

# Service Value Delivery System Based on Time-Based Competition

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**Abstract**—In this paper, the necessary conditions and the components of the operation of service value delivery system are analyzed; the every node enterprise to make clear that the function of each of them in service value creation and addition is discussed. The processes and model of market-driven value delivery system are discussed in this paper, and the processes content and model are presented, we firstly discuss the operational flowchart and classification of the service value delivery under the time-based competition environment. Secondly, we analyze the tactics of time-based competition in supply chain system and the marketing system, both of which compose the whole service value delivery system.

**Key Words**—Value delivery system, Time-based competition, Service value, supply chain

## I. INTRODUCTION

The essence of time-based competition (TBC) involves compressing time in every phase of the product development and delivery cycle, which becomes one of the most important strategies for enterprises nowadays. Enterprises take quick respond to the demands of customers and rapid introduction of new products as the main strategic target and possess competitive cost and service quality at the same time, so they have to reduce the process time of service (involved product) planning and developing, producing, selling and transporting. Under the environment, in which product life cycle becomes shorter and demand forecast is harder, TBC between enterprises is very necessary. Value delivery system (VDS) is one of the most important process, which includes the whole supply chain system and the marketing network of the service. The operational aim of VDS is to maximize the service value that delivery to customer and realize the profit of member company in system which obtained by participation in value creation. According to the different functions, a VDS can be divided into two portions: one is the supply chain system, the other is the marketing system, which will be discussed separately later. However, we must consider the influence on service or brand value both from the strategy selection in supply chain system and from the implement effect of marketing policy synthetically.

Research on VDS under TBC is to control the service stream, stock and cost to maximize the value that delivered from the system to customers, considering the influence of product lifecycle on the product demand and price simultaneity. It is because that demand and price of the product are always the main factors to weigh whether a product possess advantages in competition or not. And under the TBC, these factors are also sensitive to time, each of which change dramatically in different process of product's lifecycle. So, in this paper, we will forecast the product's demand and price at some periods by using some forecasting model in marketing and the results will be involved to compute how the service value is in the VDS, which is the criterion to consider the advantage that the company, or even the VDS achieved under TBC environment. With the global economy development, a remarkable phenomenon shows that the VDS create value for customers by supplying needed products and services. VDSs and their abilities are at the heart of every firm and, more than anything else, determine whether the firm survives in the marketplace or disappear into bankruptcy or reengineered. VDSs may cover many forms as illustrated by these two cases (Meredith and Shafer, 1999) as follows: (1) Facing increased competition and customers who are smarter, more demanding, and less brand-loyal. Furthermore, not toasting buns should translate into substantial cost savings due to reduced preparation time and the elimination of commercial toasting equipment (Gibson, 1995). (2) The integration of the system and the distribution system meant that customers would rarely encounter out-of-stock items. Further, the use of scanners at the checkout stations eliminated the need for price checks. By Kmart's own admission, its employees were seriously lacking the skills needed to plan and control inventory effectively (Duff & Ortega, 1995). These brief examples highlight the diversity and importance of VDSs. Great many societal changes inevitably involve VDSs. There is great pressure among competing nations to increase global productivity. Businesses are on a national crusade to improve quality and speed of their offerings in both products and services. As we will see, increasing productivity of the firm and value-added to customers are primary objectives of service VDSs. Technological change is an important consideration. Technologies such as e-mail, laptops, personal digital assistants, e-commerce, are profoundly affecting business and are fundamentally changing the nature of today's work.

Since the early nineteen 70s, many literatures represented how to shorten manufacturing process time in supply chain operation, such as Vinson, C.E (1972) discussed costs of ignored lead time uncertainties in inventory phase. G. Jr, published a milestone article named ad “Time-the next source of competitive advantage” in 1988, he first put forward the word of “time-based competition”, not only analyzed the evolving process of competitive pattern, also discussed the importance of time by way of competitive advantage’s core resource and described the essence of those such as time-based manufacture, time-based sale, time-based distribution, time-based innovation and strategy etc. Stalk, G. Jr and Hout, T.M., (1990) expatiated TBC in-depth, analyzed its relationships among business, financing, customer and innovation. Certainly, TBC has an important strategic significance, it can reach the following objective: adding the enterprise productivity; increasing product price elasticity; lowering the enterprise risk; enlarging the market possession. Gattorna John ( 2003 ) based on financing explained compressed time strategy result in value, with eye on the customer service, customer response, balance in supply and demand, inventory. In China, research on TBC emphasized TBC strategy combining with supply chain. From operational viewpoint, Yanhui Li and Shihua Ma (2005) designed a distribution system to minimize the total responding time other than the delivery cost in the TBC environment and the multi-objective non-linear programming model for TBC distribution system was constructed with certain assumptions as premises. Shihua Ma and Ling Shen (2005) Based on analysis of the insufficient plan pattern which is widely used, a new plan pattern, predict-order pattern in supply chain was proposed for TBC. Predict-order pattern aimed to shorten multi-stage response time, and made node enterprises in supply chain link up business information and made plans in advance. Xiao Zhou *et al.* (2002) distributed the quick-responded logistics pattern should be improved lies in the logistics of manufactures and their downstream enterprises. Thus it can be seen, most of literatures studied TBC is based on supply chain management, and that A.Lockamy III (1993) analyzed the lead time management based on product delivery system, set up a conceptive model to manage how to reducing lead time for manufacturer VDS. We can know this article is early to refer delivery system based on TBC.

In this paper, the necessary conditions and the components of the operation of service VDS are analyzed; the every node enterprises in a VDS to make clear that the function of each of them in service value creation and addition is discussed. We firstly discuss the operational frame and classification of a VDS in TBC. Finally, we analyze some factors that must be controlled in a VDS.

## II. MISSING ELEMENTS AND PROCESS MODEL IN THE SERVICE VDS

The term *operation* is often applied loosely in business, and can mean anything from a firm’s facility, to a service VDS, to a process, to an activity, to a formal functional organization of people. Recall that a VDS’s definition, clearly, some of these processes are officially part of the operations functions, but there are likely other processes in a VDS that fall under other functional areas within the organization and within other organizations in the supply chain, e.g., we may view a examples within GM include: Marketing processes that introduce to customers the new season’s Cadillac configuration; Design processes responsible for engineering detailed features for that configuration; Assembly and test processes within operations; Sales processes responsible for finished good distribution, demand forecasting and promotions. Unfortunately, most firms manage processes departmentally, without recognition and concern for the entire VDS. James Harrington (1991) explained the history and reasons for broken processes so prevalent in businesses today. A service VDS and its associated processes were first developed out of a need to provide a family of products or services. In most companies, these needs arose when the business was young and growing. They were developed quickly to meet an immediate need to marshal a small internal population to serve a small customer target base.

As business grew, disparate new products and services were added, but most likely provided by the same processes. Responsibility for these processes was divided among many departments, and additional checks and balances were instituted as small empires grew. Little pools of bureaucracy began to develop. Two, three, or even four replaced one signature. Bureaucracy became the rule rather than the exception. Patches were put on top of patches. No one really understood what was going on, so no one could audit business processes within VDSs to ensure that they were operating correctly. Along the way, the focus on the external customer was lost. The firm became more inwardly focused, and people did not really understand the impact of their activities on external customers. Consequently, many business processes became ineffective, out of date, overly complicated, burdened with bureaucracy, labor intensive, time consuming, and irritating to management and employees alike. While most firms accepted these processes as a necessary evil, they have turned out to be millstones around the organization’s neck that increasingly hamper its ability to compete.

It is no wonder that in practice, important decisions made by a firm bear little or no relationship to their stated or official business strategy-even if the firm regularly conducts what it considers a rigorous strategic planning exercise. One important reason is that firms tend to seek strategies that are uniform in nature. This offers apparent clarity in the form of consistent strategic statements that are easy to express, explain, and address. A desired level of uniformity has inherent attractions no matter what the company’s scale. It is not surprising then that typical expressions of corporate strategy include such general terms as low cost, differentiation, balanced scorecard, and critical success

factors. The use of general terms such as these blur rather than focus the firm on differences in markets that are increasingly characterized by difference, not similarity, and it brings conflicting demands on the operations function.

Unless strategy statements translate into actions and result in incremental or radical improvement in the VDSs, they are of little value. Markets are characterized by increasing difference. Companies replace annually some 10 percent of existing sales revenue with “better” margin business (Terry Hill, 2000). The key to understanding markets, therefore, lies in being able to identify and integrate this new business into existing or new VDSs. Because the needs of the market segments differ, decision priorities likely differ by market segment and VDS. Firms must stop thinking functionally, and start thinking about markets served, and the VDSs and associated processes that need improvement. World-class firms continuously strive to provide superior products and services to their target customers.

Business process improvement embodies the following principles: Linking improvement efforts to the needs of target customers, ensuring constancy of purpose; Working on a manageable number of projects, emphasizing improvements to critical processes within value streams with the greatest potential for improvement and profit; Using facts, not speculation, based largely on data collected or logically inferred from customers and other stakeholders for selection and direction of improvement projects; Pro-actively considering creation and improvement, as well as correction.

Business process improvement efforts may well involve and impact people within every functional department in the VDS. A business process improvement initiative should be directed to a specific target market, its VDS and critical processes. It involves three basic steps:

*(A) Determine the process intent*

*Process intent* is a clear statement of what the VDS is intended to do—create value of customers, of course, but specifically who is the customer, what type of value is needed, and by how much additional value (Swartz, 1994). Unmet needs continually arise between what customers require and what the firm currently delivers, and these needs may be expressed in general terms, e.g., missing or inferior aspects of the bundle of products/services that comprise the offering, a price too high relative to perceived value in the marketplace, or some shortcoming concerning response time in delivering the offering. If the firm expects loyalty from its customers, these needs must somehow be satisfied by the firm’s VDS and associated business processes. Thus, to improve the VDS, it is essential to first understand exactly who the customers are (target market profiles) and what they need.

*(B) Develop the process model*

A *process model* is a detailed statement of how work should be divided in the VDS to satisfy the process intent (the process model would be best labeled the “*VDS model*”). Unmet customer needs can be satisfied through development or improvement of one or more processes within the VDS. Critical processes in the VDS must be identified and

understood. If critical processes already exist they should be dissected to uncover opportunities for improvement. With this analysis, a process model which best conforms to the process intent may then be constructed.

*(C) Establish the learning and improvement system*

The abovementioned covers how to establish *continual learning and improvement* within the “process model”. Learning and improvement involves three sides: Organization and management of change; Feedback and control; Standardization. Furthermore, business process improvement on one aspect of the business may have been unsuccessful, yet the firm may have gained if the lessons can be shared elsewhere.

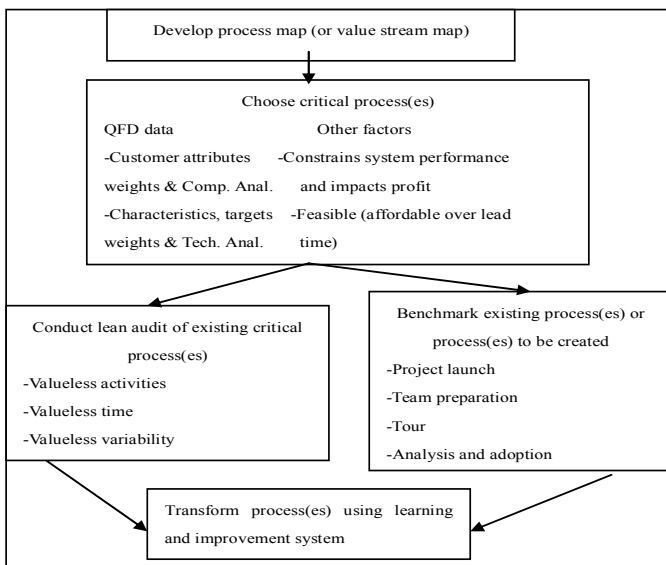
*Process intent* (is commonly known in marketing circles as a value proposition) is a clear statement of what the service VDS is intended to do, a strategic direction for the firm’s management and employees as well as position statement for target customers on the role of the VDS. Many companies mistakenly assume that particular products or services compete in the same way in different markets, thus, failing to recognize how business is won. That is, the *external process intent* must be translated into the *internal process intent*. Internal process intent relies on performance characteristics, design specifications and performance measures, and performance targets to describe the unmet needs in terms the company can measure. A process model is a detailed statement of how work should be divided to satisfy the process intent. Figure 1 represents a logical set of steps in developing a process model. The first is to construct a process map that identifies major processes within the VDS. Second, critical processes are identified whose creation or improvement would enable us to satisfy the process intent. Processes should be dissected and analyzed to uncover opportunities for improvement. In addition to a statement of the process model, it is also important to establish within the process model a set of actionable, prioritized recommendations as to how to achieve the process intent in a profitable manner and stay there.

### III. THE SERVICE VDS AND TBC

The service VDS based on TBC has quite sensitive to time. Mostly, the meaning represents as follows: The market demand change along with product’s life cycle, such demand change can be described by the product’s life cycle curve; With the market demand change, product’s price will fluctuate in time progress, which will directly influence the revenue of service VDS and members in the system; The marketing strategy can alter product demand, usually add product value and improve product delivery efficiency.

In market economy, a service VDS is enclosed customer, is based on supply chain and marketing system. Namely, it is a complex system that responding market demand rapidly, its objective is to create maximal value for customers and node enterprises of the system. When product is sensitive to time, whether it is functional product or innovative product, often

needs utilize the TBC strategy in a VDS. When the functional product is sensitive to time, its market demand and price are all influenced by itself lifecycle and seasonal demand markedly, e.g., milk. To furthest achieve the product value, meet market demand, the service VDS must adopt TBC strategy, as soon as possible shorten lead time and process time of all nodes to guarantee product delivered to customer in the determinate time window and in optimal status. Innovative product usually is sensitive to time, the reason includes: At the initial period of product introducing, the firstcomer can become monopoly absolutely, results in node enterprises in a VDS can gain the excess profit.



**Fig.1 Development of process model**

When the service VDS is based on TBC, then all members of the system should recognize TBC as the accordant value proposition, i.e., strategy of nodes is regarded as their active rule must be based on TBC. Otherwise, time competitive advantage created by the upper stream enterprises, can be weakened by other nodes, which counteract even delay the product value realization time, then result in aftereffect would be not only wasteful, but also lose the market opportunity due to missing competitive advantage. Therefore, setup the accordant value proposition actually means that the strategic disposer and layout in members of supply chain come down in one continuous line. This can reach from the following: Essence of TBC is rapid response to customer's demand; All members in the system must have enough production capacity; TBC needs integrate the enterprise's abilities.

#### IV. OPERATIONAL FLOWCHART OF SERVICE VDS BASED ON TBC

Generally, the dominance built based on TBC can actualize as follows: Time competitive strategy is driven by customer demand, i.e., according to customer demand fluctuation, enterprise rapidly adjusts its actions such as design, production, sale, etc., to meet customer demand at best times and largest released value; Time competitive strategy oriented in technological innovation, i.e., enterprise via the rapid innovation mechanism, deduces new product introducing

time, takes possession of market at best times and maximal output, such pattern behaves obviously in updating speed industries such as IT; Time competitive strategy oriented in marketing. Therefore, different node enterprises in service VDS undertake the different tasks based on TBC, and they need to implement the different strategies. Commonly, considering the operational characteristics of nodes, the VDS based on TBC is divided into 4 modules, i.e., time-based design, time-based manufacturing, time-based sale, time-based service.

Time-based design indicates via reduced product design period, improved the transform speed from concept to real product, based on technological innovation, to reach product competitive advantage, which can be realized from the following: In the different phases of new product development process, enterprise needs control and reduce the interstitial time among processes, as the possible as shortens time, such as time covered in redeployment, combination and process of the setup team, etc; The different types of product development organization will effect on time reduced, for example, some of organizations invite other members to participate in the R&D projects, such as supplier, the relative technological personnel in production department, seller in final market so many as retailer, improve the knowledge sharing between the design department and others; Enterprise must makes use of the computer auxiliary technology. Product design process would result in value creating process, but its contribution to value creation occasionally limits in conception, yet no scale value realization or value-added. Time-based manufacturing mostly utilizes the competitive strategy based on customer demand. According to the different product types, the detailed operational measures are incomplete similarity. For instance, the functional product always use JIT production pattern, the innovative product is suitable the rapid responsive operational pattern, and that the virtual operation provides more flexibility and more agility for the service VDS. Time-based sale indicates decrease product no value-added time in circulation to the best to enterprise's abilities, such as stock time, distribution time, etc., the same as time-based service, enterprise must follow out the time competitive strategy based on sale. If product can not deliver to customer in time, or does not sold and become finished goods stock, then JIT production will lose its significance. Time-based sale objective not only leads up market, enterprise becomes a leader in market, but also increases turnover speed, then deduces the period involving in product transforming profit to create more value. Herein, enterprise needs reengineer channel, makes the sale channel is so flat that enterprise and consumer are easy communication directly, and improves factor control and radicalization to the distribution channel. Nowadays, along with computer network and information technology development rapidly, market has already entered E-business times, online transaction is on popularization, in this way will result in both sides sale information transfer promptly and reduce the process time of product sale at greatest degree. Time-based service means that response to customer service

demand rapidly, i.e., supports knowledge transfer and technology be used in the fore-and-aft product sale widely. Enterprise responds to customer service in the customer's forbearing time, can maximize customer value, then can keep customer loyalty and realize the product brand value. Time-based logistics mainly means that decreasing the needless waiting time and process time among nodes. In the service VDS based on TBC, enterprise should introduce the new operational pattern such as third party logistics, fourth party logistics, to improve the linkage effect among enterprises and increase product competitive advantage. In addition, to some products, enterprise in order to win the time advantage, can introduce the merge-in-transit strategy or postpone logistics strategy to change process from the tradition non value-added process to value-added process.

In fact, build inventory in anticipation of demand makes life so much easier for manufacturers, despite all the troubles that inventory management gives them. It is a luxury that many service enterprises envy. Management of a service enterprise often has to guess what demand will be and then establish its capacity, within fairly narrow limits, to meet that demand. If demand falls below projections, the enterprise suffers the pain of having to pay an excessive investment in capacity (e.g., facilities, or equipment). If demand exceeds the projections, then the enterprise loses revenue and contribution to profit. It can be a tricky business. A restaurant for example, must have sufficient capacity upon first opening, or risk a loss of goodwill, a deathnell for new sites. Generally, there are two ways to resolve these problems: adjust supply or adjust demand. We will discuss the two ways in detail. Under TBC, a chief consideration for the management of supply chain within a service VDS is to make sure there is enough capacity at the peak to response to customer demand rapidly. It is mandatory to prepare well for the peak, whenever it occurs. The supply of capacity in services may be adjusted in three general ways: shifting resources, changing resources levels, and changing the structure of the system.

*Shifting resources:* Shifting resources is most effective when there is a scheduling problem, not a capacity problem, i.e., there is sufficient capacity overall, but it does not match the seasonal demand pattern. One way to deal with a scheduling problem is to shift the schedule of existing resources to cover peak loads to meet customer demand quickly. To the extent that the demand for services can be forecast or managed, the staff-start times and breaks can be adjusted accordingly. Of course, staff schedules must conform to work rules of unions, company policy, day-care considerations, etc. Another way to deal with a scheduling problem is to schedule the most productive employee. For this reason, fast-food restaurants schedule their best crews for their peak hours each week and renew services schedule their best workers at bottleneck activities during their peaks to deliver their value rapidly.

*Changing resource levels:* When there is a capacity problem, to win TBC advantage, changing resource levels becomes a viable option. To increase capacity usually involves

adding resources (such as space, equipment, materials, or worker). In many services, the most controllable resource is worker. Worker may be acquired by hiring full-time or part-time workers, or by using overtime. Some services are constrained at peak times not by worker but by space or equipment. Here is where short-term rentals or borrowing can help. There are two ways to justify such excess: (1) Margins earned at the peak. Peak times may be so lucrative or the costs of setup excess capacity may be so cheap that it pays for the service to exist with excess capacity for the rest of the time. At it turns out, many service organizations are judged by customers on their ability to handle peak loads; (2) Countercyclical service. Some service facilities have multiple uses. The economic justifications behind these two scenarios are complicated. The duration of the peak, the prices that can be charged, the costs of maintaining the facility, the costs of operating it, and the off-peak demand and prices must all be considered.

*System restructuring:* Whatever the system capacity, it is important to use it to the fullest under TBC. There are several ways to restructure a VDS based on TBC: perform activities concurrently, combine activities, standardize service pathways, untangle work flows in the layout, create cells, perform triage, provide support, and educate customers. (a) Perform activities concurrently: Sometimes, improvements in the rapid response to customers can be made if different resources perform tasks concurrently. For example, a credit card check may be performed concurrently while customer-mailing information and the order are processed. Even in cases where the same amount of work needs to be done, performing activities in parallel can shorten the customer's flow time. (b) Combine activities. Opportunities to combine similar or sequential activities may also be encountered. By consolidating multiple activities into one and performing the activity by one set of resources, the system may benefit from shorter processing times and queue times. © Standardize service paths. Some customers, types of customers or customer orders may follow different paths through the same set of activities. The system can become much more orderly and efficient by rearranging some pathways so they all follow the same route, and increase TBC advantage. (d) Untangle work flows in the layout. Once the paths are standardized, we may discover opportunities to change the layout within the process so that customers or orders flow in the same direction through the resources. Logical and physical flowcharts often are effective in identifying tangled workflows. (e) Create cells. Here cells mean that a natural extension of linearizing pathways and untangling workflows. A cell includes a set of resources that is dedicated to similar customers, customer types or customer orders. Reductions in processing time and variability are possible because of increased homogeneity of work and added learning by workers. It is important to note, however, that resources dedicated within cells, are usually unavailable to "help out" on work across cells. (f) Triage. Triage mechanisms can serve to route customers, customer types or customer

orders to appropriate cells. (g) Provide support. Workers need proper support to perform their jobs. (h) Educate customers. Such mechanism that can effectively increase capacity and rapid responding time is to educate customers as to how to follow desired behavior. (i) Customer participation. Such mechanism that can increase capacity and responding time is to persuade customers to do things for themselves.

The key to demand management is to alter the behavior of customers, shifting the timing of demand, so that the peak is "shaved", and the off-peak times, with their excess capacities, are fed more. Sometimes, this can be done directly, and other times it has to be done indirectly.

*Direct management of demand:* The direct management of demand involves the following ways. (1) Deny service. It is often better not to accept business than to surprise customers with long waits. In the absence of input from the company, customers may decide to leave the system. (2) Reservations. For many services especially those with high intrinsic value for the customer, demand can be managed by introducing a reservation system. Reservations also act to regulate the arrival of demand and to decrease its variability. Certainly, reservation systems exist side-by-side with first come, first served non-reservation systems. This nearly always occurs with services that have enough excess capacity to accommodate walk-in business. Customers here also recognize that those who have planned ahead should be rewarded more than those acting on impulse, if capacity suddenly becomes constrained. (3) Yield management. Closely allied to reservation systems is yield management. Airlines have done much to perfect this technique. The objective of yield management is to maximize the revenue that a service can realistically expect. Yield management, of course, requires an absolutely accurate and timely control system so that sellers have the best, most current data about the status of demand and knowledge about which fare classes are still open and which are either full or closed. It is no wonder that yield management is essentially a product of the information age. (4) Triage. Triage affects demand as well as supply. In the military, triage usually refers to battlefield conditions where the severity of patient medical needs is assessed and priorities for treatment are decided. Therefore, some cases are taken on immediately, others wait, and still others are treated in a partial way.

*Indirect management of demand:* Indirect management of demand includes persuading customers who might ordinarily want service during peak times to shift their demand to nonpeak times when there is capacity or delay time to handle them. The indirect management of demand focuses on the pricing and service policies that companies can use as inducements to customers. The detailed analysis is as follows. (1) Pricing policies. Customers understand price. As long as demand curves slope downward, lowering price is an incentive for getting customers to buy more of what you have to offer, and raising price will choke off demand. Raising prices for peak times and lowering prices for nonpeak times can work wonders for smoothing demand on the service process. (2)

Promotions. Non-price service policies to shift demand are less straightforward, and often not as effective as pricing policies. They are frequently used in conjunction with pricing policies. (3) Alter customer expectations. Another non-price mechanism has to do with a service firm's ability to influence customer expectations about timing. In a word, the suitable patterns of demand management and supply chain management will result in many ways benefit in the service VDS based on TBC, such as the maximum profit, the rapid response to satisfying customers, more value-added, etc.

## V. CONCLUSIONS

Under the environment, in which product life cycle becomes shorter and demand forecast is harder, TBC between enterprises is very necessary. In this paper, the necessary conditions and the components of the operation of service VDS are analyzed; the every node in a VDS to make clear that the function of each of them in service value creation and addition is discussed. The operational frame and classification of service VDS in TBC is discussed. Secondly, we analyze the tactics of TBC in supply chain system and the marketing system, both of which compose the whole VDS. Thirdly, we analyze some factors that must be controlled in a VDS.

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