

The Study of Symbiosis Question of Clusters Enterprise Value Chain in the “Post crisis era”

----- A Perspective Based on value network and Grid

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Abstract: Along with constant evolution of the world economy, the global economic crisis which was following the United States subprime loans crisis has entered “post crisis era”. However, it is still not resolved that this crisis has been highlighted the problem of abnormal inner structure of clusters enterprise value chain in our country, and some developmental obstacles coexist in the cluster enterprises. This article will address the realities of the “post crisis era” with value network and Grid as starting points and put forward a symbiotic path of cluster enterprises value chain, and then provide a theoretical basis for the decision about the symbiosis.

Keywords: “post crisis period”; cluster enterprise value chain; symbiosis

I. Introduction

As the world economy continues to evolve, the global economic crisis which was following the United States substandard crisis has entered a relatively stable, detente and co-existence of the unknown turbulent “post crisis era”. Recalling the history of the development of the industrial revolution, it can be seen that every time the economic crisis will bring about the industrial structure of the major reshuffle, a major adjustment, and eliminate a number of backward industries and enterprises and give birth to a number of new industries and enterprises, and induce a major transformation of industrial development patterns. According to the report that our research group has recently made for clusters of small and medium enterprises in Hengyang, Hunan, affected by the economic crisis, it shows that in the 158 enterprises surveyed: the closure account for 30.5%, adjusting the structural transformation is 60.8%, more than 90% are impacted by the last crisis. Since the economic crisis has led to the closure of many small and medium enterprises, then the original cluster value chain will be impacted by the closure of small and medium enterprises and may trigger the disruption of cluster enterprise value chain. So in this general pattern, the study on how to achieve the recovery of the enterprise cluster value chain and symbiotic evolution in disruption is of great practical significance. This paper will address the reality of “post crisis era” from the perspective of the grid to study the problems of symbiotic cluster value chain.

II. Literature Review

In other countries, the earliest description of the phenomenon of enterprise clusters comes from Adam • Smith^[1], who studies the issue of enterprise clusters from the perspective of the division of labor. By the nineteenth century, Alfred • Weber^[2], the founder of the industrial location theory, illustrates the phenomenon of enterprise clusters from the perspective of industrial location theory. By the twentieth century, the theory was represented by Michael • Porter^[3] who studies the issue of enterprise clusters from the perspective of competitive advantage. By the twenty-first century, the theoretical study about cluster enterprises became more active. American scholars, as Chalmers, Michael T Pich, Roger Baytiss, Sai-on Cheung^[4] and so on, all conducted a study on enterprise clusters and establish the model of cluster efficiency and the model GCC (Global Commodities Chain) of global cluster enterprise value chain.

In China, researches on the issue of enterprise clustering began in the end of the twentieth century and mainly focused on the formation of business clusters, function, and innovation and so on. For example, Qiu Baoxing^[5], Yang Yi^[6]. With the continuous development of China's enterprise clusters, people began to shift a large study to the upgrade research of industrial clusters, such as Zhang Jie, Liu Zhibiao^[7], who studied the local industry cluster of China's escalation from perspective of the system constraints and the global value chain embedded in. It was a stage of rapid advance of globalization. The combine of Economic Globalization and the revolution in information technology has brought many profound changes for the world economy, most notably is the formation of Global Production Value Chain. A common phenomenon of the economic development is that the object enterprise of developing countries participating in global trade market is not a single, isolated, but leans on the local industrial clusters value chain as a carrier^[8]. Therefore, local industrial clusters value chain should be one of the most important carriers and the engine of developing countries gaining export competitiveness and stimulating economic growth. However, the last economic crisis has highlighted the abnormal problems of internal structure in the value chain of China's existing industrial clusters^[9]: First, the low-end of the value chain; second, an internal deformity of

the industrial chain; third, the enterprises in discrete clusters. So, in order to solve this deep-seated structural and inherent distortions problems, we will involve many aspects, this article takes enterprise value network and the "third-generation Internet" technology --- grid technology as entry points to study the problem of "post crisis era" cluster enterprises value chain symbiotic.

Access to relevant literature can be seen, Adrian Slywotzky firstly proposed the concept of value network, he thought enterprises should change their organizational design for the increasing individual demand of customers, responding to the impact of the Internet and the market highly competitive, and change the traditional supply chain into a value network. American scholar David Bovet (2001) put forward a digital supply chain business model from the digital supply chain perspective of the value system, IBM senior vice president of worldwide Linda • S • Sanford (2008) considered that, it is a business development trend from the value chain to value network.

With regard to the study of grid in abroad, the U.S. Professor I. Foster^[10] who works in Argonne National Laboratory, thinks that the fundamental purpose of the grid is to coordinate resource sharing and solve collaborative problem in a dynamic, multi-institutional virtual organizations. The fundamental characteristics of the grid are to share resources and eliminate the "islands of information and islands of resources." Mark Linesch thinks^[11] generalized grid can be seen as a platform that is an organization of business and management resources. The narrow grid refers to a variety of specific applications, such as cooperation in scientific research, market risk analysis, forecasting, design, simulation, business intelligence and transaction processing environments.

In China, Li Guojie, the director of the calculation in Chinese Academy of Sciences, thinks that the grid is actually the third major wave which follows the traditional Internet, Web and can be called third-generation Internet. Simply speaking, the traditional Internet achieves the connectivity of computer hardware and Web achieves the connectivity of pages, while the grid on the Internet is trying to achieve the full connectivity of all resources. Hou Wen and many others think^[12] the grid for the multi-regional, cross-enterprise distributed and heterogeneous resources to provide a resource sharing and collaborative management of the environment to allow tasks that users submit can be completed in a dynamic composition of e-commerce systems.

Literature can be seen from the above, the current value network research has made a lot of research results, these results for the enterprises in the new market and technological environment of the business model transformation provides a useful theoretical basis. The value chain in the Internet age has had a clear operational bottleneck; the value network is a new concept. The value network as cutting-edge ideas is becoming a leading nature concept. From the above description of the grid, we can see

that the important cause that our existing industry clusters exist the internal structure of deformity is the resources and information "islands" in the cluster enterprise value chain, while the Grid is just the "nemesis" of the "isolated island". Therefore, cluster enterprises value chain based on Grid technology can share resources among whole value chain and get rid of the crisis as soon as possible and move towards symbiotic and sustainable development. In specific coping strategies, we can build a service platform based on Grid to promote cluster enterprise value chain symbiosis.

III. Research method and paths

On the basis of literature collection and real investigation, through establishing one value chain transformation model based on the value network, the traditional value chain operation pattern are transformed into the value network operation pattern, then constructing a resources sharing model of cluster enterprise value network based on grid technology, so the symbiosis question of cluster enterprise value chain has a good operational ways of solution.

IV. Countermeasure analysis

Firstly, transforming the traditional value chain operation pattern into the value network operation pattern for enterprise value chain clusters symbiosis.

Faced with the new operating environment, the traditional value chain model has the limitations of the following aspects: (1) The environment of market ,which is complexity of turbulence and non-controllable, has led to such results that any forecast tools and methods were unable to accurately predict product market and the real supply and demand in real markets, the traditional value chain model can not achieve a real match between product supply and demand, the individual needs of customers can not be met; (2) The popularization and application of e-commerce not only impacts the sale model of product markets and factor markets but also impacts the customer's shopping patterns. Moreover, it affect the customer's shopping behavior, leading to the marketing models under the traditional value chain model no longer applicable; (3) The operating model of value chain only provide products and services to all customers through a single production and distribution processes. In this case, the customer's unique value proposition is difficult to be met. At the same time, the core capacity of enterprises can not be complementary because internal and external resources and capabilities in enterprises failed to be effectively coordinated, enabling enterprises not being able to respond quickly to market demand. Taking into account the enterprise's competitors, but not considering complementors who play an increasingly important role in the enterprise's value creation, traditional analysis of value chain has great limitations; (4) The operating model of value chain has obvious "bullwhip effect". On the one hand, this "bullwhip

effect” will make the deviation of the value chain of information flow, logistics and cash flow along the chain to enlarge, leading to decision-making “distortion”. On the other hand, the “bullwhip effect” makes the total of the entire chain have a huge inventory costs. A linear relationship among enterprises makes any unforeseen factors induce the point “broken links” of value chain, and may be causing paralysis of the entire chain, and posing great threats to the system's operation. Meanwhile, to the value chain model, rigid supply structures can not achieve elasticity of output and flexible production. Especially when demand is solution or individual customization, it is more powerless for the model of value chain.

Through the above analysis, we can see that the operational model of value chain has limitations in the new enterprise environment, while the emergence of the operational model of value network, which is more competitive than the traditional value chain, can improve this limitation. The following three aspects are specific performance in the value network:

- (1) Customers take the initiative to trigger the value network, allowing companies to get the real demand information. Instead of the traditional way that the enterprises trigger the value chain, the demand for customer directly trigger orders, production and distribution in the value net, thus changing the trading status that customers are passive to accept the output of value chain. When the customer's “God” status has been affirmed and customer's demand information has been confirmed, the network is just able to combine front-end which is to understand the customer's needs with the back-end which is to implement in the light of what the front-end commits. allowing the production to be based on the real demand for customer rather than subjective self-speculation of enterprise. So, the risk of market is reduced, and the satisfaction of customer is increased.
- (2) The overall value network adopts the real-time collaboration, allowing rapid response to customer needs. In value networks on creating value, enterprises must be with customers, partners and even competitors to work together. According to different customers, different activities and the most appropriate partners assigned, enterprises and various departments take advantage of the collaborative commerce system to carry on communication and coordination and make use of the design for flexible business flow, logistics and information flow to ensure the value network quickly respond to the change of the demand for customer, making the overall value of net generate the greatest customer benefits. At the same time, the overall value network of real-time collaboration can also reduce the enterprise's inventory levels and the negative impact of “bullwhip effect”.
- (3) Digital transmission, allowing inter-enterprise resources to be quickly constituted and adjusted.

Unlike the traditional value chain most of which is analog transmission, the value network is a digital transmission. The value network can not only enable customers, enterprises and other partners coordinate their resources in

time but also significantly shorten the operating cycles which is from the customer orders to the enterprise delivery to increase the rate of enterprise cash flow.

In short, the enterprise value network has six kinds of basic competitive edge effects, inclusive network economy, economies of scale, and the risk of confrontation, viscous effects, complementarily effects and speed of the effects. Therefore, in the network trading environment, enterprises should transform traditional enterprise value chain business models from a strategic height.

Transforming the value chain into the value network, enterprises generally have three purposes: first, to enhance the capacity of enterprise to quickly respond to market; second, to enhance the capacity that enterprises quickly provide personalized products and increase customer value and customer satisfaction; third, to enhance the network operating environment of which enterprises adapt corporate transactions and enhance their core competitiveness capabilities. In the trading environment of network, the three purposes can be achieved by establishing the conceptual model transformed by enterprise value-chain. The specific content was shown in figure 1.

From the above conceptual model diagram can be seen that when enterprise value chain is transformed into enterprise value-chain network, it will mainly include the three core sub-network systems, namely, customer resource network, the internal operation of networks and cooperation between enterprises in the supply network. The three sub-network systems constitute the core content that the enterprise based value network transform the value chain.

The value system transformed, which is based on this conceptual model, separate from the traditional value chain. The following is main features:

- (1) It can reflect the real needs of customers through the customer resource network so that the two problems can be improved here. In the traditional value chain model, the two problems are that the products are difficult to resolve supply and demand matching and the individual needs for customers are unable to be met;
- (2) Using real-time collaboration through the internal operation of networks to carry on internal operations of enterprises, enterprises can quickly transform the customer needs into the actual supply;
- (3) By means of inter-enterprise collaborative supply network to go on digital transmission, it makes inter-enterprise resources be combined with the rapid adjustment of the value chain so that it transforms the value of one-way network into value network concurrent engineering. In this way, the response time of the needs of business-to-customer has been relatively improved, and the use of resources is also more fully in enterprises.

The secondly, constructing a resources sharing model of cluster enterprise value network based on grid technology for enterprise value chain clusters symbiosis.

OGSA-DAI (Open Grid Service Architecture-Data Access Integration) provide a unified interface for the adoption of grid data access and integration. Information sharing in

cluster enterprise value chain includes three parts: a shared resource base value chain, value chain alliance center platform on behalf of bundled services, and sharing and private resources of various enterprises.

The sharing information database of value chain deposits on the cluster platform for enterprise resource center to collect and manage the basic information of enterprises of the value chain, summary of information of enterprise (the name of enterprise, profile, contacts, the product of enterprise ,credit, etc.). Otherwise, it also provides enterprises with the industry dynamic information, personnel information, market demand and so on. This information is completely open for the member of the League of enterprises registered .If enterprises want to get this information; they only need to access the value chain alliance center platform. Grid-based grid service builds a shared resource system and contributes to the symbiotic evolution of enterprise value-chain clusters from the following aspects:

The first, through resource bundles and packaging, to achieve the automatic integration of resources of “isolated island” in cluster available, to broaden the scope of enterprise clusters, and promote the symbiotic evolution of enterprise value-chain clusters.

The second, by constructing a market credit evaluation mechanism of recommendation based on trust and recommendation evidence taking advantage of the theory of DS to achieve a fair deal of cluster Enterprise Grid Resource to promote the symbiotic evolution of enterprise value-chain clusters symbiosis.

The third, by constructing a grid of the GSI system to ensure the security of grid resource of the enterprises in cluster to promote the symbiotic evolution of the enterprises in cluster.

V. Conclusion

Recalling the history of economic crisis can be seen that every time the economic crisis will bring about the industrial structure of the major reshuffle, major adjustment and will eliminate a number of backward industries and enterprises and give birth to a number of new industries and enterprises. This crisis has highlighted that the deformity problems in the inner structure of China's current enterprise value chain. To enterprises, we must seize the opportunity of the “post-crisis era” of industrial structure adjustment. Faced with the new operating environment, the traditional value chain model has had a clear operational bottleneck, the value network is a new concept. The value network as cutting-edge ideas is becoming a leading nature concept. All enterprises should transform traditional value chain operation pattern into the value network operation pattern for enterprise value chain clusters symbiosis. With third-generation Internet technologies ---- Grid as a starting

point, we fully linked the enterprises in cluster resources “isolated island” to achieve a comprehensive cluster sharing of heterogeneous resources in order to continuously improve the competitiveness of the enterprises in cluster, and finally go to a symbiotic growth path of development. However, symbiotic development of enterprise value chain clusters, involving many constraints. This article has addressed the realities of the “post crisis era” with value network and Grid as starting points and put forward a symbiotic path of cluster enterprises value chain, and then provide a theoretical basis for the decision about the symbiosis. Only in this way, the symbiotic development question of cluster enterprise value chains can be solved really.

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Background of Authors

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Figure Captions:

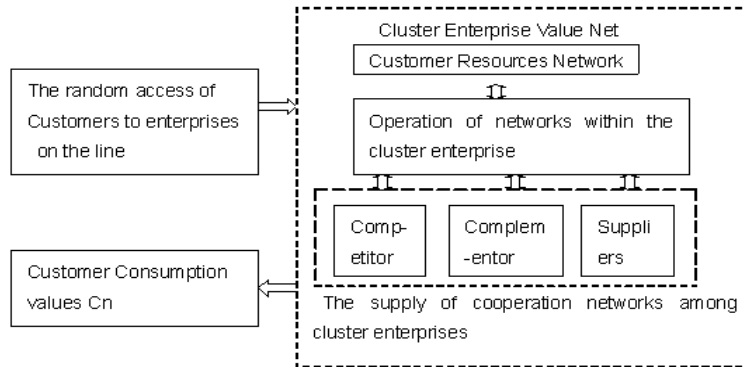


Figure 1 Conceptual model of transformation value chain into value network