

Manufacturing Strategy Development in the Production Value Chain

Track: Operations Strategy

Abstract

Since Porter (1986) proposed the value chain, new competitive needs have led companies to develop new functional arrangements including manufacturing activities. Presently, manufacturing management comprises not only the production system itself but we may also include R&D, logistics, and services. This paper seeks to identify how two central aspects are related in a proposed production or operation value-chain: organizational knowledge and manufacturing strategy. We address this issue analyzing knowledge creation/integration in three case studies developed in industries with different environmental dynamism. The first results indicate different types of knowledge throughout the value chain: strategic knowledge, coordination-related knowledge and problem solving knowledge.

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1. Introduction

This article discusses the role of organizational knowledge in the production or operation value-chain (OVC). We follow a strategic approach to evaluate this relationship. One of the main objectives is to identify the types of knowledge which take place in the management in the OVC. We also analyze if competitiveness is a consequence of the integration of the OVC's parts or if competitiveness is caused by specific parts of the OVC. Firstly, we present the theoretical references. Secondly, the methodology. And, finally, we present three case studies and some initial conclusions.

2. Theoretical References

2.1 The Production Value Chain

Porter (1986) initially proposed the value chain, identifying primary and secondary activities. We adapted this proposal for the production area. The main differences were the inclusion of R&D as a primary activity and the exclusion of the marketing & sales activities.

An adapted version of the OVC is presented in Figure 1. R&D, logistic of supply chain, production, logistic of distribution and services are the primary activities in the OVC. In other words, they preferentially add value to the products. Organizational systems are related to human resources orientation, leadership and other issues related to the managers' profile. Management systems include all the managerial systems used in the OVC – TQM, JIT, strategic planning, ISO etc. Technologies consider all types of technology related to hardware or software in the OVC. This last group is named secondary activities. They are the support for the primary activities.

Finally, the competitive criteria chosen by the company will define the decision orientation in the OVC.

One of the main aspects related to the OVC is the creation of added value in products or services. Porter (1986) defended that the links among each part are able to create a competitive advantage. Similarly, Branderburger and Stuart (1996) argued that there is no asymmetry in the importance of suppliers, firms and buyers in the added value creation. On the other hand, Ghemawat (2000) argued that the most important aspect for competitiveness is not the links among the parts of the value chain. To him, the aspect which creates a competitive advantage is the development of competencies in specific parts of the OVC. Coca-Cola's distribution system is recognized as a strong source of competitive advantage compared to Coca's competitors. Also, existing services have been identified as one of the main focus for added value creation. While Porter and Branderburger and Stuart (1996) bring an idea of strategic alignment, Ghemawat (2000) follows a resource-based theory approach.

Dynamic capabilities are also related to added value creation throughout the value chain. Fine (1999) stressed out the importance of dynamism over the supply chain and competitiveness. Therefore, even if there is not a unanimity about competitiveness and the management of the OVC, we may consider that all strategic decisions in manufacturing are not restricted to the shop-floor but they are extended to R&D, supply-chain, logistic of distribution, services, or in other words, to the whole OVC.

2.2 Organizational Knowledge

- A three levels model

Organizational knowledge has been considered as one of the most important resources in the current competitive context. Different types of knowledge have been identified – technical and strategic types are some examples (Liebskind, 1996). We propose a hierarchical view of the organizational knowledge. See Figure 2.

The first level we called strategic knowledge. In this level, companies' managers discuss the business strategies and their development into each area, such as production, marketing & sales, finance etc. Considering the frameworks related to capability creation and sustain by Leonard (1994), at this moment companies look at their future and seek to create new capabilities or new products and services.

The second level, we called coordination-related knowledge. In this level, companies' managers seek the needed knowledge to integrate the different value chain activities. Porter (1986) considers that a better integration between the different activities leads to a competitive advantage. Therefore, the ability to create a perfect integration of the OVC's parts may be a key capability.

The third level, we named problem-solving knowledge. This level is concerned with the day-by-day activities. Like Nonaka's *Ba* framework (Nonaka and Konno, 1998), Roth et al. identified TQM, JIT and other management techniques as feasible possibilities to create and to disseminate organizational knowledge. To Leonard (1994), companies usually discuss the present and seek to strengthen their existing capabilities at this level in the management activities.

The three types of knowledge are interrelated, considering that they are integrated in two directions - top-down and bottom-up.

Hayes et al. (1988) argued that the strategy is deployed throughout the different hierarchical levels in the most competitive companies. In a similar way, we consider that the three kinds of knowledge are developed throughout the different hierarchical levels but with distinct emphasis. Strategic knowledge is preferentially concentrated on the directory level. Problem-solving knowledge is more concentrated on the first-level management. Finally, coordination-related knowledge may be considered a bridge between the two first types and it is more concentrated on the medium level management.

With these first theoretical references, we may list some preliminary questions. First of all, how are the knowledge levels at the OVC deployed and what kind of knowledge is sought? Secondly, how are the strategic criteria (such as cost, quality, flexibility, innovation and delivery) developed throughout the OVC? Finally, what is possible to identify in the case studies presented – is competitiveness a product of the integration among the steps of the OVC or is this a consequence mainly of specific parts of the OVC?

3. Case Studies

With the objective of answering the questions above, we present three case studies following an exploratory approach.

The first company is named Muri Assembly Lines and its product focus is on manufacturing automation especially for the automotive industry. It presented an expressive increment in its revenues during the last three years (more than 100%). Presently, it is seeking for strategic alliances in order to compete globally.

The second company is called Pigozzi and it is a manufacturer of components for agricultural machines and heavy transport equipment. Today, it is expanding its revenues. One important triumph is to become a global supplier for John Deere.

Condor Machines is the third company. It is a strong global competitor in pneumatic technology for transportation in ports. It bought a German company in order to have access to advanced technologies and it has established agreements with other companies located in countries such as the United States with the objective of expanding its activities.

3.1 OVC's Parts

All the companies identified the focus on specific markets as fundamental for their competitiveness. The integrated management of all parts of the OVC is a key aspect for Muri and Condor. Considering that both companies work with make-to-order production, flexibility and delivery are order winners criteria. Consequently, a capability related to the OVC's integration is fundamental. On the other hand, Pigozzi produces following mass production logic. To Pigozzi, the production system itself is one of the most important parts of the OVC in order to achieve the patterns needed in cost and quality.

The three companies consider that services are another key aspect in the OVC for competitiveness. In any choice - Brazilian or global markets, they believe that their companies need to provide a reliable service within 24-48 hours in any region of the world. Pigozzi and Condor achieve this pattern in their global sales while Muri provides any type of service in 24 hours in the Brazilian territory.

R&D is also another part of the OVC stressed by all the companies. Muri and Condor seek to develop commercial agreements in order to access new technologies. Examples include strategic alliances (Muri), acquisition (Condor) and eventual activities (Condor). Pigozzi

identifies that its R&D is able to develop suitable products to its clients even without strategic alliances.

The other primary activities were not pointed out as the most important for competitiveness. Just Pigozzi considers the importance of its own production system. Muri and Condor produce internally only what is necessary and sometimes they buy all the components externally. For them, the most important part of their OVC is the supply chain. From their suppliers, they will be able to provide reliable delivery and product quality.

3.2 The three types of knowledge in the OVC

The three-level model of organizational knowledge was clearly described by Muri's managers. In this company, the first level of the decision concerns the strategic focus of the company. They always ask themselves: Is this sale in our strategic target? Are we able to provide a reliable service in this region? These informal questions help them verify whether they really have the needed technical knowledge.

With a positive answer, the next step will be planning the coordination of the different parts of the OVC and of the people responsible for each step. Now, the coordination knowledge allows the company to establish the timetable and to program the integration of the parts of the OVC. Past experiences and works provide the necessary information for these activities.

The last type of knowledge takes place after the beginning of the coordination activities. The person responsible for each part of the OVC seeks to correct existing problems. Again, past experiences are the main input to solve existing problems in this level. This orientation is similar to the present context proposed by Leonard (1994).

Muri's managers described a mental strategic map of the company. Even considering that it is not formalized (or it exists just as tacit knowledge), all the managers follow it. This is a three-dimension map. See Figure 3. The first dimension is the product scope (assembly or test lines), the second is the market scope (automotive parts, domestic products or electronics) and the last dimension is the regional scope (today, just the most industrialized regions in Brazil).

Condor and Pigozzi also expressed some familiarity when the model was discussed with them. All the companies said that the activities related to knowledge coordination and knowledge solving-problem start only when the strategic decisions are finished. In other words, the strategic orientation is the primary subsidy for all the subsequent activities.

4. Conclusions

Based on the case studies presented, we may state:

- There is not a clear evidence that just the integration of the OVC's parts or just a specific capability created in a specific part of the OVC are enough to assure competitiveness. The examples suggest that integration could be a capability for companies with a make-to-order orientation. On the other hand, the company with a high volume of production seemed more inclined to identify its capabilities in some specific parts of the OVC. Therefore, a complementary view between integration and focused capabilities may be more indicated when we analyzed the OVC.
- The three-level model of knowledge may be an useful model to link company's strategic orientation to day-by-day activities including coordination and problem solving.

- Tacit knowledge may provide important inputs to the strategic management of the OVC, integrating the three types of knowledge proposed in this article.

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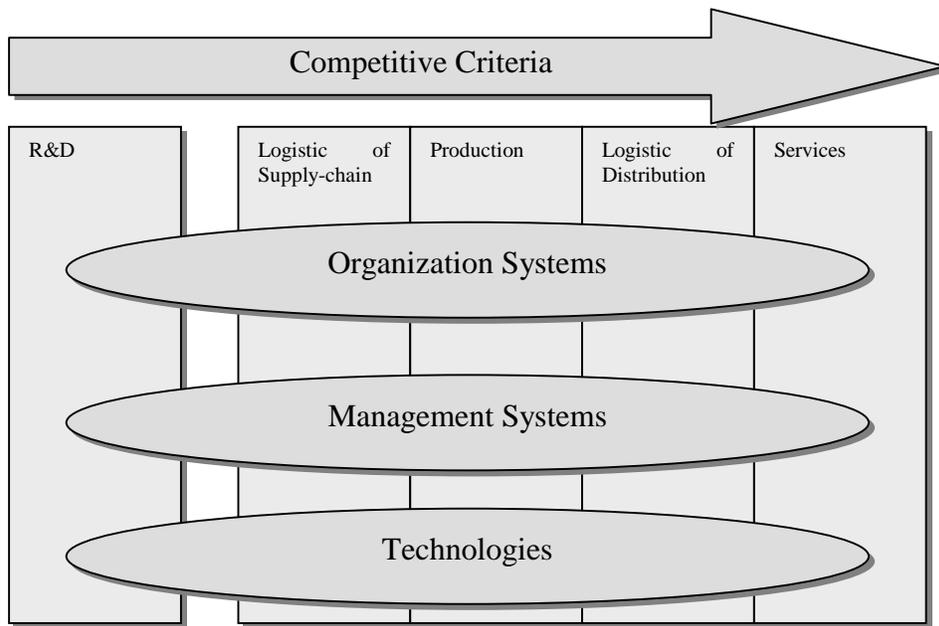


Figure 1 – Operations Value-Chain in a strategic view. (Adapted from Porter , 1986).

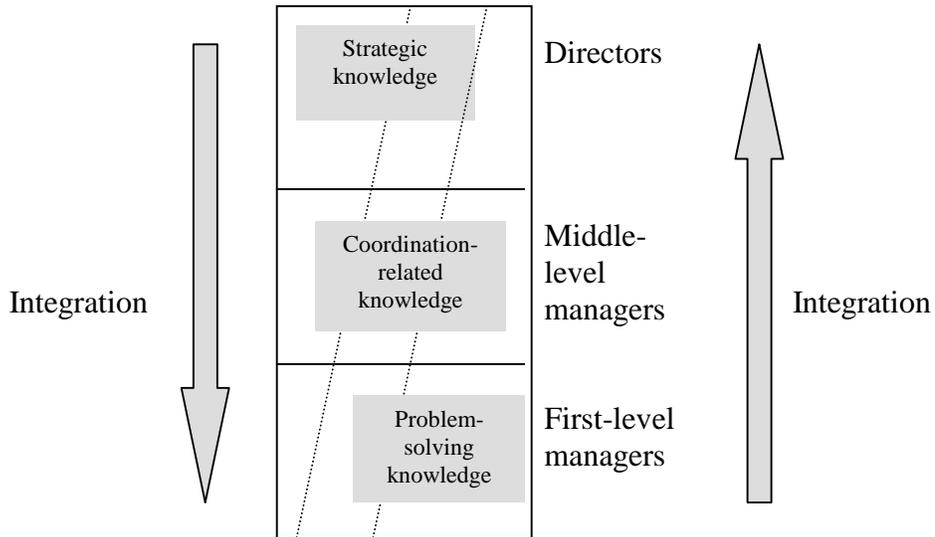


Figure 2 – The three-level model of organizational knowledge.

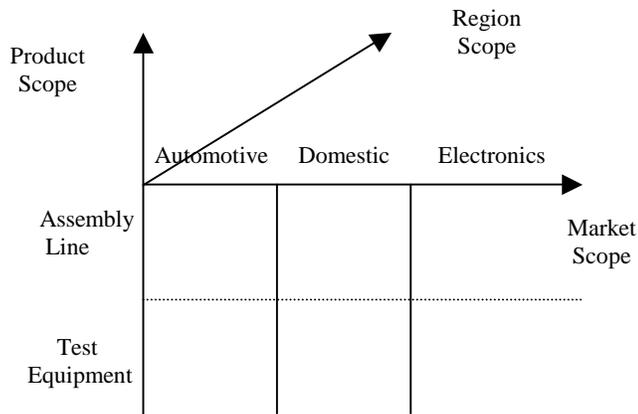


Figure 3 – Mental strategic map.