

SUPPLY CHAIN MANAGEMENT AND VIRTUAL ORGANIZATION

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Summary

Success of the contemporary enterprises (also) depends a lot on their capacity to manage all important supply chains in which they are involved. For that reason the enterprises must rethink and innovate their management (in general) and especially the management of supply chains. Supply chain management can be defined as “managing the entire chain of raw material supply, manufacture, assembly and distribution to the end customer”. One of the main decisions of interest in supply chain management is how much of the supply chain should be owned by each business. But in the modern environment vertical integrations alone are not enough. The alternative to vertical integration is some other form of relationship, not necessarily ownership. The relationship between the links of the supply chain will be examined in more details in terms of the flows between the operations involved. These flows may be of transformed resources such as materials or of transforming resources such as people or equipment (e.g. like hierarchy, contractings, trading commitments etc.). For their formation, performance and working we can use different organizational concepts, which vary in the span from classic organization to virtual organization. At the same time each organizational concept can be supported (also) with different organizational structures, as for example virtual organization. From the viewpoint of supply chain management, virtual organization can be discussed as a concept of operating and/or organizational structure of operating. This contribution discusses two theses: 1) How traditional and virtual concepts of organization (as two extremes) encouragement supply chain management and 2) How virtual organizational structure supports operating of supply chain management.

Key words: traditional organization, virtual organization, virtual organizational structure, supply chain, supply chain management.

1. INTRODUCTION

Organizations in modern environment are able to assure its existence and long-term development with the satisfaction of needs and demands of end-customers. Producers can be competitive on the market, when they offer suitable: price, quality, range, uniqueness, and contribution to sustainable development as judged by customers. For this reason they are confronted with the constant dilemma, how to re-form their work (and behavior) to reach the desired target results. Entire and suitable (this is efficient and successful) organizational work can be assured on the following basis: permanent dynamic adaptation of intentions and aims, use of suitable business concept and innovative work and behavior (Fly, Stoner, 2000; Potocan, 2005; Potocan, 2006; Potocan, Mulej, 2008; etc.).

Entire and innovative (understanding) forming and performing purchasing operations and physical distribution has also an important role in business (Nigel, 1996; Potocan, 2004). They define the (possible) level of suitability when assuring the needs (and demands) of end-users. The use of logistic and material management in an organization enables (partly) improvement of work, but not (also) “optimization” of the whole production process of products and/or services (in which more organizations collaborate). To deal with the whole supply process many different integrated concepts of managing across the traditional functional areas of purchasing operations and physical distribution were developed (e.g. materials management, merchandising, logistic, supply chain management).

SCM presents ambitious and strategically significant concept, which can be defined as “managing the entire chain of raw material supply, manufacture, assembly and distribution to the end customer” (Heitzer, Render, 2003; Murphy, Wood, 2004; Christopher, 2005; Chopra, Meindl, 2006; Potocan, 2007). SCM is the most developed integrated concept, but by its use, the organization meets some open dilemmas such as: 1) what sort of connections exist among the part of SC, 2) what is the role (meaning) of different units (e.g. parts) in the entire (SC), and 3) how can we optimize the parts of the entirety (to form structure) to reach “optimal results” of common work.

Organizations in the modern business environment need the entity of vertical and horizontal integrations (e.g. relationships) if they wish to design and implement more holistic SC (and/or SCM). In this frame the work of the SC (and/or SCM) participants can be innovated, especially with non technological innovations, orientated into suitable organizational forming and organized work (Daft, Steers, 1986; Hatch, 1997; Handfield, Nichols, 2002; Potocan, 2005; Daft, 2006; Jones, 2008).

Therefore we would like to shift attention from a general-based discussion about SC and/or SCM to more practical issues: How to organize the SC and their relationships and/or SCM. We offer some new suggestions about: 1) Application of traditional and virtual concepts of organizational encouragement SCM, and 2) Use of virtual organization for supports of operating of SCM.

2. HOW WE UNDERSTAND MANAGEMENT OF SUPPLY CHAINS

There are many different ways in which the linkage involved in the flow of materials and services can be integrated or grouped together (Daft, 2003; Waller, 2003; Cole, 2004; Cohen, Roussel, 2004; Blanchard, 2006). Four basic are: material management, merchandising and logistics and supply chain management (for details concerning of each of them see e.g.: Pohlman et al., 2000; Rushton et al., 2001; Heitzer, Render, 2003; Hugos, 2006; Slack et al., 2006; Anklesaria, 2007; Potocan, Kuralt, 2007). These have focused attention on managing across the traditional functional areas of purchasing operation and physical distribution.

The central of our research is SCM. SCM is a broader and strategically significant concept which includes the entire SC from the supply of raw material, through manufacture, assembly and distribution to the end customer. It includes the strategic and long-term consideration of SCM issues as well as the shorter term control of flow throughout the SC. Basic objectives of SCM are mainly: to focus on satisfying end customers, to formulate and implement strategies based on capturing and retaining end-customer business and to manage the chain effectively and efficiently.

The relationship between the links of the SC will be examined in more detail in terms of flows between the operations involved (Daft, Steers, 1986; Hatch, 1997; Handfield, Nichols, 2002; Harmon, 2003; Waller, 2003; Murphy, Wood, 2004; Christopher, 2005; Blanchard,

2006; Slack, 2006; Bolstorff, Rosenbaum, 2007; etc.). These flows may be of transformed resources such as materials or of transforming resources such as people or equipment. The term used to include all different types of flow is exchange. The exact nature of the relationship between the different linkages within the SC can be viewed on a continuum which goes from highly integrated at one extreme through to temporary and short-term trading commitments at the other.

The different relationship types which we will briefly present are the following: integrated hierarchy, semi-hierarchy, co-contracting, coordinated contracting, coordinated revenue links, long-term trading commitment, medium-term trading commitment, and short-term trading commitment. (For details concerning of each of types see also e.g.: Daft, Steers, 1986; Nigel, 1996; Pohlman et al., 2000; Handfield, Nichols, 2002; Cohen, Roussel, 2004; Christopher, 2005; Potocan, 2005; Blanchard, 2006; Bolstorff, Rosenbaum, 2007; etc.)

The different types of relationship and the main elements of exchange in the relationship are summarized in Table 1.

Table 1. Exchange in different types of relationship

<i>Relationship type</i>	<i>Exchange elements</i>	<i>Examples</i>
<i>Integrated hierarchy</i>	<i>People, materials, goods and services, technology, information, money, equipment</i>	<i>Single product of firms, e.g. paper</i>
<i>Semi-hierarchy</i>	<i>People, materials, goods and services, technology, information, money, equipment, centralized control, divisional reporting</i>	<i>Multi-division firm, holding company, e.g. chemicals, food</i>
<i>Co-contracting</i>	<i>Medium-/long contract, technology, people, materials, good, service, knowledge</i>	<i>Co-maker ship, joint venture e.g. automotive</i>
<i>Coordinated contracting</i>	<i>Specification, payment, planning and control of information, materials</i>	<i>Projects, e.g. construction</i>
<i>Coordinated revenue links</i>	<i>Contract, performance measures, specification of processes and products/service, brand package, facilities, training</i>	<i>Licensing, franchising, e.g. fast-food chains</i>
<i>Long-term trading commitment</i>	<i>Reservation of future capacity, goods, and services, payments, demand information</i>	<i>Single and dual source, blanker order, e.g. electronics</i>
<i>Medium-term trading commitment</i>	<i>Partial commitment to future works, reservation of capacity, goods, specification</i>	<i>Preferred supplier, e.g. defense</i>
<i>Medium-term trading commitment</i>	<i>Goods and services, payment, order documentation</i>	<i>Spot orders, e.g. stationery purchase</i>

Represented types of relationships and SC can be formed on different ways. For that reason we use different starting points and organization forms.

SCM can also be improved with application of virtual organization (VO) which enables better coordination of cooperation in SCM (and especially coordination of cooperation of all participant of all its different types of relationship) when satisfying the needs and demands of end-consumers.

3. RESEARCH APPROACHES FOR VIRTUAL ORGANIZING OF SCM

Authors use different approaches in research of VO: the concept or activities of organization. In accordance with their intentions authors also expose different viewpoints of VO's activity – for example organizational, managerial, informational, ethical, etc. (Barnatt, 1995; Grenier, Metes, 1995; Goldman et al., 1995; Bleeker, 1998; Mowshowitz, 2002; Franke, 1999; Black, Edwards, 2000; Durban, 2001; Penrose, 2001; Potocan, 2005).

For the need of our research of SCM, various concepts (and treatments) of VO by various authors can be divided in two basic groups (Potocan, 2001; Potocan, 2004; Warner, Witzel, 2004; Potocan, 2005; Potocan, 2007; Potocan, Mulej, 2008; etc.):

- The first group of researchers defines and treats VO as a (new) stage of development in the organization specific activity (in general) and all its areas and levels of its specific activities (as SCM in our research). They assume that the activity of the traditional organization in the modern environment must be adapted to new conditions and demands, especially concerning resources, management structure, technology, values, and knowledge. To define the characteristics of components of the organization criteria of virtuality are used. They define the stage of organization's change from the tangible to the virtual form. The virtual stage of an organization can be somewhere in the interval between the wholly tangible and wholly virtual organizations, and hardly ever in any of the two extremes, in practice.
- The second group of researchers defines and deals with VO especially from the organization and management viewpoints, e.g. stressing the organizational structure. They understand VOs

as legally independent, but economically interdependent due to sharing aims and management of results in the market.

In spite of all differences the approaches are mutually connected and supplement each other. The first approach enables us to understand starting points of transforming of a traditional tangible organization to VO when we discuss about all or selected areas of business (like SCM in our case). It focuses on research of various stages of VO and enables us to more holistically understand the organizational development process. The second concept is focused on handling of the completely virtual organization, as the extreme final phase of development of the virtual activity and/or as the most developed form of the virtual activity of an organization.

4. VIRTUAL ORGANIZATION OF SCM: SOME BASIC CHARACTERISTICS

Organizations try to adapt to conditions of growing dynamization and globalization of business in different ways. At the end of the 1980s an important organizational invention (and in some cases also an organizational innovation) appeared - the idea of a VO (See: Snow et al., 1992; Davidow, Malone, 1995; Allcorn, 1997; Franke, 2002; etc.). In the organization and management theory VO is defined as an organization, which in many cases does not exist institutionally. However, there is a changeable net of organizations and people, which perform processes to reach VO's aims and intentions.

If we start from the organizational viewpoint of SCM, we can understand the VO of SCM as a net of legally independent organizations, which are mutually connected by performing activities of SCM to realize common aims (See: Barnatt, 1995; Grenier, Metes, 1995; Goldman et al., 1995; Nigel, 1996; Bleeker, 1998; Franke, 1999; Durban, 2001; Penrose, 2001; Warner, Witzel, 2004; Slack et al., 2006; etc.). These aims and working toward them makes the connected organizations interdependent: they need each other to succeed.

Most of the definitions suppose that the net of organizations of SCM does not institutionalize the central function of the management. Instead of hierarchy, the informational systems are used to solve informational and organizational problems of integration. The basic advantage of such organization of SCM is – in accordance with the given situation – connecting basic competences of the given organization without forming (institutionally) an integrated organization, which would (could) react to changes in its environment too rigidly.

The VO's activity of SCM is based on two ideas: 1) forming an organization in accordance with the value-chain of SCM (Goldman et. al., 1995; Rayport, Sviokla, 1995; Porter, 1990; Galbraith, 2002), and 2) reaching the most important competences with which the organization can maximise its contribution to the value – once it develops its own competences and concentrates them on its segments of the value-chain of SCM (Porter, 1990; Barnatt, 1995; Bleeker, 1998; Penrose, 2001; Franke, 2002; Slack et al., 2006; etc.).

VO enables (also) overcoming of different obstacles and activity limits – activities of the organization in its environment (e.g. between the organization and environment) and internal organizational activities (e.g. between the organization and its parts). The basic characteristics of the virtual phenomena, which arise between the organization and the environment in SCM are shown in the Table 2 (Potocan, 2001; Potocan, 2004; Potocan, 2005; Potocan, 2007).

Table 2. The basic characteristics of the virtual organizing of SCM, which arise between the organization and the environment

<i>Specifics and characteristics of virtual organizing of SCM I</i>	
<i>A network of legally and economically independent companies</i>	<i>Central management functions are not institutionalized</i>
<i>Focusing on key competences and extensive outsourcing (best-of-everything-organization), inside the network mostly</i>	<i>Cooperation on the basis of common understanding of the business (mission)</i>
<i>Cooperation by vertical and horizontal structures</i>	<i>Substitution of extensive networking of contracts with trust and framework contracts</i>
<i>Connection by information and communication techniques</i>	<i>Arising of ad hoc virtual organizations in a defined network</i>
<i>Common appearance of company parts outward</i>	<i>Risk and costs divided among all partners</i>

Basic characteristics of virtual phenomena, which arise inside the organization, are shown on Table 3 (Potocan, 2001; Potocan, 2004; Potocan, 2005; Potocan, 2006).

Table 3. Basic characteristics of virtual organizing of SCM, which arise inside the organization

<i>Specifics and characteristics of virtual organizing of SCM II</i>	
<i>Blurring task and responsibility fields</i>	<i>Abolishment of work dividing procedure</i>
<i>Target covering of the responsibility field</i>	<i>Project work</i>
<i>Many-fold work of single co-workers</i>	<i>Trust and cooperation</i>
<i>Forming of the organization structure after the process</i>	<i>Optimizing value-chain at the beginning of development of the key competences</i>
<i>Satisfaction of needs and demands of a costumer</i>	<i>Ethics of interdependence</i>

The important positive and negative consequences of VOs (of SCM) are shown in the Table 4 (Potocan, 2001; Potocan, 2004; Potocan, 2005; Potocan, Kuralt, 2007).

Table 4. The important positive and negative consequences of VOs

<i>Positive consequences</i>	<i>Negative consequences</i>
<i>Quick reactions to the needs and demands in the environment</i>	<i>Loss of identification</i>
<i>Specialization on key competence</i>	<i>Loss of flexibility</i>
<i>Economics of scape and scope</i>	<i>Loss of know-how</i>
<i>Use of complementary know-how</i>	<i>Interdependence</i>
<i>Better acceptance</i>	<i>Dispelling responsibility</i>
<i>Assurance of existence with a long-term cooperation</i>	<i>Less profit</i>

Different authors also defined the basic common characteristics of all VOs as an entity of:

- Lack of physical structure,
- Reliance on communications technologies,
- Mobile work,
- Hybrid forms,
- Boundary, and
- Flexible and responsive.

VO can reach the mentioned characteristics in different ways, as for example with the realization of the following activities:

- Forming best-of-everything-organization; partner organizations take active part in VO of SCM with their key-competences;
- Cooperation in VO of SCM can be based on vertical, horizontal and mixed structure;
- Whole connection is based on the usage of information and communication technology;
- Assurance of common appearance of the VO units outwards is important;
- The cooperation plan of SCM is based on common understanding of business; trust and frame contracts replace the exact cooperation contracts;
- A plan of networked organizations of SCM, which enable ad hoc forms of different VOs;
- Forming coordinated decentralization in VO of SCM, which is able to replace institutionalized and centralized management functions in the organization.

When we speak of VO of SCM (and all VO in general), we speak either of “organization with virtual elements” or of “virtual organization with tangible elements”. The distinction may seem unimportant, but it is not. The continuing presence of the tangible world in VOs means, there managers also must continue to learn and practice the basic management skills as well as learn the new skills, required when dealing with this new environment.

5. SOME CONCLUSIONS

A supply chain is a strand, or chain, of operations within an organization’s supply network which passes through the organization. There are many different terms (and the concepts describes by them – e.g. purchasing and supply management, physical distribution management, logistics, merchandising, material management, and SCM), some of which overlap, which are used to describes various parts of the SC. They represent an increasing degree of integration between the linkages of SC.

SCM is a broader and strategically more significant concept which includes the entire SC from the supply of raw materials, through manufacture, assembly and distribution to the end customer. It includes the strategic and long-term consideration of SCM issues as well as the shorter term control of flow throughout the SC.

The exact nature of the relationship between the different linkages within the SC can be viewed on a continuum which goes from highly

integrated at one extreme through to temporary and short-term trading commitments at the other.

The organization tries to define the totality of working tasks, its mutual relationships, connections and synergies, as well as mechanisms for the suitable connection and coordination of organizational factors.

For the formation of the working of SCM, the organization is able to use different starting points. The challenge of managing in modern organization is to achieve and sustain the right mix between the people, technology and knowledge the organization possesses. To do this, managers must first ensure that they have determined their goals and set out a workable strategy to achieve them. They must then develop the right organizational processes and structure with the best mix of real and virtual elements for meeting that goal. Finally, they must invest into the right technology to enable the requisitely (tangible and/or) virtual space to be created.

The VO of SCM as a business concept is still very much in its infancy. It has been theorized about, albeit to a limited extent; after 2000 a number of papers, articles and books were produced which talked up the ideal of VO of SCM and forecasted it to be the organization's way of managing (and especially managing of SC) of the future.

Despite of differences, researchers share opinion that transforming the classical tangible organization into VO of SCM is not possible without innovative change of ethics of all important people in an organization.

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