rely on telecommunication operators to realize their deserved value in the telecommunication industry value chain.

2.3 "Mesh" stage of the development of the telecommunication industry value chain

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Since 2008, the telecommunication value growth business has fully re-developed with the development of the Internet. Due to the certain policy support, the continuous improvement of the market opening degree, the breakthrough of technical bottleneck , the widening of the scope for competition, consumer demand diversifying as well as other large-scale industry in the whole telecommunication industry value chain joining, cross-industry alliance is formed in the telecom industry value chain, prompting the increasingly wide areas of the telecommunications industry. In this case, the telecommunication industry value chain is no longer a continuously extending single chain, but one covering in all directions and continuously spreading "mesh" value chain, as is shown in Figure 2. Other links of the original single value chain is providing distinctive value growth services to the user through the operator's network resources and is looking for new value growth space. The development of the network makes the development of value growth services flourish.

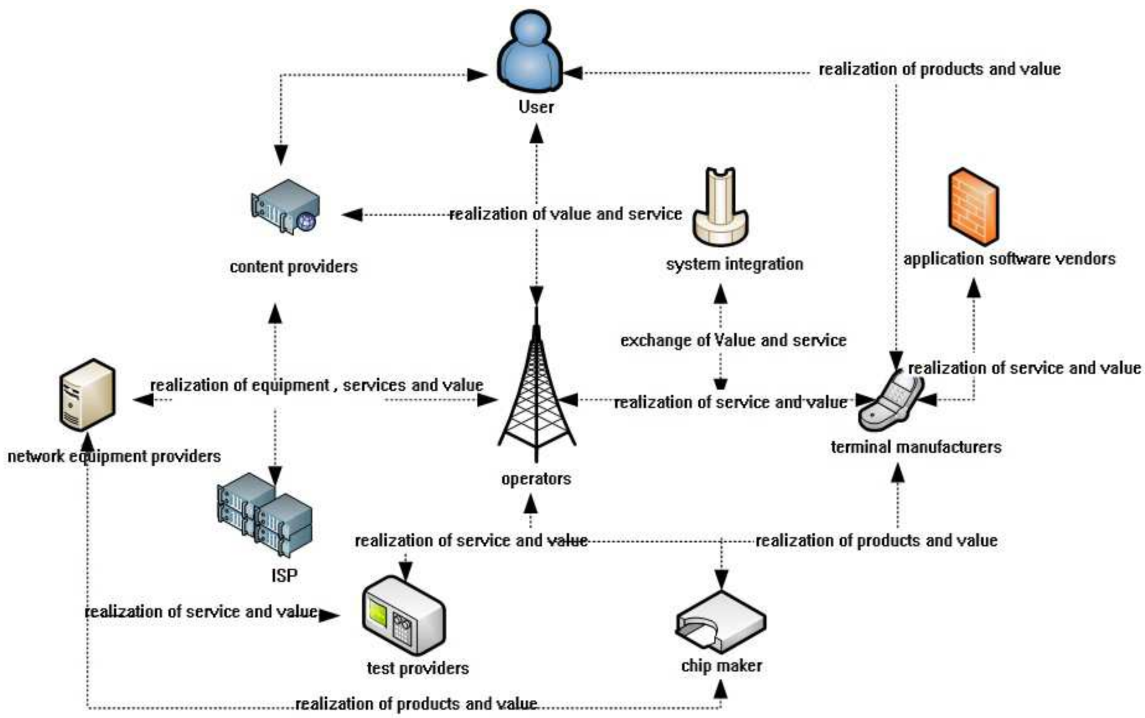

Fig.2. "Mesh" value chain of the telecommunications industry

Although in the whole "mesh" telecommunication industry value chain, telecommunication operators still rely on their own customers and network supporting systems and other resources to occupy the central position of the entire telecommunication industry value chain, other links in the value chain system is also positioning itself clearly, among which content / value growth service providers are becoming more and more important for the development of the telecommunication industry and their positions are also increasingly growing high. Though CP (content providers) or SP (service providers) depends on the existence of telecommunication operators to come into being and develop, telecommunication operators have to make sure its own position. The whole industry value chain surrounds the operators and delivers services to users through the division of labor and close coordination of various parts in order to achieve a double-win situation. But this kind of core status does not mean that the operators enjoy full leadership in the industry value chain. The operators only play a leading role in the development of the whole industry.

3. RESEARCH METHODS AND DATA INDICATORS

3.1 Research Methods

DEA (Data Envelopment Analysis) model uses the concept of the production function and linear programming method to construct an optimal production frontier and with the actual production

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by manufacturers observation point (that is, the decision-making unit, Decision Making Units, abbreviated DMU) and production frontier gap, the manufacturer production efficiency is estimated [2]. As using the DEA model to have efficiency evaluation, there is no need to decide the production function in advance. It is able to handle a number of input and output data as well as not being influenced from the dimensionless of data and price information, it gets a wide range of applications since it was brought up. So, three types of DEA model are used to have efficiency analysis: The first one is DEA-CRS (Data Envelopment Analysis-Constant Returns to Scale data Envelopment Analysis Method - Constant Returns to Scale Model) model. It is mainly used to calculate the comprehensive scale technical efficiency. The second one is DEA-VRS (Data Envelopment Analysis-Variable Returns to Scale) model, mainly used to calculate the pure technical efficiency and the scale efficiency [3]. The third one is DEA-CE (Data envelopment Analysis-Cost Efficiency) model, mainly used to calculate the configuration efficiency and cost efficiency.

3.1.1 DEA-CRS model

DEA-CRS (Data Envelopment Analysis)model is a method based on the concept of relative efficiency according to Multiple Indicator inputs (input) and Multiple Indicator outputs (output), having evaluation of the relative effectiveness or efficiency of the department or unit of the same type [4]. And, in the calculation of the technical efficiency CRS model is based on the assumption of constant returns to scale. It indicates that the evaluation of the decision-making unit can expand output scale by increasing inputs in proportion .Relative to the pure technical efficiency estimated by the back DEA-VRS model, the efficiency of this model is called the comprehensive scale technical efficiency [5]. The model construction is as follows:

Suppose j ($j = 1,2,\cdots,n$) departments or units (each j referred to as a decision-making unit).The use of the i input quantity is x_{ij} , the r output quantity is y_{rj} , the unit's efficiency can be calculated by model (1):

$$\min \ \theta$$

Subject to:

$$\sum_{j=1}^{n}\lambda_j x_{ij} + s_i^- = \theta x_{ik}, i = 1,2\cdots S$$
$$\sum_{j=1}^{n}\lambda_j y_{rj} - s_r^+ = y_{rk}, r = 1,2\cdots M$$
$$\lambda_j \ge 0, j = 1,2.....n$$
$$s_i^- \ge 0, s_r^+ \ge 0$$

(1)

In the model (1) of DMU_k , $\theta, s_r^+, s_i^-, \lambda$ respectively, the decision-making unit comprehensive scale value of the output variable tightening variables, input variables slack variables and input and output variables of the weight coefficient. DEA-CRS model optimal solution θ^k , the economic connotation is as follows:

(1) When $\theta^k = 1, s_i^- = 0, s_r^+ = 0$, DMU_k is effective. That is, input factors X_k in a decision-making unit K has been completely transformed into outputs Y_k .

(2) When $\theta^k = 1$, s_i^- and s_r^+ are not both zero, DMU_k is weakly efficient. When one of a decision-making unit k or several inputs X_k outputs Y_k factor is reduced, it is still available. That is, in the case of same amount input, it may also increase the volume of output;

(3) When $\theta^k < 1$,the DMU_k is non-DEA effective. The decision-making unit k will be put X_k into the θ^k times so as to maintain the origin Y_k to a constant factor proportional reduction to the original investment.

3.1.2 DEA-VRS model

Production systems, under the CRS model assumptions for the evaluation of the decision-making unit in the best returns to scale (unchanged) in the actual situation, however, inadequate competition in the market or constraints of input elements supply and other factors often cause decision making units production can not be in the best returns to scale conditions[6] Decision Making Units may be in the stage of increasing returns to scale or decreasing, so evaluated decision-making unit of non-DEA effective may be derived besides from own input and output improperly, it can also

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result from factors of scale. So depending on the returns to scale stage and the decision makers making appropriate business decisions can improve efficiency. Therefore, Banker, Charnes & Cooper (1984) on the basis of the CRS model, increased convexity assumptions $\sum \lambda_j = 1$, This DEA-VRS model also known as the BCC model [7].

$$\min \ \theta$$

Subject to:

$$\sum_{j=1}^{n} \lambda_j x_{ij} + s_i^- = \theta x_{ik}, i = 1,2 \cdots S$$
$$\sum_{j=1}^{n} \lambda_j y_{rj} - s_r^+ = y_{rk}, r = 1,2 \cdots M$$
$$\sum_{j=1}^{n} \lambda_j = 1, j = 1,2.....n$$
$$s_i^- \geq 0, s_r^+ \geq 0 \qquad (2)$$

Variables θ, s_r^+, s_i^-, λ and model (1) have the same meaning, respectively, the pure technical efficiency of decision making units DMU_k, output variables, tightening the variable input variables and the output and input variables of the slack variable weight coefficient. DEA-VRS optimal solution θ^k meet: $\theta^k = 1$, $s_i^- = 0$, $s_r^+ = 0$ DMU_k is DEA effectively, $\theta^k < 1$, DMU_k is the effectiveness of DEA.

Scale technical efficiency, pure technical efficiency and scale efficiency in DEA model can be illustrated in Figure 1. X is input, y is the output, ECO constitutes DEA-CRS production frontier model. FEG production frontier constitutes a DEA-VRS model. Point A in the figure represents an investment of q and output Q of non-DEA effective decision-making unit, and compared to point D it gets the same amount of output, and thus at points A pure technical efficiency is calculated by Equation 3. Pure technical efficiency reflects that under conditions of variable returns to scale, the ratio between the decision-making unit input on the production boundary and the actual input, and the effectiveness of decision-making unit in the use of technology in the production process. That is, in the case of a given investment, the capacity of decision-making unit to obtain the maximum output capacity.

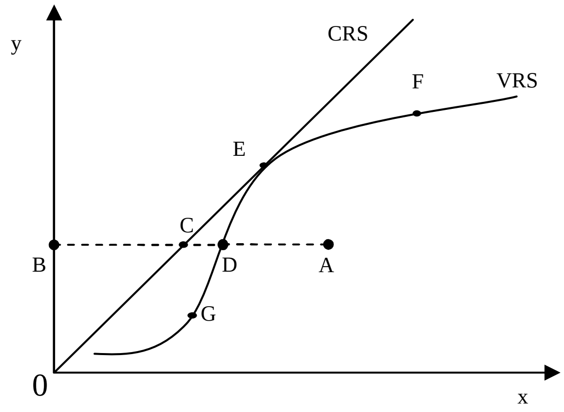

Fig.3. CSTE, PTE and SE

The gap between non-effective production frontier ECO and FEG embodies the scale inefficiency. Scale efficiency of point A can be calculated by Equation 4. Scale efficiency reflects the ratio between the production frontier inputs and target inputs of the decision-making unit. That is, whether the decision-making unit is undertaking production activities in the optimal investment scale. Seeing from Figure3, the production frontier FEG can be divided into GE and EF segment. At GE segment, production function curve VRS presents "the rapid increase" [8]. That is, output increases is greater than the amount of input factors increase, known as increasing returns to scale phase. At EF segment, the production function curve VRS presents "steadily". That is, the amount of increase in output is less than the amount of input factors increase, called diminishing returns to scale phase. At point E, the amount of increase in output is exactly equal to the amount of input factors increase, called the scale constant returns. Comprehensive scale technical efficiency of point A is calculated by the formula 5, reflecting the overall condition of the pure technical efficiency and scale efficiency, and comprehensive scale technical efficiency is exactly equal to the multiple of the scale efficiency and pure technical efficiency. That is, $STE = SEP \times TE$ .It is clear that only when the pure technical efficiency and scale efficiency are both effective, comprehensive scale technical efficiency can be effective, and it can be calculated by DEA-CRS model.

$$PTE_{A,VRS} = \frac{BD}{BA} \qquad (3)$$

$$SE_A = \frac{BC}{BD} \qquad (4)$$

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$$TE_{A,CRS} = \frac{BC}{BA} \quad (5)$$

3.1.3 DEA-CE model

DEA-CE (Cost Efficiency) model is based on the DEA-CRS model is imposed a target. That is, the input price information is added to the model, in order to evaluate the decision making unit on the cost minimization under conditions of output or income. It reflects the cost minimization and cost (i.e. the ratio between observed gap), is considered all the loss efficiency of comprehensive efficiency [9].

$$\min \ CE_K = \sum_{i-1}^{m} p_i x_i$$

Subject to:

$$\begin{aligned} &\sum \lambda_j X_{ij} \le x_i, i = 1, \cdots, m \\ &\sum \lambda_j Y_{rj} \ge Y_{rk}, r = 1, \cdots, s \\ &L \le \sum \lambda_j \le U \\ &\lambda_j, x_i \ge 0, j = 1, \cdots, n; \\ &U \ge 1, 0 \le L \le 1 \end{aligned} \quad (6)$$

Wherein, model p, λ respectively the decision-making unit DMU_k input prices vector, the output variables and input variable weight coefficient vector. By substituting the p_i and x_i above with the model, we can reach the optimal combination of inputs x_i^*, so that the cost of c_k^* is the smallest. Then, the cost efficiency can be used C_k^* / C_k for evaluation, which C_k is the actual cost [10].

Cost efficiency and other efficiency relationship can be expressed as:

$$CE_A = TE_A \times AE_A = PTE_A \times SE_A \times AE_A \quad (7)$$

Formula 7, CE is the cost efficiency .AE (Allocative Efficiency) reflects the object being evaluated the cost to the minimum possible level of ability and the object being evaluated at the output of the same premise between various elements of the optimal proportion of [11].

3.2 Data indicators

According to the purpose and methods of the research, the paper selects the number of workers in the telecommunications industry, gross fixed capital formation as well as the total assets as input indicators, and select telecom business volume, the main business income and total profit of the output indicators. Taken into account of the availability and accuracy of the data, this article select the sample time from 1998 to 2010 and all data come from annual report of "China's Statistical Yearbook", "National Communications Industry Statistical Bulletin" and "Statistical Yearbook of China's tertiary industry". China Telecom, China Mobile, China Unicom and China Netcom.

Research model shows that, when calculate the cost efficiency we must know the price of the input variables. That is to say, the labor price of Chinese communication with the average wage of workers in the telecommunications enterprises is expressed as following:

$$P_1 = \frac{TLC}{E} \quad (8)$$

Where, P1 stands for the labor price of telecom industry, TLC stands for the total wages of labor of telecommunications industry, and E is the number of telecommunications workers. The gross fixed capital formation can take advantage of the perpetual inventory method to estimate the fixed assets. Taking into account of the factors of economic growth, the rate of depreciation of fixed assets should be the national average depreciation rate and the rate of growth of the national GDP. The formula for the calculation of fixed assets to form the total model, which is the capital stock in the year t; □ is investment in fixed assets based on 1998 constant prices,; β is the annual depreciation rate.

$$K_t = I_t + (1 - \beta_t - g_t) K_{t-1} \quad (9)$$

The price of fixed capital can be expressed P2:

$$P_2 = \frac{(\beta_{it} + g_{it}) K_{i,t-1}}{K_{it}} \quad (10)$$

The total assets of China's telecom industry price is equal to China's financial statutory loan rate of the year.

$$P_3 = i_l \quad (11)$$

Wherein, P3 stands for the price of the total assets of China's telecom industry, i_l is the financial legal lending rate.

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Table 1 Chinese telecommunications industry inputs, outputs and price data indicators descriptive statistics

	T(100M)	T(100M)	P(100M)	K	I(100M)	E(10T)	r	β	TLC/E
Mini	2264.94	2247.00	233.28	4860.70	1413	57.2	5.3	10.91	13017
Max	18591.30	7280.10	1737.22	18148.46	2648	98	7.47	15.77	40242
Mean	7947.40	4538.80	840.85	12767.00	2065.70	76.20	6.005	13.36	26754
SD	5398.88	1668.89	485.07	4516.67	349.90	157876.82	0.72	1.73	10627.36

4. EMPIRICAL RESULTS

According to the model, using 1998-2010 data and DEAP 2.0 software, calculate the efficiency of the Chinese telecom industry value chain evolution, and get comprehensive scale technical, pure technical efficiency, scale efficiency, configuration efficiency and cost efficiency of China's telecommunications efficiency from 1998 to 2010. The results are shown in Table 2.

Table 2 1998 ~ 2010 efficiency estimated value of China's telecom industry

year	SE	RTE	STE	AE	CE	Scale
1998	1.000	1.000	1.000	1.000	1	—
1999	1.000	1.000	1.000	0.925	0.925	—
2000	0.999	1.000	0.999	0.680	0.68	irs
2001	0.997	0.964	0.962	0.788	0.758	drs
2002	1.000	1.000	1.000	0.772	0.772	—
2003	0.924	0.965	0.892	0.844	0.753	drs
2004	0.974	1.000	0.974	0.823	0.801	drs
2005	1.000	1.000	1.000	0.871	0.871	—
2006	0.986	0.993	0.979	0.917	0.897	drs
2007	1.000	1.000	1.000	1.000	1	—
2008	1.000	1.000	1.000	0.999	0.999	—
2009	0.997	0.968	0.965	0.996	0.961	irs
2010	1.000	1.000	1.000	1.000	1	—
AVE	0.990	0.991	0.982	0.893	0.878	

Actually, the process of value chain in telecom industry evolution is the process of integration between upstream and downstream enterprises of the industry chain, which produces among the competing enterprises, such as industrial chain, collaboration, value added. Compared with the efficiency of the different stages of development of the telecom industry value chain, the clear direction in development of the telecommunications industry can be clarified. from the perspective of integration efficiency, competing, and the synergistic efficiency as well as value-added efficiency, the Chinese telecom industry value chain evolution stage evaluation of the efficiency of the various stages of the value chain of China's telecom industry average are shown in Table 3.

Table 3 Chinese telecom industry value chain stage efficiency mean

Mode	SE	PTE	STE	AE	CE
1999-2001 three-stage	0.99 9	0.98 8	0.98 7	0.79 8	0.78 8
2002-2007 Multistage	0.98 1	0.99 3	0.97 4	0.87 1	0.84 9
2008-2010 Mesh	0.99 9	0.98 9	0.98 8	0.99 8	0.98 7

4.1 Comparison of China's telecom industry value chain integration efficiency

Chinese telecom industry value chain integration can be understood as control the whole telecommunications industry as a core nodes enterprise - the interaction between the merger and reorganization of the telecom operators, the formation of effective competition in the different telecom business market, so that original broken ring, solitary ring of the telecommunications industry chain form a complete industrial chain, such as the formation of the fixed-line telecom services industry chain, telecom services industry chain of mobile networks and Internet telecommunications industry chain, end-user demand of the telecommunications technology advances prompted the different industry chain competition and consolidation[12].

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As the constant integration and improvement of industry chain, China's telecom industry can obtain a wide range of value:

(1) Industrial chain integration is conducive to the efficient allocation of resources, through the integration of industrial chain, the telecommunications market compete effectively in the formation of a complete telecom enterprises operating in different business, resulting in improved efficiency in the use of telecommunications resources and eliminate the original waste of telecom resources caused by asymmetric competition in oligopolistic operating companies as well as weak competition between telecom companies and disorderly competition in the telecommunications market. As can be seen from Table 3, the allocative efficiency of China's telecom industry from the three-stage - Multi-Purpose - mesh style gradually appear an upward trend, enhance the 0.082 and 0.127 in turn, accumulated 0.209.

(2) The integration of industrial chain telecom enterprises gain higher value in return. With the increasing competition of the process of market-oriented operating companies and the continuous deepening of the telecommunications industry, the profit of a single link in the decline, such as traditional voice business rates continue to drop. After the integration of the telecom industry chain , through the development of new value-added telecom services and market, such as the launching of the new forces and their related services for the students user groups M-Zone brand business, the telecommunications industry obtain higher profits from the overall operation returns. Compare Mesh with multi-stage, cost efficiency improved 0.138; make a comparison between multi-stage and three-stage, cost efficiency improved 0.061.

4.2 The competing and synergistic efficiency of the China's telecom industry value chain

The different enterprise value orientations has led to competition between the upstream and downstream enterprises in the telecom industry value chain, and the pursuit of common interests makes mutual cooperation, namely the coexistence of competition and cooperation, and mutual penetration[13]. As competitive and cooperative relations between the telecom companies and the SP (Service Provider), competition and cooperation between IPHONE (phone terminal provider), telecom operators and ASP (application service provider), competition and cooperation. The existence of the telecom industry value chain is based on the division of labor and collaboration of intra-industry, a specialized division of labor can improve technical efficiency, expanding value-added flow; while collaboration makes the value of the value-added aspects of the industry value chain can be able to be a "link" [14]. Diversification and personalization of consumer demand, gradually produced a large number of specialization independent enterprises in the telecom industry value chain. These enterprises formed a close collaboration with strategic alliances and has a strong synergistic effect. Enterprises of the telecom industry value chain through synergies in production, sales, management and other aspects of development not only reduces the types of costs, but also improves the efficiency of technology and its impact on the efficiency of the allocation of resources, thus enhance the high efficiency of the entire industry value chain development and competitiveness. Seen from Table 3, the overall technical efficiency appears an upward trend. However, compare with multi-stage and three-stage, its technical efficiency declined 0.013. This may be a loss of efficiency due to the synergy of the various aspects of the value chain of the telecommunications industry; allocative efficiency is also showing a gradual upward trend. Technical efficiency and allocative efficiency working together makes the evolution of China's telecom industry value chain cost efficiency show a growing trend in mesh-stage which reached 0.987.

4.3 The value-added efficiency of China's telecom industry value chain

With continuous extension and expansion of the telecommunications industry value chain, while value added of products is improved, the entire industry is also value-added. For example, with the participation of the value subject of the government, banks, medical institutions, schools, shopping, tourism and catering, the increasing of existing telecommunications "three-step", "multi-stage" industrial chain link produces cross-industry joint service business, cross-industry alliances in the telecommunications industry chain, and break single chain extension mode of he original telecom industry chain, which is a new "mesh" of telecom industry chain. Businesses of all sizes gathers to form agglomeration effects, and achieve the cost-intensive and economies of scale. Due to path dependence and technological spillover effects, it has formed industrial clustering effect by the further expansion. At the same time, the continuous extension of the telecom industry chain promotes integration, development and optimization of telecom services and gave birth to a lot of new

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business derived from the integration of mobile communication technology and Internet technology, such as mobile Internet services, traditional voice services and IP technology combined with optimization of the IP phone business. The introduction of these new businesses improves the communication network resources utilization efficiency. Seeing efficiency measurement data, compare mesh with multi-stage, technical efficiency rises from 0.974 to 0.988 and improves 0.014; scale efficiency upgrades from 0.981 to 0.999 and enhance 0.018; pure technical efficiency changes from 0.993 to 0.989 and improves 0.004. Enhancing effect of efficiency and value is more obvious. Make comparison between multi-stage and three-stage, technical efficiency declines 0.014, which is mainly caused by the decline in scale efficiency, and most years of China's telecom industry are in the stage of decreasing returns to scale, showing excessive investment of resources and does not bring economies of scale.

5. CONCLUSION

On the basis of divided stage value chain of the evolution of China's telecom industry , this article evaluates the efficiency of the evolution of the telecommunications industry value chain integration, the competing and collaboration efficiency and value-added efficiency. The results show efficiency of the evolution of the telecommunications industry value chain significantly improves, deriving from the deepening of market reforms, absolute domination of power of telecom operators in the entire telecom industry chain gradually lost, and a steady increase of competitive entities and links by the telecom deregulation and technological progress in the value chain of the telecommunications industry. This change makes telecommunications factors of production gradually allocated by telecom operators to rely on changes in market allocation, which greatly improves the efficiency of the telecommunications industry as a whole. With the changes in market demand and the deepening of the telecommunications industry, on behalf of the 2G voice and low-speed data business momentum in the market value creation is gradually lost. The development of 3G services which provide information services and information products will become the focus of the market. The escalating of 3G will lead to a new round of substantive changes of telecom industry value chain system, namely modular mesh evolving. In a modular of value chain system, communication terminal equipment by sending and accepting life, entertainment, work and other multi-media services, and by increasing the added value of the sub-module system, and the industry value chain is extended. At the same time, network equipment providers, application providers, content providers and related entities through modular development not only seize new business and add new value but also create and enhance the total value of the industry value chain. And also impact core position of telecom operators in the value chain system which makes value from centralized to decentralized and promptes the operators from the basic network operators transition to integrated services provider.

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