

Relating Structure of Supply Chain (SC) Organizations to its Objectives: Few Propositions and a Pilot Study

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ABSTRACT

In this paper, we identify objectives of supply chain (SC) departments and relate them to the strategy of the firm. We identify three broad strategy types, Defenders, Prospectors and Analyzers (Miles and Snow et al. (1978)). Objectives of the SC organizations are identified from literature as cost, delivery, flexibility. Dimensions of organization structure are identified as formalization, centralization, standardization, specialization and complexity of work flow (Pugh et al. (1969)). In this paper we give a few new propositions relating objectives and organization structure of supply chain organizations. This is verified by a pilot study.

(Keywords: Structure of Supply Chain Organizations; Strategy types; Objectives)

1. Introduction

Strategic orientation is useful because it defines the organization's dominant competitive posture and provides a synthesis of the cognitive mental models of its key strategists. Strategic orientation characterizes how a firm sees the competitive process, and subsequently prescribes how the firm will approach the competitive arena (Engelland and Summey, 1999). According to Hayes & Wheelwright (1984), a consistency is required between corporate strategy and functional strategies such as new product development (NPD), manufacturing and marketing strategy or, in other words, a strategic consistency.

Strategic fit means that both the competitive and supply chain strategies have the same goal. It refers to consistency between the customer priorities that the competitive strategy is designed to satisfy and the supply chain capabilities that the supply chain strategy aims to build. A company's success or failure is closely linked to the following keys:

1. The competitive strategy and all functional strategies must fit together to form a coordinated overall strategy. Strategies of all the functions must be complementary to each other to help a firm reach its competitive strategic goal.
2. The different functions in a company must appropriately structure their process and resources to be able to execute these strategies successfully (Chopra and Meindl, 2001).

Strategy implementation is the process by which objectives and practices (i.e. processes, technologies, organizational arrangements and/or managerial systems and approaches) are put into action. One of the key principles associated with successful strategy

implementation is that at any time, strategy and practices need to be consistent with, and supportive of, each other (Chandler, 1962; Owen, 1982). Many generic corporate (e.g. Miles and Snow, 1978; Porter, 1980; Kotler et al., 2001) and manufacturing (e.g. Hayes and Wheelwright, 1984; Richardson et al., 1985) strategies have been proposed. These literatures suggest that different strategies require different organizational and managerial practices. Many authors on strategic management (e.g. Andrews, 1971; Porter, 1980) suggest that strategy should be about aligning the business with its environment. This means that strategy is an adaptive mechanism. Miles and Snow (1978) see strategy as a constraint for the organization to respond to its environment. The firms need to adopt new systems that cannot be observed in the traditional organization structure where independent functional areas such as production and marketing prevail (Bowersox et al., 1995). There are different types of organization having their own set of objectives with respect to supplier, production, distribution and customer satisfaction. As it is not possible to present a single type of organization structure that will best suit the strategy of different type of organizations (defenders, prospectors and analyzers), each of these adopts an organization structure which aligns with most of their objectives. Defenders search profitability by maintaining existing products in established markets through 'technological efficiency' (Miles and Snow, 1978). Prospectors continuously develop new products and markets and, consequently, tend to have difficulties achieving operational efficiency. Analyzers combine efficiency in their operations with effectiveness pursued by adding new products and markets.

Supply chain organizations first started in the early 1990s. Before we can answer the questions of what makes a good supply chain organization we need to understand the goals of such an organization. The objective of supply chain groups differ based on their organizational maturity. As the supply chain organization matures, the focus shifts from manufacturing to the support of cross-functional process like sales and operation planning (S&OP) and new product launch. As a part of this maturation process, the organization moves from a forecasting orientation to the demand sensing one and from functional measures to the business metrics that are shared across the organization (Lora Cecere, 2006).

2. Literature Review

2.1 Strategy Types

There are essentially three strategy types: Defenders, Analyzers, and Prospectors. Each type has its own unique strategy for relating to its chosen market and each has a particular configuration of technology, structure and process that is consistent with its market strategy (Miles and Snow, 1978). Defenders primarily stay in their existing domains and stable market niches. Product development for these companies is limited to the improvement of existing products. Efficiency and control are important factors for these companies. Defenders tend to ignore developments outside of domain. Defender type organizations favor mass production. It involves a detailed functional division of labor and limited authority to lower level management i.e. most of the objectives are decided by top level management without considering the lower level management. Also, the

customers have limited options, so delivery performance level suffers for defender type organizations.

Prospectors are the most innovative type and emphasize the development of new products and technologies and the exploration of new markets. They try to be first in the market with new products, and continuously experiment with responses to emerging trends and changes in the market place. They are characterized by a low degree of formalization, and have greater decentralized decision making and higher flexibility. In prospector type organization higher authority is given to lower level management and they are involved in decision making along with top level management. Also the customers have variety of options and hence, delivery performance is of greater importance for the prospector type organization.

While defenders tend to establish only a single core technology, the Prospectors develop multiple technologies. Prospectors systematically add new products and new markets to their portfolio and put a lot of effort into monitoring 'a wide range of environmental conditions, trends and events' (Miles and Snow, 1978). Prospectors are inclined toward product innovation, so their organizational structure needs to be flexible and prepared for quick adaptation to market changes. Many studies have indicated that such companies are best managed with a low level of formalization, i.e. not based on rules and procedures (Burns and Stalker, 1961, Hage and Aiken, 1970, Miles and Snow, 1978).

Analyzers try to combine the exploration capability and innovativeness of the prospectors with the defenders ability to serve existing markets effectively. These companies pursue efficiency in the stable markets they serve, and try to be adaptive to and prepared for change in the turbulent markets in which they are also active at the same time. However, analyzers are not first movers. Rather their focus is on quick adoption of new concepts launched by successful prospector companies.

Miles and Snow et al. (1978) described the fourth type of organization (Reactors), but considered it to be an organization that lacks a viable strategy or is in transition from one of the three ideal strategies to another. Doty et al. (1993) compared the effectiveness of the typology with and without reactors, and found empirical support for these (excluding reactors).

2.2 Structure of SC Organizations

Moreno-Luzon and Peris (1998) addressed level of decision-making centralization and level of formalization-standardization as the basic organizational design variables of the contingency model relating to quality management. Formalization can be defined as the degree to which roles and tasks performed in the organization are governed by formal rules, and standard policies and procedures. If higher level of flexibility is required by the organization, then level of formalization should be low whereas if the organization requires a rigid structure then higher level of formalization will be suitable. Degree of formalization can be explained by the existence of independent department responsible for supply chain management and the strategic positioning of the department and the degree of centralization which reflects the scope of responsibilities and the power of SC

department within the organization (Kim, 2007). The concept of formalization refers to “the extent that the rules governing behavior are precisely and explicitly formulated and the extent that roles and role relations are prescribed independently of the personal attributes of individuals occupying positions in the structure”. In other words, formalization describes the degree to which work and tasks performed in the organization are standardized (Dewsnap and Jobber, 2000; Mollenkopf et al., 2000; Manolis et al., 2004).

Bowersox and Daugherty (1995) and Daugherty et al. (1992) suggest that the concept of formalization in SCM perspective can be consistent with it in organizational perspective. They define formalization as the degree to which decisions and working relationships for SC activities are governed by formal rules and standard policies and procedures. Centralization can be defined as the pattern of authority distribution for various departments within the organization. The management decides the authority distribution pattern on the basis of objectives to be achieved and type of strategy to be followed by the organization. For example, defender’s strategy is cost oriented, so centralization should be high whereas prospector’s strategy is product innovation oriented, so lower level of centralization will be suitable. Centralization is defined as the extent to which the power to make SCM decisions is concentrated in an organization (Mollenkopf et al., 2000; Manolis et al., 2004). Higher degrees of centralization correspond with concentration of decision making authority at more senior levels (Dewsnap and Jobber, 2000). The degree of centralization is determined partly by hierarchical relationship between SCM department and other functional areas over the control and responsibilities for SCM activities (Leenders et al., 2002). According to Bowersox and Daugherty (1995) and Tsai (2002), three structural components-formalization, centralization and specialization have considerable influence on organization performance. Factors favoring centralization include standardization of products and business processes, cost reductions created through opportunities to allocate resources efficiently and economies of scale and improved levels of knowledge and expertise through the dedication of staff and resources (Droge and Germain, 1989). Decentralization offers business units autonomy and control over key functional activities, supporting the principle that business units must carry responsibility for major decisions if they are to be held accountable for performance (Johnson and Leenders, 2006). Potential advantages of centralization include greater buying specialization, coordination of policies and systems and consolidation of requirements. Meanwhile, decentralization improves service and lowers costs by pushing decision-making responsibility closer to the end user, promotes closer working relationships between suppliers and end users and provides increased opportunities for end users to manage total cost of ownership factors (Leenders and Johnson, 2000). There can be other objectives like cost, flexibility, quality and innovation on the basis of which organization structure can be decided. The competitive dimensions can include cost, quality, flexibility, and delivery performance among others (Corbett and Van Wessenhove, 1993; Minor et al., 1994; Vickery, 1991).

The manufacturing strategies of firms today are increasingly reflecting attempts to excel on a number of competitive dimensions. Competitive advantage can be gained from excelling at both cost and quality; flexibility and delivery; or possibly any combination of

the four (Stock, Greis and Kasarda, 1999). Cost as a competitive priority can be interpreted as the firm's intention to be the lowest cost producer in its industry. Different type of organizations have different cost objectives like defenders main focus is to achieve cost efficiency whereas prospectors do not care for the cost prospective. Flexibility refers to the ability of the organization to deal with the uncertainties associated with the market and the environmental conditions. Higher flexibility implies quick adoption to the changes in the market. If any organization is more inclined towards the product innovation, then its structure should be more flexible. Flexibility can be considered to be of two different categories: design flexibility and volume flexibility. Design flexibility is the "capability to make rapid design changes and/or introduce new products quickly." Volume flexibility refers to the "capability to respond to swings in demand" (Miller and Roth, 1994).

Supply chain can achieve organizational flexibility, the ability to change generic operations, in two ways: through organic change or through modularity. In organic change scenarios, organizations shift to new activities. They have the advantages of retaining established relationships, communication links and higher level management positions (Chandrashekar and Schary, 1999). In a competitive marketplace where organizations compete for customers, delivery performance is also an important dimension for deciding the organizational structure. Delivery performance can be defined as the level upto which products and services supplied by an organization meet the customer expectation. Delivery performance provides an indication of how successful the organization is at providing products and services to the customer. If an organization has higher delivery performance, then its relationship with its customers will be stronger. A company's customer relations practices can affect its success in managing the supply base as well as its performance (Scott and Westbrook, 1991; Ellram, 1991; Turner, 1993). Innovation in either product or process development is often considered to be an element of flexibility, as well (Parthasarthy and Sethi, 1992). Hage and Aiken (1970) argue that centralization might have a negative influence on innovation.

On the basis of above discussion this paper has considered five dimensions on the basis of which SCM objectives can be described: cost orientation, flexibility (product and volume), delivery performance, quality and risk. Similarly there are five dimensions on which supply chain activities can be structured: formalization, centralization, standardization, specialization and complexity of work flow. SC structure can be defined on the bases of organization's strategy. As defenders, prospectors and analyzers have different strategies, there should be a strategic fit between their supply chain and competitive strategies. To achieve strategic fit, supply chain activities of an organization must support their objectives. Three steps have been defined for achieving the strategic fit (Chopra and Meindl, 2001) –

1. Understanding the customer.
2. Understanding the supply chain.
3. Achieving the strategic fit

SC structure has been defined and classified in a number of ways in the literature. A very simple way of describing SC structure differentiates between organizations on the

dimension of centralization or decentralization (Ghoshal, 1994). One of the major problem of decentralized organization is that the goals of the agents are not aligned with the overall goal of organization (Dirickx and Jennergren 1979, Milgrom and Roberts, 1992). Different business subunits have their own objectives. To pursue their private interests, these units may choose to send false, or biased, information to headquarters and other departments (Jennergren and Muller, 1973). Companies must adjust their organizational structure and management processes to adapt to changes in the external competitive environment or its strategy in order to maximize performance (Galunic and Eisenhardt, 1994). The two extremes (prospector and defender) are consistent with findings put forward by the other authors, e.g. Burns and Stalker (1961) and Porter (1980). They labeled these extremes the mechanistic and organic management system, respectively. Burns and Stalker (1961) explicitly mention that mechanistic firms have a functional organization structure with high level of formalization i.e. extent to which rules and roles are precisely and explicitly formulated. Organic firms, on the other hand, have low level of formalization.

Mechanistic firms have a hierarchical structure and the way of coordination between the members of the organization is limited to vertical, that is, between superior and subordinate. Mechanistic systems are appropriate in stable conditions and have a functional organization structure, a high degree of formalization, and many rules and procedures. Organic systems are most appropriate in changing conditions and are characterized by loose structures and few rules. Miles and Snow's (1978) prospector corresponds with Burns and Stalker's organic system and Porter's differentiation strategy, while the defender strategy corresponds with Burns and Stalker's mechanistic system and Porter's cost leadership strategy. Analyzers combine cost-leadership and a mechanistic system orthogonally with differentiation and an organic system. That is, they either spatially or temporally separate innovation and operation, but do not do both in the same part of the company or at the same time (Volberda, 1998).

According to Chopra and Meindl (2001), a product-focused organization performs many different functions in producing a single product whereas a functional-focused organization performs few functions on many types of products. A product focus tends to result in more expertise about a particular type of product at the expense of functional expertise that comes from a functional manufacturing methodology. Hybrid organizational structure approach is defined as the structure having features of both centralized and decentralized structures (Leenders and Johnson, 2000). While previous research has found that the hybrid organizational model is the most commonly used within large supply organizations (Johnson et al., 2006), there is still considerable variation with respect to how the hybrid model is implemented. In 1960s, matrix structures became a popular organizational framework for managing new product and service development. Matrix organization approach manages coordination of activities across unit lines within the organization. The matrix combines the benefits of project and functional organizations by integrating the work of various specialists. The matrix structure operates through a two-dimensional system of control: a project/product-line chain of command and a functional chain of command (Lawrence, Kolodny and Davis, 1982). Project managers retain responsibility for developing products, while functional

managers concentrate on the organization's capability to make use of up-to-date technical knowledge (Katz and Allen, 1985). On the basis of above arguments we have main organization structure types of SC departments as mechanistic, organic and matrix structure.

3. New Propositions

It can be said that most appropriate basic SC structure for defender, prospector and analyzer type of organization is mechanistic, organic and matrix respectively. SC activities may have positive effect on the organization if there is no conflict between them. We can reduce these conflicts by assigning the responsibility to each of the SC activities as clear as possible.

There are two questions related to the problem on the status of exclusive SC department. The first question is on how the existence and status of an exclusive department in charge of strategic SC activities within the organization affects the improvement of SCM performance. This is related to the discussion on the necessity of exclusive SCM department in terms of SC performance. The second question is on whether or not the SC department must take all responsibilities for the implementation of SC activities, and what relationship it has with the existing functional departments. (Kim, 2007). Further, the hierarchical level of each of the department including SC department should be clear within the SC organization structure. Each of the department has varying importance which is directly associated with the type of organization. SC organization structure for defender requires higher level of formalization, centralization, cost efficiency, standardization and lower level of innovation, risk, flexibility and delivery performance. Their planning is always toward the production and cost control (Miles and Snow et al, 1978 and Thompson, 1965). These objectives can be achieved by having a mechanistic type of SCM organization structure. Also most of the logistics activities should be controlled by production department.

Thus, we can suggest the following hypotheses.

H1. 'Defender' organization stresses on higher efficiency and hence its SC department would achieve this by choosing a 'mechanistic' organizational structure.

H2. In 'Defender' organizations, finance and production departments are enjoying higher importance compared to other departments (Miles and Snow et al. (1978)).

H3. In 'Defender' organizations, logistics activities will be under the control of production department.

SC structure for prospector requires higher level of innovation, risk, flexibility and delivery performance and lower level of formalization, centralization, cost efficiency and standardization. Prospector's problem is how to facilitate and coordinate numerous and diverse operations. Prospector's administration must be able to deploy and coordinate resource among numerous decentralized units and projects rather than to plan and control the operations of the entire organization centrally (Miles and Snow et al., 1978). As they

are more inclined toward the new product innovation, so their planning is mainly towards marketing and research and development. These objectives can be achieved by having an SC structure as organic (Miles and Snow et al (1978) and Thompson (1965)). All SCM related activities are performed under the supervision and control of other functional department (Kim, 2007). As prospectors are market oriented so marketing department is likely to have higher importance compared to other departments within the organization. Also delivery performance level is relatively higher as compared to defender and analyzer type organizations. So, marketing department controls most of the logistics activities. We suggest the following hypotheses on the basis of above arguments.

H4. ‘Prospector’ organization focuses on delivery, flexibility and reliability and this could be achieved by choosing an ‘organic’ structure for its SC department.

H5. In ‘Prospector’ organizations, marketing department enjoys higher importance compared to other departments

H6. In ‘Prospector’ organizations, logistics activities are under the control of marketing department.

SC structure for analyzer requires higher level of cost efficiency and delivery performance, medium level of formalization, centralization, innovation, flexibility and standardization. Such types of characteristics can be achieved by having a matrix type of SC structure (Thompson, 1965) with each of the department having its relevant SC activities. For firms employing this type of organization, SC department focuses on coordination and connection with other departments for efficient utilization of SC activities rather than the direct control of SC activities (Kim, 2007). According to Miles and Snow (1978), Analyzers main problem is how to differentiate the organization’s structure and processes to accommodate both stable and dynamic areas of operations. As they try to be cost efficient as well as updated with the new product –market relationship, so marketing and production department plays a major role. We suggest the following hypothesis on the basis of above arguments.

H7. ‘Analyzer’ organizations stress higher efficiency and effectiveness and this could be achieved by choosing a matrix type of structure for its SC department.

H8. In ‘Analyzer’ organizations, marketing and production departments enjoy higher importance compared to other departments.

H9. ‘Analyzer’ organizations will have their logistics activities under the marketing and the production department.

4. Pilot Study and Results

The sample selected comprised of companies having different background, location and business. The questionnaire was filled up by various functional departments of these companies viz. their Purchase, Marketing, Production, and Supply Chain departments. The companies selected for the study were:

- GIPLK (a well known detergent manufacturing company in North India)
- PLPLK (a well known producer of leather products in North India)
- ITWILH (a well known producer of coolants and chemicals in South India)
- BPCLK (a well known petroleum products company in East India)

We prepared a questionnaire (Hazarika, 2007) to know the scores on various dimensions of the organization structure of the supply chain function and also the strategy and objectives of the company. We collected data from above four companies and we had the following results:

1. **GIPLK** is a ‘Defender’ organization and is supported by a ‘Mechanistic’ structure of its SC department. Also the logistic department was with the production function. It had high scores (for the SC organization) on centralization, formalization, standardization and specialization and low score (for the SC organization) on complexity of workflow.
2. **PLPLK** is a ‘Prospector’ organization and is supported by an ‘Organic’ structure of its SC department. Also the logistic department was with the marketing function. It had low scores (for the SC organization) on centralization, formalization, standardization and specialization and high score (for the SC organization) on complexity of workflow.
3. **ITWILH** is a ‘Prospector’ organization and is supported by an ‘Organic’ structure of its SC department. Also the logistic department was with the marketing function. It had low scores (for the SC organization) on centralization, formalization, standardization and specialization and high score (for the SC organization) on complexity of workflow.
4. **BPCLK** fits into an ‘Analyzer’ type of organization and is supported by a ‘Matrix’ structure of its SC function. Also the logistic department was reporting to the joint team of the production and marketing functions.

Thus we see that the limited case studies we undertook lend full support to hypotheses developed in earlier section.

5. Conclusions

The purpose of this study is to relate the SC structure to its objectives which we do by using the classification of Miles and Snow et al. (1978), i.e., defenders, prospectors and analyzers. Interesting hypotheses are presented (and these are supported by limited pilot study) which need to be verified by a future study undertaken on a larger scale.

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