Supply chain strategy and Organizational culture: a framework for effective information flows

* D.Ghose

Abstract

Purpose- Information flows in the supply chain shows the patterns of organizational culture and supply chain strategy (SCS). This paper aims to links organizational culture and SCS using competing values and an uncertainty framework.

Design/methodology/approach – From literature review on organizational culture and SCS, this paper presents a typology with four patterns of organizational culture with four types of corresponding SCS.

Findings – This paper presents diverse requirements for effective design of supply chain in that for each pattern of organizational culture, corresponding SCS is identified: efficient for hierarchical, risk-hedging for group, responsive for rational, and agile for developmental culture.

Research limitations/implications – The exploratory nature of this study requires empirical research validation. Firms may use this research framework in design and evaluation of their supply chain management structure according to their organization's cultural elements and requirements.

Practical implications – Using these integrative framework business executives may better manage the informational infrastructures that reflect the rich dynamics between their particular organizational cultural traits and supply chain behavioral practices.

Originality/value – This paper expands the concept of organizational culture in the extended supply chain network context and identifies information strategy profiles.

Keywords –Supply chain management, corporate strategy, Organizational culture, Information systems.

Paper type Conceptual paper

*Lecturer, Department of Business Administration, Assam University, Silchar, India
Email: debomalya_bemba@sify.com

Introduction

Fierce Competition in today's global markets, the introduction of products with shorter life cycles, and the heightened expectations of customers have forced business enterprises to invest in, and focus attention on, their supply chains. This, together with continuing advances in communications and transportation technologies (e.g. mobile communication, Internet, and overnight delivery), has motivated the continuous evolution of the supply chain and of the techniques to manage it effectively.

Rich communications in organizations reflect the intangible cultural traits and tangible strategic practices (Canessa and Riolo, 2003; Carmeli and Tishler, 2004). Effective information flows require high level of congruence between organizational culture and strategic practices (Leisen et al., 2002; Gallivan and Srite, 2005). Outstanding organizations integrate their organizational value architecture and strategic information system (Wagner, 2004; Avison et al., 2004).

Researchers have recognized the importance of strategic fit between structure and infrastructure of organizations for their sustainable competitive advantages (Hill,2000; Slack and Lewis, 2003). It is reported that organizational culture is a significant factor that accounts for the productivity gap between US and Japanese companies (Denison,1984). Cabrera et al. (2001, p. 251) state:

Whether or not the organization is able to achieve its strategic objectives will depend on whether it can deploy the right kinds of processes and behaviors, which are in turn determined by the organization's architecture.

The right kind of organizational process, practices and behaviors decisions utilize the vital strengths of organizational culture (Schein, 1992). However, the consistent challenge for researchers is how to connect organizational culture in the implementation level of business goals and practices (Denison and Mishra, 1995; Flamholtz, 2001). Here lies the need for rigorous examination of organization culture in the context of ever expanding strategic business reality. In particular, as firms interact and align with the diverse network of suppliers and customers as their supply chain partners, rich dynamics of organizational culture become more illusive and less understandable. In this sense, organizational culture in the context of supply chain strategy (SCS) deserves a careful research.

This article examines the vital links between organizational culture and SCS and addresses three specific research questions:

(1) How critical is the fit between organizational culture and SCS?

(2) How are patterns of organizational culture and types of SCS interrelated as an integrative framework?

(3) How would this framework be useful in design and implementation of effective information flows in supply chain?

To explore the above research questions this paper is organized as follows. The first Section identifies four major patterns of organizational culture based on the competing value framework (CVF) by Cameron and Quinn (1999). The second section introduces the four types of SCS with the uncertainty framework. The third section delineates an integrative framework of organizational culture, SCS and strategic information profiles. The conclusion derives the managerial implications from the research framework.

Organizational culture

The analysis starts with organizational culture because it has more pervasive and stable traits than strategy practices do (Al-Khalifa and Aspinwall, 2001; Stock et al., 2007; Schein, 1992). Schein (1996) defined organizational culture as: the basic tacit assumptions about how the world is and organization to be that a group of people share and that determines their perceptions, thoughts, feelings, and their overt behaviors.

This definition includes three levels of organizational culture: artifacts, the espoused values, and the basic underlying assumptions. Artifacts refer to primarily visible, audible, and touchable behaviors taking place in an organization. Examples are organizational structures and practices. In the lower level of artifacts are the espoused values. The espoused values are"ought to be" in the organization where as the artifacts are "what is" (Schein, 1992, 1996). Strategies, goals, and philosophies exemplify the espoused values. This definition of organizational culture suggests that an effective strategy should be aligned to the organizational culture.

With some exceptions the majority of highly effective supply chains involve leading Organizations that shape and influence the supply chain practices. McAfeeetal.(2002) also report the impact of human resource policies of a principal company on suppliers.

For an example, with its enormous size Wal-Mart's organizational culture and SCS impact how its suppliers and distributors share relevant information and do business with one another. Hence, organizational culture in this paper means the overriding culture in the supply chain that reflects the organizational value traits of the dominant company in the supply chain.

By nature the organizational culture is context-specific and its study therefore requires careful attention to the contextual details. For this reason, we choose the CVF by Cameron and Quinn(1999)for it's theoretical validity and wide acceptance. The CVF has been widely used for the broad range of organizational culture studies (Quinn and Kimberly,1984). According to Al-Khalifa and Aspinwall (2001,p.420),CVF is "a useful model for organizations to adopt in taking a system perspective of their businesses and to plan and manage major change." Although not exhaustively representing cultural phenomena, the framework defines key elements and dimensions of organizational culture.

Figure 1 presents a typology of the CVF. It constitutes two-dimensional space that reflects different value orientations (Denison and Spreitzer, 1991):

(1) The degree to which the organization emphasizes change or stability (the flexibility-control axis); and

(2) The nature of business strategic initiatives orientation (the internal- external-axis).

A flexibility orientation suggests adaptability and spontaneity, while a control orientation indicates stability, control, and order (Stock and McDermott, 2001) An internal orientation displays a focus on the sustenance and enhancement of the existing organization, while an external orientation reflects an emphasis on competition, interaction and growth with the external environment (Stock et al., 2007). An organization that shows internal orientation may allocate its resources for maintenance and improvement goals. In contrast, an organization that stresses a high level of market orientation may invest more resources in impacting market environments (StockandMcDermott,2001).The combination of these two dimensions produces four types of culture: hierarchical, rational, group, and developmental.

TableI is a summary off our patterns of organizational culture. These four patterns of organizational culture show differences in terms of focus, leadership styles, criteria
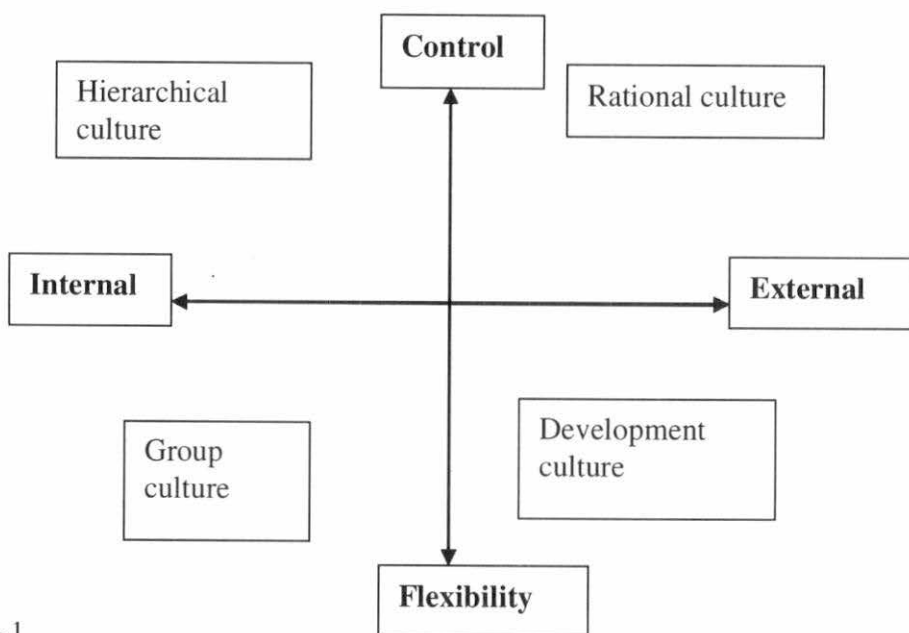

Fig - 1

source: McDermott and Stock (1999)

Category	Hierarchical culture	Group culture	Rational culture	Development culture
Organizational characteristics	Controlled, structured, Formal procedure	Extended family, personal place	Result oriented,	Dynamic and entrepreneurial
Focus	Internal control	Internal flexible	External control	External flexible
Leadership patterns	Coordinator, monitor	Facilitator, Mentor	Hard driver, competitor	Innovator
Criteria for effectiveness	Efficiency, timeliness	Cohesion, morale	Market share, goal achievement	Cutting edge output, creativity
Management theory	Control fosters efficiency	Participation fosters commitment	Competition fosters productivity.	Innovativeness fosters new resources
Management of employees	Security, conformity	Team work	Hard driving competitiveness	Individual risk taking
Organizational glue	Formal rules and policies	Loyalty, mutual trust	Achievement and goal accomplishment	Passion and creativity for innovation

Table I. Types of culture & characteristics.
Source: Adapted from Cameron and Quinn (1999)

for effectiveness, management of employees, organizational glue and criteria of success (Cameron and Quinn, 1999). Hierarchical culture emphasizes stability or control with high level of internal focus. This orientation is characterized by uniformity, coordination, internal efficiency, and a close adherence to rules and regulations. Developmental culture would be its opposing contrast in that it underlines flexibility and external orientation toward changes. Creativity, innovation, and external growth are emphasized in response to the changing demands of the external environments (e.g. ,competitors and customers).Group culture is similar to hierarchical culture in that it stresses the internal aspects of an organization, but different in that an emphasis is given more on the flexibility dimension. In this culture, employees are empowered and encouraged to participate in enhancing and optimizing internal

resources and business processes. Rational culture is externally oriented with a stress on control and stability. Organizations with rational culture accentuate productivity and achievement with well-defined objectives against external competitions (Stock et al., 2007).

It should be noted, however, that these patterns of cultures are not mutually exclusive (Al-Khalifa and Aspinwall, 2001). No organization may show only one cultural pattern. Rather, an organization is comprised of the mixed set of the four cultures. This classification off our patterns of organizational culture is for the purpose of comparison. The relative intensity of particular cultural traits defines the pattern of organization culture in a value chain (Denison and Spreitzer, 1991).

SCS

Different types of SCS have received increasing attention from both researchers and practitioners. In the 1980s and the early 1990s, the focus was on the "lean" paradigm modeled after the successful experiences in Toyota (Womacketal.,1990;Womackand Jones, 1996). The core concept of lean supply chain is in eliminating waste from production to delivery(Womacketal.,1990). In the late1990s, the new approach of SCS was the "agile" paradigm in response to turbulent market environments (Mason-Jones etal.,2000).In this way, context-specific SCS has become more appealing than general SCS. Fisher (1997), for example, presented a typology based on types of products (i.e., functional and innovative) and SCS (i.e., efficient and responsive). Afterward, Lee (2002) put forth a demand and supply uncertainty framework that produces four types of SCS: efficient, risk-hedging, responsive, and agile.

A specific type of SCS indicates the stable sets of business practices that are deeply ingrained in organizational culture (i.e. management philosophies, patterns of organizational routines and behavioral norms). Table II is the summary of four different types of SCS based on its inherent characteristics. A firm may pursue efficient supply chains (ESC) when a market is mature and competitive advantage is achieved primarily through low cost and high productivity. Firms take ESC strategy mainly to manufacture quality products efficiently and to provide customers with reliable services. Risk-hedging supply chains (RHSC) are adopted when a supply chain is evolving with the presence of uncertainty whereas its market demand is stable andpredictable. Hydro-electric power and some food producers are examples of this category (Lee, 2002). To leverage supply uncertainties, a firm would increase buffer stock for its core products or components and attempt to share the cost of the safety stock with other companies. This strategy is often used in the retail industry or dealerships. A firm that adopts responsive supply chain (RSC) offers a variety of products with high quality and performance. Often this strategy is implemented through product innovation and improvement. In order to accommodate constantly changing customer demands, this supply

chain may postpone making the final form of a product until the demand becomes specifically disclosed. Fashion apparel, computers and pop music industries are representative of this strategy (Lee, 2002). The agile supply chain(ASC) is the most flexible and the most market-oriented strategy because a firm in this category faces uncertainty from both demand and supply sides. A firm surrounded by high uncertainty endeavors to adjust promptly to volatile market and unstable supplier conditions. The firm responds sensitively to the highly uncertain demand via a variety of products with features such as high quality, high performance, and excellent customer service. The firm will also hedge the risk arising from suppliers such as supplier disruptions by leaving room for flexibility. The firms that implement ASC could be found in high-end computers and semiconductor industries.

Category	Efficient Supply Chain	Risk hedging supply chain	Responsive supply chain	Agile supply chain
Supply uncertainty	Low	High	Low	High
Demand Uncertainty	Low	Low	High	High
Focus	Highest cost efficiencies	Cost efficiency and hedging	Flexibility	Market oriented
Product type	Functional	Functional	Innovative	Innovative
Competitive priorities	Cost & quality	Cost, Flexibility, quality	Speed, flexibility	Speed, flexibility, innovation
Supply uncertainty	Low	High	Low	High
Demand uncertainty	Low	Low	High	High
Supplier relationship	Transaction based	Relation based	Partnership based	Time based

Table II

Sources: Adapted from Lee (2002) and Vonderembse et al (2006)

Competitive priorities and organizational culture

Competitive priorities of a supply chain are expressed in terms of cost, quality, flexibility and innovation. Managing competitive priorities requires focusing on particular goals over others and deploying organizational resources according to these priorities. In this sense, competitive priorities reflect elements of organizational culture that thrive one spoused values and goals of organizations (Youndtetal., 1996). TableIII is the summary of competitive priorities and organizational culture elements.

Organizational culture and SCS

Culture comprises three components: basic assumptions, values, and visible artifacts (Schein, 1992). An organization derives its visible artifacts from the values, and the values are based on assumptions that the organization takes. Thus, assumptions are more fundamental and aggregated than strategies are. Therefore, it implies that SCS should be aligned with organizational culture for effective implementation.

Competitive priorities	Organizational culture elements	Literature
Cost	Minimize the impact of individual differences, standardization	Youndt et al.(1996); Hofstede (1980); Panayotopoulou et al (2003);
Quality	Knowledge work/ sharing, skill acquisition and development	Deming (1982); Youndt et al (1996)
Flexibility	High technology, adaptable work force	Upton (1995); Parthasarathy and Sethi (1992); Youndt et.al. (1996)
Innovation	Creativity, adaptation, open communication	Cameron and Quinn (1999); Youndt et.al. (1996); Schuler & Jackson (1987)

Table III

Some researches recognized the importance of the strategic fit between organizational culture and SCS. Chorn (1991) and Gattorna and Walters (1996) explained the importance of strategic alignment between organizational culture and strategy. McAdam and Brown (2001) attempted to tackle the alignment between organizational culture and strategy with an exploratory quantitative case study approa chinthe Steel industry in the UK and Ireland. Mello and

Stank (2005) studied the relationship between organizational culture and supply chain success by using Schein's (1992) theoretical framework. They found that organizational culture plays an important role in forming suppliers' behaviors. Tummala et al. (2006) also emphasize the compatibility of supplier's cultures in developing long-term relationships.

Figure 2 shows the integrative framework that combines the two parameters (i.e., demand and supply uncertainty)from the SCS uncertainty framework(Lee,2002)with those (i.e., internal-external and control-flexibility orientation) from the CVF framework (Cameron and Quinn, 1999). this framework identifies SCS with corresponding organizational culture.

High demand uncertainty occurs in the market environment in which volatile demand and fluctuating customer order patterns are the norm. Innovative products usually show such a demand pattern. On the other hand, low demand uncertainty refers to the market environment with predictable demand and stable customer order practices. Functional products with mature product life cycles display such low demand uncertainty. High supply uncertainty refers to a supplier network that is fairly new and not yet well-established and where the supply patterns are not so stable. In contrast, low supply uncertainty is possible in supplier network that has many suppliers with stable production capabilities.

A specific SCS may be more fitting to a particular organization culture. ESC (lowin both demand uncertainty and supply uncertainty) operates in organizations that are characterized with hierarchical culture. Hierarchical culture, with the low level of external orientation, focuses on the internal process for stability. This culture is characterized by standardization, internal efficiency and organizational routines (Cameron and Quinn, 1999). This hierarchical culture naturally supports efficient SCS practices that are built on mechanistic and internal control mechanisms.

RHSC (low in demand uncertainty but high in supply uncertainty) operates in organizations that are classified as group culture. Group culture is characterized with the human relations model of organizational theory. Group culture, with its emphasis on interpersonal trust and rich internal participative mechanisms fits to RHSC practices that utilize the high level of cross-functional coordination and focus on internal resource allocations.

Demand Uncertainty (External Orientation)

Supply Uncertainty	Low	High
High	Efficient Supply Chains (Hierarchical culture)	Responsive supply chains (Rational Culture)
Low	Risk-hedging supply chains (Group culture)	Agile supply chains (Developmental culture)

Fig 2 Organizational culture and supply chain strategy

RSC (high in demand uncertainty and low in supply uncertainty) operates in organizations that are characterized with rational culture. Rational culture corresponds to the rational goal model that is high on external-orientation and control-mechanisms. Rational culture, with its strong focus on results and competent decision-making mechanisms, is well-aligned to a responsive supply chain that has high value emphasis on achievement, market leadership and competitiveness (Stock et al., 2007).

ASC (both high in demand uncertainty and supply uncertainty) operates in developmental culture. Developmental culture, adopting the open system model, is characterized with creativity and passion for innovative problem-solving mechanisms. Developmental culture supports ASC practices that are high on resource acquisitions, product leadership and entrepreneurship (Stock et al., 2007).

Information system, SCS and organizational culture

As mentioned at the beginning of this article, this integrative framework of organizational culture and SCS is further extended to identifying styles of strategic information system as caretakers, defenders, analyzers and prospectors. This classification is adapted from the works of Miles and Snow(1978) and Apigianetal.(2006).

Tables IV-VI shows the integration framework for information flows, SCS and organizational culture. The design of information system considers the fit between the organization's culture and strategic focus. Effective information flows enable firms to better create, process and deliver products and services that their ultimate customers value.

Four styles of strategic information system deserve even a brief explanation. Caretakers have a consistent and stable internal focus that processes organizational routines with great efficiency. Defenders try to protect their particular strategic resources and markets. Analyzers are highly organized according to their goal-driven results. Prospectors continue to seek and locate new market opportunities while sustain their current markets with resilience. The strategic information system has a profile in the context of integrative framework of SCS and organizational culture.

The ESC focuses on obtaining low cost and good quality to win in the market. The ESC is adopted usually in a predictable and mature market where the manufacturing process is characterized as rules and regulations, standardization and repetition for optimized processes and for the economy of scale. To attain this goal, an organization would attempt to minimize the impact of individual differences and increase the internal effectiveness the most by developing hierarchical and mechanistic culture (Nahmetal.,2003, 2004).The relationship with suppliers would be transactional-based and control-oriented. The stability and control emphasis through internal efficiency go along with hierarchical culture. Therefore, ESC adopts the practices of caretakers in its information process and system flows.

Information strategy style.	Caretakers	Defenders	Analyzers	Prospectors
SC management	SC integration	SC coordination	SC collaboration	SC alignment

Table IV Information system

Table V

Supply chain strategy type	Efficient SC	Risk-hedging SC	Responsive SC	Agile SC
Competitive priorities	Cost & quality	Cost, flexibility, quality	Speed, flexibility	Speed, flexibility, innovation
Production system	Lean, JIT	Multiple supply source, safety stock	Lean, Flexibility	Multiple supply source, safety stock
Distribution system	Integration	Intermediation	Postponement	Decoupling
Product life cycle	Long (>4 years)	Medium (>2 years)	Intermediate (6months to 2 years)	Short (3 months to 1 year)

Table VI

Organizational culture	Hierarchical	Group	Rational	Development
Organizational Characteristics	Controlled, Structured	Extended family	Result-oriented	Dynamic
Organizational process	Mechanistic	Dynamic	Organic	Virtual
Strategic emphasis	Permanence & stability, efficiency	Human development, high trust	Competitive actions and achievement	Acquiring new resources, creating new challenges
Criteria of success	Efficiency, dependable delivery	Development of HR, team work.	Market share	Having the most unique, newest or innovative products

The RHSC is employed when demand is stable and yet suppliers are uncertain. Since demand is stable and predictable, firms in this environment would more concentrate its resources on optimizing internal resources and the manufacturing and procuring and delivering processes. But the uncertainty driven from suppliers leads the firms to respond more flexibly in dealing with suppliers. They may make efforts to build a long-term and collaborative relationship with suppliers. For this, they may also empower employees to do knowledge/work sharing, skill acquisition, teamwork and continuous improvement (Youndt et al., 1996; Parthasarthy and Sethi, 1992). The flexibility and internal efficiency are suited for the group culture. Therefore, RHSC adopts the practices of defenders in its information process and system flows.

The RSC aims to compete through offering a variety of innovative products to Customers with an affordable price(FrohlichandDixon,2001;Caglianoetal.,2005).To be innovative and keep up with market needs, a firm must be sensitive to the external environment and foster creativity, adaptation, continuous learning, and autonomy (Cameron and Quinn, 1999). However, in dealing with suppliers, it is more control-oriented because suppliers are well-built. For example, for the efficiency sake ,a dominant firm may attempt to integrate suppliers as much as it can. For this, it may utilize postponement strategy. It may put off making the final form of products until the demands become clearer. In this case, although market-orientation is emphasized, control-orientation for supplier aspects is also given weight. In this supply chain, productivity, goal achievement, and competition would be of importance, which are similar to the features appearing in rational culture. Therefore, RSC adopts the practices of analyzers in its information process and system flows.

Organizations with emphasis on the ASC try to employ differentiation from others by pursuing excellence on multiple fronts such as quality, product design and performance, deliveries, and after-sales service (Frohlich and Dixon, 2001). The orientation demands quick adaptation to external changes and stresses growth, creativity stimulation, resource acquisition, and innovation. The supplier uncertainty may require organizations to be more flexible and market-oriented. Developmental culture is fit for organizations implementing the ASC. Therefore, ASC adopts the practices of prospectors in its information process and system flows.

Managerial implications:

Effective information flows are the important enablers of supply chain performance outcomes. Successful supply chain outcomes require strategic approaches, and thus SCS matters. SCS is about making values and goals of an organization's network explicit; therefore, an effective strategy may not ignore organizational culture. We now summarize a few managerial implications of our integrative framework here.

First, senior executives may better understand the contextual differences of an organizational culture and supply chain. Theories of supply chain management have examined diverse patterns of supply chains. However, many supply chain studies implicitly assume that SCS might be implemented without any consideration of organizational culture. However, increasingly critical challenges of supply chain management are to:

- Define the organizational cultural context of a particular supply chain;

- Formulate relevant SCS; and

- Implement supply chain practices through effective information flows.

The research framework presented in this paper might be useful for managers to consider different strategic contexts from organizational culture perspectives.

Second, supply chain executives also may be aware of the linkage between SCS and organizational culture. The concept of strategic fit has been well discussed in the management strategy literature. Strategic fit refers to the extent of congruency between organizational resources and market/customer requirements. Organizational resources are not automatically allocated to satisfy customer needs. It is fulfilled through a deliberate and concerted effort of applying resources to meet customer requirements. Such deliberate and concerted efforts make strategic practices possible. However, if a particular strategy has little relevance to proper usage of resources for desirable outcomes, it indicates a misfit. Such a misfit may occur when SCS is implemented without the support of effective information system flows that provide the rich strategic contexts.

Third, information executives may design and manage their strategic information flows based on the contexts of SCS and organizational culture. Firms invest a great amount of resources on IT system development. Design issues of an information system are important in that much of the resources committed in design stages may not be easily changeable or replaceable in the implementation stages. More effort has to be made in the areas of strategic design of information flows. With keen understanding of their organizational culture and strategic practices,, information executives may better define the requirements of their strategic information systems. This integrative framework can be a useful guide for building strategic and effective information infrastructure in the context of supply chain management.

Conclusion and future issues

Despite the acknowledgement of the vital role of organizational culture in SCS formulation and implementation, scant research has been carried out on the relationship between SCS and organizational culture. This study develops a research model that attempts to link SCS and organizational culture based on the uncertainty framework by Lee (2002) and CVF by Cameron and Quinn (1999).

In a rapidly changing business environment, although the formation of networks is important, the cultural patterns are less clear and more undistinguishable. Firms may not easily grasp the complexity that exists between organizational culture and SCS. However, a successful formulation and implementation of SCS may need to consider deeply-held cultural traits and intangible behavioral response patterns of supply chain participants. In this sense, this paper clarifies how a particular type of organizational culture may fit better to a particular SCS and furthermore suggests an appropriate style of strategic information system.

An effective design of supply chain information infrastructures requires solid understanding of the underlying organizational cultural traits, strategic priorities and behavioral practices. This paper suggests that the organizational culture of a dominant or principal organization influences the suppliers and distributors in the same supply chain. However, the dynamic interactions between a dominant organization and many participating organizations might not be so straight forward and therefore deserve their complex relations deserve further examination. The exploratory nature of this study requires much more empirical research for theoretical validation. Even so, this conceptual paper may still be useful for theory development and practical applications.

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