

## SYMBIOTIC AND PARASITIC SUPPLY CHAINS

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**Abstract.** The aim of the paper is to identify and characterize radically different models of supply chains. On the one hand, it tends to indicate the economic basis of theoretical existence and development of these different models and, on the other hand – that reconstructs their basic attributes. According to authors the model of symbiotic supply chains are one example of sharing economy institutions. The presented model should be treated as ideal types (of the Weberian sense), which is extremes actual business practice. It can become the starting point for assessments of real supply chain and design directions of their improvement.

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## 1. INTRODUCTION

The question often posed about the nature of the business. Is it the cooperation with partners or rivalry? The answer to this question is sought both by reference ethical as well as by reference to the criteria of efficiency. This problem is considered through the prism of behavior management and employee, it means individual people or small groups. In this study, the question is posed from the point of view of business enterprise groupings, and, more particularly, from the point of view of the nature of the cooperation between enterprises and creating an integrated supply chain.

The aim of the study is to identify and characterize radically different models of supply chains. On the one hand, it tends to indicate the economic basis of theoretical existence and development of these different models and, on the other hand – that reconstructs their basic attributes.

## 2. SUPPLY CHAINS AS KEY FACTORS OF COMPETITIVENESS

If in a very summarized form indicate the main economic megatrends of the modern world, the most commonly mentioned processes of globalization of the world economy and the expansion of ICT. Globalization is defined as “a process, a particular type of internationalization of enterprises, which, along with international expansion also includes a specific type of coordination, configuration and integration of individual operations outside of the home market” (Banacki & Gorynia, 2013, p. 8). In turn, the ICT “refers generally to a family of technologies that collect, process and store information in electronic form” (Społeczeństwo..., 2010, pp. 7).

Globalization is co-created by the transnational corporations, which “decisively create a global network of business, operate export and import, make capital account of the multibillion-dollar values. Created and utilize a global transport network, and in recent years have become major investors and creators of the modern world information and communication network” (Muller, 2004, p. 50). At the end of the first decade of the twenty-first century, transnational corporations have decisive importance in the creation of global GDP and in the world of international trade. The largest 300 transnational corporations produced the approx. 25% of world GDP and build its approx. 70% of world trade, and 78 000 of these corporations controlled by ownership 927 000 of their foreign affiliates (Gash, 2012, p. 35). Undoubtedly, this means stepping up international industrial cooperation, and in the wake of this dynamic increase in the intensity of international transport.

These processes have become reasons for the development of global logistics, which requires the global supply chains management. “Its purpose is to connect geographically dispersed around the world sourcing, production sites and markets

for finished products and provide customer better and better product availability by increasing the usefulness of space, time and form in international scale” (Tubielewicz, 2015, p. 1024). This increase in the geographical scope of the activities of transnational corporations has created an obvious difficulty, namely the need to overcome the distance space-time. The tool solves that problem is the ICT technology.

Information Decision Support Managers is primarily related to the possibilities of electronic data exchange system, i.e. EDI (electronic data interchange). In recent years, additional features EDI systems arise from the implementation of data exchange using the Internet (Krawczyk, 2011, p. 32–68). Application of these systems is the replacement of paper by their digital versions, which is associated with the reduction in compression costs and the time required to access the message. Factor strengthening the efficiency of global supply chain management is also Telematics. First of all, it allows supervision of the transport, communication and receiving information about the safety of people and cargo, and diagnostics and repair logistical devices (Krawczyk, 2011, p. 115). Finally, the hallmark of an efficient supply chain management is a broad use of RFID (radio frequency identification). It allows further reducing the cost of acquiring and using knowledge and even greater compression time access to information. It also allows and facilitates the monitoring of movement of goods, identification of manufacturers and allows for efficient recycling or utilization. RFID technology enables just wireless transfer of information stored on the miniature radio tags (Rutkowski, 2003, pp. 2–6).

There is no doubt that the current companies seek to occupy an attractive competitive position in their market and it is reason, because the companies are under great pressure from rivals. Managers of companies make decisions in the conditions of the so-called “concurrent competitive pressures” (Banaszyk, 2015, p. 17). On the one hand, the product offer directed to the market should be the cheapest. On the other hand, in turn, – it must be adapted to customized requirements. After the exhaustion of simple sources of cost reduction of economic activity in the enterprise, an important area for further reduction, it is the logistics. According to Natalie Fabb-Costes logistics creates for approx. 12% of the total cost of the final product. However, this requires integrated supply chain management, which optimize the cost of business in the supply chain as a whole and not separately in its individual cells. Adapting to customer requirements should include the use of agility (flexibility) of the supply chain. According to Martin Christopher agile supply chain has four main properties. First, it is commercially sensitive, which is based on flexible adaptation to changing market requirements (instead of setting the implementation of the forecast, the attitude should be directed to the characteristics of demand). Secondly, it is virtual, i.e. based on information exchanged between suppliers and buyers, not conditioned by a fit of stock in the warehouse. Thirdly, it integrates processes, which involves co-operation with the supplier of the recipient, joint development of products, and common databases and information systems. Fourth and finally, to be cross-linked, which creates a federation of companies

collectively shaping their competitive position on the market for final products. (Christopher, 2000, pp. 39–40).

Agile management of integrated supply chain becomes so important, that is a key factor for competitiveness in a global economy.

### 3. THEORETICAL BASICS OF MODELING SUPPLY CHAINS

Economic concepts, which are the justification and explanation of the logic design and supply chain management can be called economics exchange and economy cooperation. Each of these concepts somewhat differently describes and explains the basic principles and methods of economic cooperation between autonomous economic entities. Such entities are independent companies, which are the cells of both local and international supply chains. In the first place it will be reconstructed and interpreted assumptions of economics exchange, and – economic cooperation.

The economics of exchange, a central concept and operation of business is the act of purchase – sale. From a legal point of view, it involves the transfer of ownership of goods from the seller to the buyer in exchange for a fixed price (Encyklopedia, 2016). Partners of this transaction are naturally parties with conflicting expectations. The seller is interested in the highest possible price, and the buyer wants to keep it as the lowest. Of course, in conditions of perfect competition both have no effect on its size, but the transactions in the supply chain are not concluded in just such a system. Buyers and sellers are federated because of technical – technological relationships and realized and planned investments resulting from joint development strategy. Transactional strength of the provider and the recipient due to the specific conditions related to the economic potential of each partner, their strength of the market brand, the possibilities of potential substitution partner etc. It is assumed that each of the counterparties pays to carry it out, but executed on the market the final added value can be already divided differently. The greater part of it belongs to one of the partners in the transaction, the more it has transactional strength. In an extreme case, one of the partners gets only income covering costs and financing minimum profit and other partner wins the whole added value of the created by both. In business practice, the company that dominates the supply chain impose conditions for financial settlements to other participants, and in the longer term requires them to gradually periodic price reductions individual transactions. For example, a global company IKEA uses a special system to select suppliers, which is described in the IKEA way on purchasing products, materials and services. One of the requirements is a commitment to the cyclical reduction in production costs by 3% to 15% depending on the sector (Kilijańska, 2012). Providers of course, want cooperation with IKEA, because in the long term it ensures implementation usually very large orders. The price, however, is the gradual deteriora-

tion of the profitability of sales of the supplier, because of the cooperation agreement competes constantly many potential suppliers from around the world. IKEA can therefore use their transactional advantage and enforces its supply policy. This is not an isolated mode of operation, but typical for large, global corporations.

Economics cooperation is based on mutual realization of services, usually by sharing resources and shared manufacture of products. The basic requirements of the implementation of economic cooperation are (Hamari et al., 2015, p. 2):

- First, open the database to which access was granted to all partners of the supply chain. This information is characterized by market demand and the final strategic plans for product innovations.
- Second, the common (peer-to-peer) to finance investment projects important for the competitiveness of the final market. This can be done by mutual loans or the so called crowdfunding.
- Thirdly, collaborate in real time through the extensive use of ICT.

Economics cooperation thus presupposes mutual assistance in important projects and for the general treatment of potential operations and the development of the supply chain as a common – pool resources.

Hau Lee describes the case of one of the factories Hewlett Packard, which otherwise acting reasonably maintained low inventory levels thus minimizing the total cost of your own. However, it lengthened the period of delivery of integrated circuits to the factory that manufactured the printers. However, because the plant is not able to extend the service time of the final customer itself maintained a high level of inventories of finished products, i.e. printers. The factory producing integrated circuits minimizes costs and thus resulted in an increase in cost throughout the supply chain, because the printer require significantly more funding of the working capital than its component, ie. integrated circuit (Lee, 2005, p. 100). The logic of the formation of the cost of throughout the supply chain requires knowledge sharing by suppliers and determine the rules of participation in surplus arising due to suboptimal economic activity of one of the partners.

You can expect that most of the managers and employees of companies operating under the pressure of market competition is similarly educated and similar thoughts. Probably they dominate views in accordance with Porter's vision of the relationship between suppliers and buyers, under which everyone is looking for transactional advantage over the partner perceived as a competitor. Common values requiring maximize the economic added value for their own shareholders incline partners to behave in line with the model of the zero-one game.

According to Mark Barratt (2004, pp. 35–38) culture of cooperation, internal and external partners trust, reciprocity of benefit, mutual exchange of information, communication and mutual understanding, openness and honesty are essential factors for cooperation along the supply chain. Hau Lee (2005, p. 93) reduces these factors to the exchange of information and knowledge between units of the supply chain for the creation of a situation incentive to improve the efficiency of operations.

#### 4. CHARACTERISTICS OF DIFFERENT MODELS OF SUPPLY CHAINS

From the point of view of logic operations and the development of supply chains models can conceptualize by two descriptions of their functioning, due to the above characterized theoretical explanations. One model proposes to call the parasitic and other the symbiotic.

Frame construction scheme supply chain model is constituted by the following parameters:

- The basic premise of strategic managerial decisions:

It concerns the selection of the basic criterion for shaping the supply chain. The existence of the supply chain means that managers resigned from the construction of autarkic, vertically integrated conglomerate, where the main tool for coordination is the hierarchy. Aspiration to concentrate its financial and human potential on so called core business, results in the implementation of outsourcing strategy. Of great importance is the phenomenon of particular assets. The greater is the degree of the action potential complementarity to a partner potential, the lower is the possibility of alternative use of these assets. Every supplier therefore has an economic interest in maintaining and nurturing cooperation with its receiver. Williamson argues that if transaction costs do not change, it increases the cost of the potential change of the partner. The cost of potential change, the supplier must include in the price of delivery, unless it is concluded long-term contract diminishes the ability to change the partner. If that happens, it's a calculated cost of changing your partner can be reduced, and from this point of view, the cost of cooperation is cheaper (Williamson, 1998, pp. 97–107). “The purpose of the model of supply chain management is to maximize profit through the increase of competitiveness of the final products. The competitiveness is achieved by reducing operating costs and execute economic tasks in the shortest possible time. It is possible, if the supply chain along its entire length is closely coordinated in order to minimize the total inventory, eliminate bottlenecks, compress time and eliminate quality problems” (Waters & Rinsler, 2014, p. 3). The relationship of competition thus migrates from between companies (as in the M. Porter model) at the level of supply chains.

- Configuration of the supply chain:

It concerns the selection model of the supply chain organization. In simple, spectrum of possibilities includes three main forms: linear, network and cluster. Linear supply chain is the simplest possible and relies on cooperation successive suppliers and subcontractors getting a lower grade. Products (material goods or services) produced by the supplier are components used by the recipient in his business. The chain starts with manufacturers of raw materials and ends with the company offering the final product to the final consumer. The network supply chain is more complicated, as it appears in the virtual relationships. Some of the participants in the network work to other participants without coming into direct

interaction with participants realizing the fundamental business operations, forming a kind of the main supply chain, around which formed the network. Supply network is so much more complex than the classical supply chain and thus more difficult to manage and more at risk. In order to minimize the risk of a sufficiently complex network generally evolves to the cluster supply chain that uses the mechanisms of self-regulation. Around the companies which are the main cells of the supply chain, they formed local networks managed by the main company (Stevens & Johnson, 2016, pp. 32–24).

- Dominating information system:

It relates to a process of mutual communication in the supply chain. There are three main methods: formal, transactional and relational. Formal information system uses a paper carrier, and is codified individually for each a cooperation. The agreement contains just a very detailed arrangements between partners who define the expected product and the conditions for its acceptance by the recipient. Transactional information system uses computer software EDI, which allows the transfer of standardized data sets between autonomous computerized systems. This EDI system avoids multiplication operations to collect and transform information and accelerates their use. Relational information system has of course a computer character, but databases are centralized. The warehouse is the form of this databases, which having access rights may at any time use.

- Used the income statement:

It consists in choosing the preferred method of cost calculation of economic activity. Of course, in any case, the calculation has to reliable information on the costs incurred and the formation of prerequisites for a decision on how to minimize them. There are three methods of identification and settlement costs, namely cost accounting, the activity based costing and life cycle costing. The classic account of the cost of using the system either nature of expenses, or expenses by function and provides overall information on the operating costs of each participant in the supply chain separately. It is an account full cost accounting is usually made for a specific product or group of products (Skarżyńska, 2012, p. 44). As each participant in the supply chain differently defines its products, and the total cost of production included not only direct costs, but also indirect, therefore knowledge of the formation of the production cost of the final product is very approximate. From the point of view of reliability of the information about the real cost of production of the final product, activity based costing is better. In this method, products are the only source of the necessary actions to produce them. The unit of account become a individual action or a group of actions (Skarżyńska 2012, p. 45). Of course, the monitoring of activities costs in the complex supply chain requires full access to economic information from each of the participants in this chain. A particular difficulty is the inclusion into calculation the costs that are incurred after the sale of products to customers and ultimately the consumer. Last greatly emphasizes the importance of the final activities that are referred to as the reverse logistics. The reasons are ecological and ethical. That's why appeared proposals conducting life-

cycle costing of products. In this account it comes to a total settlement of both the so called marketing cycle costs (the product development, market launch, and market maintaining and withdrawal from the market), and environmental cost cycle, that is costs of negative, external economic effects occurring in each phase of the marketing cycle (Joachimiak-Lechman, 2014, pp. 82–84).

The symbiotic supply chain model assumes the implementation of outsourcing strategies of all economic activities that third companies can more efficiently perform. This is how the network configuration of the organization of the chain and in the case of more complex chains – even cluster. Coordination of activities of participants in the chain requires intensive exchange of information, because EDI systems can assert themselves insufficient, it is reason for popularizing the practice of using a data warehouse. In essence, this means the right to mutual access to strategic information for all or most of the members of the network. Cost management should be carried out throughout the supply chain to optimize the size of the point of view of the final product targeted to the consumer, taking into account the costs of reverse logistics. Of key importance is develop a fair distribution of surpluses among all participants in the chain. Parasitic supply chain model also assumes the implementation of outsourcing strategy. However, the organization is dominated by linear supply chain, only with elements of very complex network. Coordination of economic activities of network participants is primarily formal with possibility limited use of EDI systems. Access to information of strategic importance is heavily restricted, and only the information absolutely necessary for the satisfactory performance of the supply chain are exchanged. Each of the participants in the chain operates its own cost accounting, and is interested in strengthening its transactional power to gain an advantage over a partner and take over most of the worked out financial surplus.

The presented models should be treated as ideal types (of the Weberian sense), which are extremes actual business practice. They can become the starting point for assessments of real supply chain and design directions of their improvement.

## 5. CONCLUSION

Considerations presented above are part of the discussion of the meaning and future of the so called sharing economy. It is a concept that allows a more rational use of available resources. It refers to the idea of sustainable development and corporate social responsibility. You can expect that – as stated – symbiotic supply chains are one example of sharing economy institutions. Another advantage of them is undoubtedly the social externality which required the formation of trust between participants of the symbiotic supply chain and the common creation of knowledge between them.

The reasoning may be regarded as a working hypothesis. Checking requires the empirical observation of real efficiency of the supply chain in line with the two highlighted models.

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