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THE ESSENCE AND SCOPE OF SUPPLY CHAIN STRATEGY

The article addresses the issue of strategic decisions undertaken while managing supply chains. Conclusions are drawn from economics, logistics, operations, marketing, supply chain and strategic management literature review.

Conducted research proves that three groups of supply chain strategic decisions could be distinguished: supply chain structure forming, relations crafting and supply and demand synchronization. The listed decisions reflect three levels of organization strategy: corporate (supply chain structure), business (relations) and functional (synchronization). Transaction costs and strategic positioning theories provide comprehensive basis for supply chain strategic decision analysis.

The idea of Supply Chains and Supply Chain Management

The idea of the integrated supply chain has been developed in management literature since early eighties of XX century. From the narrow logistics perspective supply chain is restricted to materials and information flows from suppliers, through manufactures and distribution centers to retail outlets and final customers. For example, M. Christopher defines supply chain as" a network of connected and independent organizations mutually and cooperatively working together to control, manage and improve the flow of materials and information from suppliers to end users"[1]. In broader sense "the supply chain is any combination of processes, functions, activities, relationships and pathways along which products, services, information and financial transactions move in and

[1] M. Christopher: *Logistics and Supply Chain Management. Creating Value – Adding Networks*. Prentice Hall 2005.

between enterprises"[2]. It means that every enterprise has its own internal supply chain which is a link in many external configurations. Furthermore, the logistics is only one part of supply chain process and it can not be considered as a synonimus for supply chain management concept. According to the Council of Supply Chain Management Professionals (non-profit organization which is better known under former name the Council of Logistics Management): "Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies"[3]. The demand management is relatively new component within supply chain management concept which helps the suppliers to understand the customer's buying processes as well as to build customer relationships. It is still less recognized element in logistically oriented supply chain designs[4]. Nevertheless based on the product – relationship matrix, Cooper and Slagmulder distinguished four key decisions and activities areas in the integrated supply chains management, such as[5]:

- configuration of product and network, which covers the decisions concerning the main rules of cooperation,
- formation of the production network, mainly the choice of production facility and warehousing locations as well as their capabilities,
- product design with involvement the research and development abilities of suppliers,,
- process optimization in order to reduce cycle times and inventory level in the cost-effective way.

Despite that there is no consensus of the contemporary supply chains and supply chain management definitions, the essence of the concepts is focused on changing customer-suppliers relationships from traditional power and competition to trust and close collaboration in order to receive synergy effects in terms of value added and competitive advantage. It is always focused on efficient integration of its links and coordination of the main value-added business process from the supplier to the final customers.

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[2] J. Gattorna: *Living Supply Chains. How to Mobilize the Enterprise Around Delivering What Your Customers Want*. Prentice Hall, 2006, p. 2.

[3] CSCMP Supply Chain Management Definitions, www.cscmp.org.

[4] See: W.E. Hoover, E. Eloranta, J. Holmstrom, K. Huttunen: *Managing the Demand- Supply Chain. Value Innovations for Customer Satisfaction*. John Wiley and Sons, New York 2001.

[5] R. Cooper, R. Slagmulder: Supply Chain Development for the Lean Enterprise – Interorganizational Cost Management. Productivity Press, Portland 1999, p. 10.

Strategic decisions and their hierarchy

Strategic decisions are long term and their results are difficult to change. Moreover, they deal with high complexity, future, hence involve a lot of risk. Strategic decisions undertaken within a company could be divided into three groups, in accordance with management level and the level of detail:

1. Corporate strategy which embraces the following decisions: growth direction (eg. market development, product development, diversification), growth pace (stabilization, expansion, defense of position) as well as form of growth (internal, capital, contractual);
2. Competitive/business unit/sector strategy – includes decisions concerning company's relations with competitors, clients, suppliers within each sector the company plan to operate. In particular, competitive strategy should provide answers to the following questions:
   a. Where to compete/cooperate (whole market, chosen segment)?
   b. What to compete with (value delivered to the final customer – price, quality, innovativeness, time, others)?
   c. Whether to compete (direct competition, avoiding competition, cooperate)?
   d. What kind of relations are developed with suppliers and clients (transactions, partnership, acquisition, merger)?

From SCM point of view, vertical relations (supplier – client), are of the greatest significance. Nonetheless, concerning the broad understanding of supply chain, according to which it includes both vertical and horizontal constellations, relations with competitors (competition, strategic alliances, mergers, acquisitions) should be also taken into account.

3. Functional strategies – include details of mentioned above strategies. But to put it differently, they not only describe the mechanics of implementing corporate and competitive strategy across various functions, but simultaneously they indicate the possibilities as well as barriers of its full implementation. Furthmore, functional strategy can be understood as a means for supporting the firm's overall strategic good to achieve competetive adventage.

Supply chain management is based on process not function approach to company. Hence, identification of functional strategies might rise some concerns. To address this issue Lambert distinguishes process, instead of functional strategies for the sake of SCM[6].

[6] See: K. Croxton, S. Garcia-Dastugue, D. Lambert, D. Rogers: *The Supply Chain Management Process.* „International Journal of Logistics Management" 2001, Vol. 12, No. 2, p. 13-36.

Strategic decisions within supply chain

Concerning described above levels of strategies, three types of strategic decisions regarding supply chain could be listed:

A. Forming supply chain structure;
B. Shaping relations with supply chain members;
C. Designing rules of synhronization between demand and supply streams.

It should be highlighted that although described separately, described decisions are linked closely, being undertaken simultaneously.

A. Supply chain structure formulation

Supply chain structure stands for constellation of companies forming supply chain, as well as roles these companies play, i.e. manage/perform activities/processes included in supply chain. Such understanding of supply chain structure is closely related to business model definition presented by Obłój (formulation of value chain allowing for efficient utilization and renovation of resources and competences[7]) as well as concept of business architecture defined by Trocki (the way of shaping group of companies, which collaborate at achieving business goals, along with mutual links among those companies[8]).

Strategic decisions regarding formulation of supply chain structure include:

1. Construction of value system and roles each supply chain member plays in the system – **logic of responsibilities/activities deployment;**
2. Number, location and capacity of nodes forming production-logistics net – **spatial deployment of activities**.

As far as value system construction is concerned, the starting point is definition of key competences in the context of value provision to the chosen market segments. The competences that provide competitive advantage to the company should be controlled internally, while the others, especially those performed by the other companies in the most efficient manner, should be outsourced[9].

It should be underlined that the above general recommendation is, to some extent, a simplification. First of all, decisions concerning integration/ disintegration of value chain (usually known as make or buy decision) are

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[7] K. Obłój: *Tworzywo skutecznych strategii*. PWE, Warszawa 2002, p. 98.
[8] M. Trocki: *Kształtowanie struktur działalności gospodarczej*. „Organizacja i Kierowanie" 2000, No. 4, p. 28.
[9] S. Cohen, J. Roussel: *Strategic Supply Chain Management.* McGraw Hill, New York 2005, p. 15.

sophisticated and next to obvious potential benefits (other company could perform a certain activity faster and at lower cost) pose a risk and certain costs (uncertainty concerning reliability or quality of external company, increase of transactional costs). Regarding the theory of transactional costs by Williamson, it should be flatly stated that decision concerning outsourcing of activity depends upon specialization of necessary resources, uncertainty (caused by opportunism) and eventually repetitiveness of transactions[10]. Moreover, next to transactional problems, the issue of great importance while configuring supply chain is the level of autonomy of activity/process in question. In case, the activity is closely related to other activities strategic alliances are better way of supply chain structure formulation than outsourcing[11]. Secondly, as Prahalad, Ramaswamy and Kay states, the core competence next to ability to manage/perform chosen activity/process, could be also the ability to coordinate activities undertaken at different stages of value system. According to Prahalad, Ramaswamy coordination means collaboration at value creation and generation of value at the points of interactions of collaborating companies[12]. Kay explains that the core competence is the ability to create and manage "relative contacts" – unwritten rules of collaboration among employees and other companies, members of value system[13].

On the basis of the above description, Obłój proposed three models of value system construction[14]:

- Operator: the company concentrates on chosen aspect of value creations (certain element of value system). In the past that operator model was characteristic for small and medium companies or business units of large enterprises, which specialize in managing a single activity/process within value system, fulfilling the roles defined by supply chain leader. Today the market trends such as outsourcing, lean management, virtualisation and IT development causes changes of role and behaviours of SMEs in supply chains. Analysis of statistical data and observations concerning quality changes proves that these changes consist in:
  - development of new competences and skills connected with requirement of informational transparency for increase of value added;
  - increase of activity and flexibility of SMEs in creation of supply networks utilisind resources of large companies;

[10] O.E. Williamson: *Ekonomiczne instytucje kapitalizmu*. PWN, Warszawa 1998.
[11] H.W. Chesbrough, D.J. Teece: *When Is Virtual Virtous.* „Harvard Business Review", Jan-Feb 1996.
[12] C.K. Prahalad, V. Ramaswamy: *Przyszłość konkurencji. Współtworzenie wyjątkowej wartości wraz z klientami*. PWE**,** Warszawa 2005, p. 8.
[13] Por. J. Kay: *Podstawy sukcesu firmy.* PWE, Warszawa 1996, p. 99.
[14] K. Obłój: *Tworzywo skutecznych strategii*..., op. cit., p. 135-154.

  - establishment and development of revelance of trransactional brokers as new intermediate links between participantes of supply chains;
  - increase of influence of retails on demand forecasting, as well as inventory and supply chain management in the other links of chains;
  - abandoning of logistics self-services for public logistics services centres;
  - decrease of number and independency of small truc companies in fulfilling transportation needs of supply chains[15].
- Integrator: the company takes control over whole or substantial part of value system. At the first glance, integrator is not a proper model for supply chain management. Nonetheless, as Obłój explains, control over value system does not only materialize through mergers/acquisitions of suppliers/clients but also by building long term relations with other supply chain members, where integrator dominates, imposing the rules of value creation (utilizing his bargaining power). The model is characteristic for large companies, usually international corporations. In such cases headquarters control not only its own subsidiaries, but also independent suppliers and clients. The examples of such practices could be find in automotive, beverages, electronics, IT as well as large retailers, e.g. like in Japanese distribution Keiretsu structures with dominant position of the central integrator. The integrator, usually the large and well known brand firm, is not only responsible for establishing and introducing the rules and standards of product, information and finance flowsamong supply chain partners, but it also initiates its suppliers' development and integration. The central coordinator also decides about risk and gains divisions among supply chain participants. The classic example is Toyota Kereitsu structure with just-in-time system fully desribed by Ychiro Monden[16].
- Conductor: the company focuses on chosen areas of value system (which are the core competences) spinning off/ forming strategic alliances for other areas. The very important competence of conductor is the ability of orchestrating activities and competences of supply chain members. A virtual company, which is able to reconfigure supply chain structure in a very fast manner is a vivid example of the conductor model. As Obój explains the size and value of tangible resources owned by conductor is not of primary importance. What really matters is the ability to create and implement supply chain vision and mutual competitive advantage. Conductor is a perfect model

[15] J. Witkowski: *The changing role of SMEs in European Supply Chains*. University of Autonome of Barcelona 2006, 3td EDP Workshop Proceedings, www://webs2002.uab.es/edp/workshop/cd/Proceedings/3EDPW_jWitkowski.pdf

[16] Y. Monden: *Toyota Production system. An Integrated Approach to Just-in-Time*. Institute of Industrial Engineers, Norcross-Georgia 1993.

for supply chain management since he leads supply chain or plays the role of partner in case of cooperation with company that has equally high bargaining power.

The type of model, chosen by a company, determines responsibilities of that company in the supply chain. Operator focuses on carrying out assigned (by the supply chain leader) activities – his role is rather passive. Integrator and conductor set supply chain goals, deploy value net activities among supply chain members, control and motivate them (active role)[17].

The basic feature of supply chains are physical (as well as accompanying information and monetary) flows. Activities undertaken by the cooperating companies are materialized mainly by the number, location and capacity of production/logistics network nodes: production sites, warehouses, logistic centres, sales depots etc. Therefore, the second group of strategic decisions concerning supply chain structure include number, location and capacity of production, sales sites, warehouses (centralization vs. decentralization, shortening vs. extending number of supply chain echelons) concerning efficiency and effectiveness of the whole net[18].

Is should be underlined that as far as value system issues are concerned, decisions are based on qualitative analysis. On the other hand physical construction of production/logistics net is mainly based on optimization techniques: linear/ integer programming and simulations.

B. Shaping relations with supply chain members

The second group of strategic decisions contain formulation of relations with other supply chain members. Building the right set of relations, the company considers the following list of criteria:

- Mechanism of relation: transaction, trust, capital;
- Symmetry of partners;
- Timespan of cooperation;
- Scope of collaboration.

According to Cohen and Roussel, relations within supply chain are formed usually with[19]:

- Customers;

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[17] P.J. Batt, S. Purchase: *Managing collaboration within networks and relationships.* „Industrial Marketing Management" 2004, Vol. 22, p. 170.

[18] According to SCOR model basic supply chain parameters are: reliability, responsiveness, flexibility, costs and efficiency of assets utilization see: www.supply-chain.org.

[19] S. Cohen, J. Roussel: *Strategic Supply Chain*..., op. cit., p. 142.

– Physical goods suppliers;
– Services providers (mainly third party logisticians);
– Competitors.

As far as supply chain relations are concerned, partnership is quoted as a most desirable form. However, this issue necessitates more detailed analysis. According to Lambert, partnership is always carefully crafted relation (non-standard) i.e. is based on specific solutions/undertakings/technologies fitted for individual needs and features of partners[20]. Hence, it is not a standard relation that could be offered to every supply chain member. As Hakansson explains, the less standard supply chain process the higher importance of learning and exchange of knowledge between potential partners[21]. Thus, mutual learning and transfer of knowledge constitutes the main feature of partnership.

Another important attributes of partnership is trust (basic precondition for exchange of business information and common undertakings), engagement of supply chain members (materialized by willingness to define mutual goals, undertake common projects, devote resources for the sake of partnership development) as well as perception of resources and competences of potential partners as a key factor of competitive advantage[22].

To recap, partnership has two dimensions. First, economic, including net benefits (and their distribution). Second, social, concerning trust and engagement.

A literature review proves that partnership is not homogenous[23]. On the contrary, various forms could be distinguished, subject to scope of collaboration (number of co-managed processes) and its strength (level of integration). However, two mains streams are visible in the analysed taxonomies. First, static – partnership type is determined by the specific features of companies (partners): strategic goals, organizational structure and culture, willingness to cooperate,

[20] D. Lambert, M. Margaret, A. Emmelhainz, J. Gardner: *Developing and Implementing Supply Chain Partnerships.* „The International Journal of Logistics Management" 1996, Vol. 7, No. 2.

[21] H. Hakkanson, V. Havila, A. Pedersen: *Learning in Networks.* „Industrial Marketing Management" 1999, Vol. 28, p. 444.

[22] S.L. Golicic, J.T. Mentzer: *An empirical examination of relationship magnitude.* „Journal of Business Logistics" 2006, Vol. 27, No. 1, p. 83-85; S. Cohen, J. Roussel: Op. cit., p. 139, T.M. Simatupang, R. Sridharan: *The collaborative supply chain.* „International Journal of Logistics Management" 2003, Vol. 13, No. 1, p. 15-30; P.E. Evans, B. Wolf: *Collaboration rules.* „Harvard Business Review" 2005 July-August, p. 99-101.

[23] See. S.L. Golicic, J.T. Mentzer: *An empirical examination of relationship magnitude...*, op. cit., p. 81-108; J.M. Whipple, D. Russell: *Building supply chain collaboration: a typology of collaborative approaches*. „The International Journal of Logistics Management" 2007, Vol. 18, No. 2, p. 174-196; H.S. Jagdev, K.D. Thoben: *Anatomy of enterprise collaboration.* „Production Planning & Control" 2001, Vol. 12, No. 5, p. 437-451; T. Skjoett-Larsen, Ch. Thernoe, C. Andersen: *Supply chain collaboration Theoretical perspectives and empirical evidence.* „International Journal of Physical Distribution &Logistics Management", Vol. 33, p. 531-549.

product/demand[24]. Second, dynamic – level of partnership development (scope and level of integration) increases as companies gain more experience in cooperation with a certain partner[25]. The first approach is represented by Lambert, who formulated comprehensive model of cooperation with three main types of partnership subject to length and scope of collaboration[26]. The second approach is advocated by Skjott-Larsen and Whipple[27]. The latter bases his model on concrete supply chain management concept CPFR (Collaborative Planning, Forecasting and Replenishment), accordingly at each level of partnership set of processes/activities is described in great details.

The common feature of partnership models is a negative coloration between level of integration, scope and strength of cooperation and number of partnership relations. As Lambert notices, the most sophisticated level of partnership (the highest integration level) does not exceed more than 2-5% of all inter-organizational relations in supply chain. Therefore the following question should be posed: what other relationship options are available for a company in case potential benefits from partnership are minor or it is not possible to develop partnership due to conflicting goals, asymmetry or other reasons. The answer could be find in governance spectrum described initially in marketing literature[28].

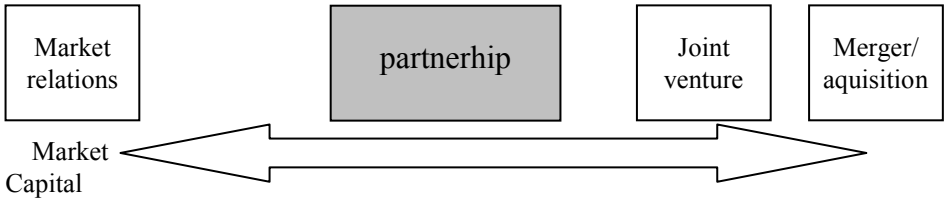

Fig. 1. Continuum of control and collaboration

Source: D.M. Lambert M.A. Emmelhainz, J.T. Gardner: *Developing and Implementing Supply Chain Partnerships.* „The International Journal of Logistics Management" 1996, Vol. 7, No. 2, p. 2.

[24] See. L.-E. Gadce, H. Hakansson: *Supply Network Strategies.* Wiley 2001, p. 142.

[25] See. R. Brennan, P. Turnbull: *Adaptive Behavior in Buyer – Supplier Relationships.* „Industrial Marketing Management" 1999, Vol. 28, p. 481-495.

[26] D.M. Lambert, M.A. Emmelhainz, J.T. Gardner: *Developing and Implementing Suppy Chain Partnerships.* „The International Journal of Logistics Management" 1996, Vol. 7, No. 2.

[27] J.M. Whipple, D. Russell: Op. cit., p. 174-196; T. Skjoett-Larsena, Ch.T. Thernoe, C. Andersen: Op. cit., p. 531-549.

[28] Governance spectrum has been introduced in marketing literature by F.J. Contractor, P. Loranie: *Competition vs. Cooperation: A Benefits/Costs Framework for Chosing Between Fully-Owned Investment and Cooperative Relationships*. „Management International Review" 1988, Vol. 28, Special Issue, pp. 5-18; J. Heide: *International Governance in Marketing Channels*. „Journal of Marketing" 1988, Vol. 58, No. 1. pp. 71-85; F. Webster Jr.: *The Changing Role of Marketing in the Corporation*. „Journal of Marketing" 1992, Vol. 56, No. 4, pp. 1-17.

Market relations are probably the most common form of collaboration between suppliers and buyers. In that case no mutual initiatives improving flows of goods and information are undertaken. Obviously, market relations could be long term. However, trust is replaced here by formal agreements, which describe desirable behavior of both sides of relation. Moreover, market relations are proper for standard products/services, offered by many suppliers. In such cases potential benefits stemming from partnerships are insignificant. Hence it is more effective to choose from the pool of offers to get the best solution in a short term. The advantage of market relations is ability change the contractor when needed, due to market or supply chain changes. Accordingly, market relations remind rather competition but not cooperation. As Harison and Van Hoyek states, only several out of 200 suppliers of Japanese car manufacturers could consider their relations with manufacturer as partnership. The others have to compete for orders on everyday basis[29].

Hierarchical relations are placed on the other side of governance spectrum. They are usually implemented between asymmetric partners, i.e. companies with significantly different sizes, competitive positions, access to unique business information. Although, as figure 1 pictures, capital is a basic mean of control here, supply chain offers more popular ways of control – bargaining power of stronger node. Classic examples could be found among supermarkets and their suppliers. The former exert pressure on price erosion (less money for suppliers), postponing payments of assets reliable (money later available for suppliers)[30]. Another vivid example are car producers that cut lead times for raw materials and semi products (by the means of just in time approach), which usually cause higher inventories at supplier side.

Important feature of hierarchical relations is presence of a strong leader in the supply chain (also known as central coordinator) that sets the vision and goals in supply chain, initiates many activities and control their execution. Usually the role of coordinator is served by a large international or global company – a market leader. However, pending on the sector features, its location in value system and scope of influence over other supply chain member that role vary[31]. According to Peck, the leader has the biggest share in value creation, the best access to the market, the most specialized knowledge and competences[32].

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[29] A. Harrison, R. van Hoek: *Logistics Management and Strategy.* Prentice Hall, New York 2002, p. 219.

[30] See: D.R. Towill: *A perspective on UK Supermarket Pressures on the Supply Chain*. „European Management Journal" 2005, Vol. 23, No. 4, pp. 426-438.

[31] Por. H.Ch. Pohl, S. Mayer: *Trendy i strategie w logistyce europejskiej.* „Logistyka" 1999, No. 6, pp. 6-7.

[32] H. Peck, U. Juttner: *Strategy and Relationships:Defining the Interface in Supply Chain Context*. „International Journal of Logistics Management" 2000, Vol. 11, No. 2, p. 36.

More often, the role of coordinator is taken by fourth party logistics, called also supply chain integrators (4th PLs), who in the name of their client, manage whole supply chain.

It should be stressed that alike in partnership relations, hierarchical constellations are also diversificated:

1. Traditional control – the company utilizes its bargaining power or influence over other supply chain nodes based on legal issues; the leader imposes specific behavior of the other supply chain members or implement penalties (in case of undesirable behavior or effects unsatisfactory results). Control could be utilized under the umbrella of mentioned above CPFR or other supply chain concepts, like VMI (vendor managed inventory). Obviously, basic features of partnership are less important is such cases. First – engagement is replaced here by warrant – e.g. membership in leader's supply chain is conditioned by strictly defined rules of collaboration. Second, trust is replaced by control imposed by the leader. Third – deployment of net benefits – usually the lion share goes to the leader (he optimizes supply chain flows from his own perspective, which usually is not a best/ most profitable solution for other members).
2. Co-control – more similar to partnership. The leader influences the other supply chain members through its reputation, expert knowledge, experience, trying to motivate others to act in a certain way. If in case of traditional control, the most important elements are warrants, described in great details procedures, the focus in co-control is shifted towards social integration (materialized by intense communication, meetings loyalty). Co – control is beneficial for both sides. The leader by setting goals and supply chain standards based on reputation and expert knowledge, increase probability of long-run collaboration with chosen companies (Keiretsu structures[33]). On the other hand the latter, due to cooperation with the strong leader, gain competences or even resources (e.g. access to the sophisticated IT solution)[34].

Based on the above review, modified continuum of supply chain relations (governance spectrum) is presented (fig. 2). It contains three basic forms of relations, available for supply chain members: competence (market transactions), partnership (symmetric relations) and control (hierarchical relations) and their derivatives.

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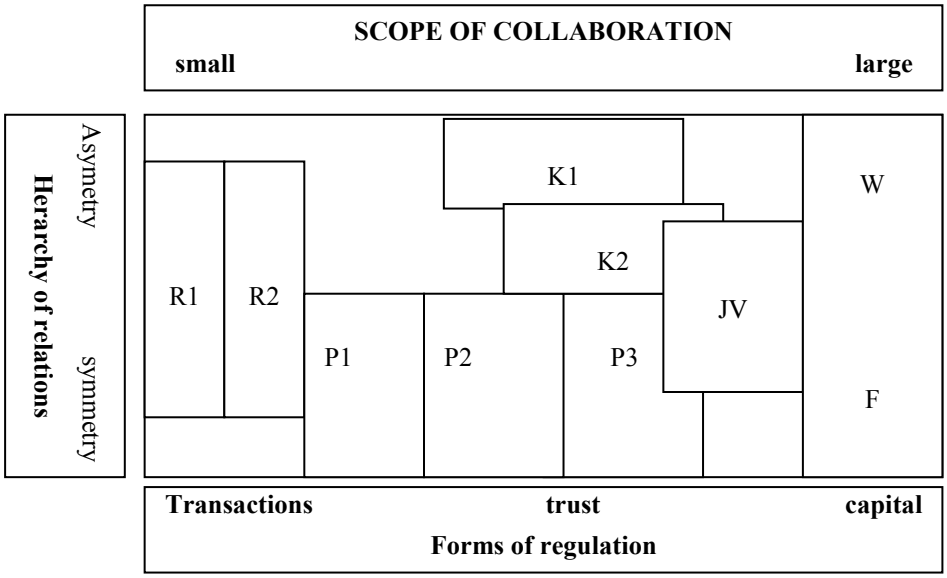
[33] See: J. Witkowski: *Logistyka firm japońskich*. Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław 1998.

[34] Interesting framework of company development resulted in net intersection is net model of internationalization. see: J. Johnson, L.G. Mattson: *Internationalization in Industrial Systems – A Network Approach*. In: N. Hood, J.E. Vahlne: *Strategies in Global Competition.* Groom Helm, London 1996, pp. 278-314.



R1 – market relations, short term, R2 – market relations – long term, P1-3 partnership , K1 – traditional control, K2 – co-control, JV – joint venture, W – acquisition, F – merger

Fig. 2. Modified governance spectrum

Obviously, shaping supply chain relations is a sophisticated task. First, large amount of possible solutions is available. Secondly, choosing from the pool of available options, it is necessary to consider interweaving econocmic, social and technical issues. What is more:

1. Each supply chain is a set of various relations that overlap[35];
2. Supply chain relations are not static and can be changed[36];
3. Change of relations type in one area of supply chain affects the others, hence holistic view is indispensable[37].

[35] See: M. Ciesielski, S. Zimniewicz: *Partnerstwo i dominacja*. „Gospodarka Materiałowa i Logistyka" 2005, No. 4, p. 4; B. Rodawski: *Supply Chain Relationship. Case of Automotive Company*. „Logistyka 2006, No. 5, p. 22 (Introlog 2006, 1st International Conference of Logistics 23-26 September 2006 Proceedings CD).

[36] H.S. Jagdev, K.D. Thoben: *Anatomy of enterprise collaboration. „*Production Planning & Control" 2001, Vol. 12, No. 5, P. 439.

[37] D. Ford, R. McDowell: *Managing Business Relationships by Analyzing the Effects and Value of Different Actions*. „Industrial Marketing Management" 1999, No. 28, p. 431-433.

C. Balancing supply and demand stream

First of all, Considering supply and demand balance, it is necessary, as the term is not unequivocal[38]. According to the Websters Encyclopedia synchronizing means "to occur at the same time or to proceed in the same rate"[39]. For the sake of the article, the understanding of issue in question is understand broader, i.e. as reconciliation between two streams in time and space[40].

Second, the subject of synchronization should be precisely defined. In this case, subject perception of supply chain is helpful, according to which, the synchronization includes spectrum starting from material flows, ending at balancing flows of materials, information, people, knowledge, technology and money. It is regarded here, that primary importance should be prescribed to adjusting demand (flowing through the chain as information – mainly orders and sales/production plans) and supply of goods and services (flows of material and business information). Both flows should be accompanied by the third – money which allows for better deployment of risk and costs and benefits among supply chain members.

In literature, next to presented above scope of synchronization, the following points of view are advocated:[41]:

1. Limited to synchronization of material flow between consecutive elements of production/logistics network (purchasing, production, distribution, retail) – this narrow understanding could be identified with traditional perception of supply chain as a mean of cost reduction;
2. Extended by the issues of designing and commercialization of new products, including, next to material, information and money, also exchange of knowledge and technology;

[38] See: T.M. Simatupang, R. Sridharan: *A benchmarking scheme for supply chain collaboration.* „Benchmarking: An International Journal" 2004, Vol. 11, No. 1, p. 23.

[39] *The New Lexicon Webster's Encyclopedic Dictionary of the English Language*. Lexicon Pulications, New York 1988, p. 1003.

[40] See: *Encyklopedia organizacji i zarządzania*. PWE, Warszawa 1981, p. 506.

[41] See: J. Godsell, A. Harrison, C. Emberson, J. Storey: *Customer responsive supply chain strategy: An unnatural act?* „International Journal of Logistics: Research and Applications" 2006, Vol. 9, No. 1, p. 52.

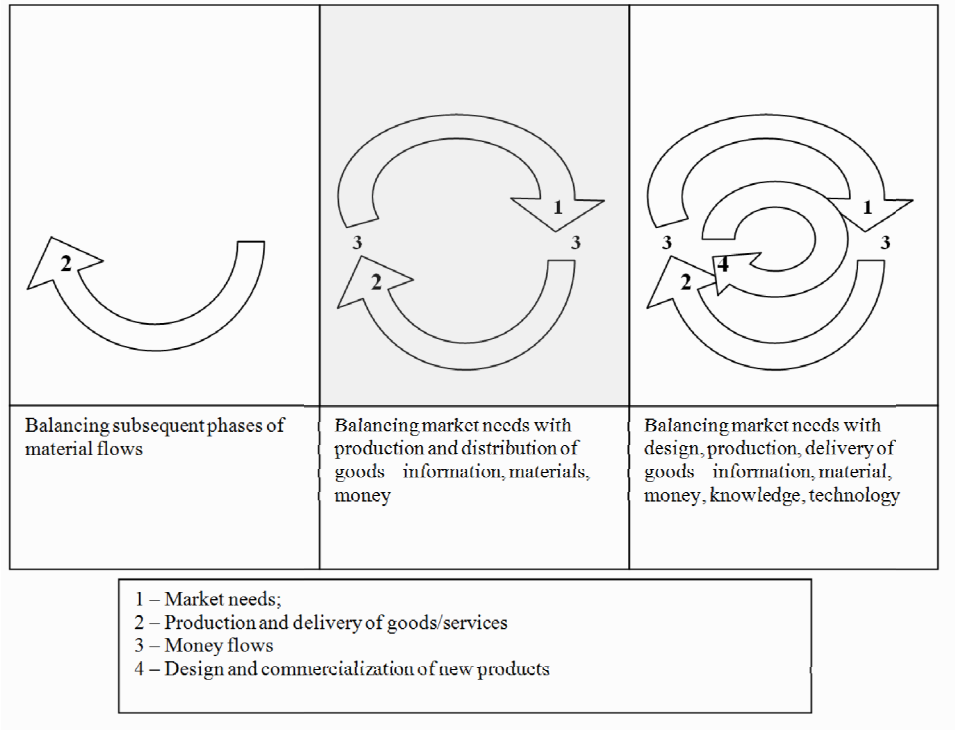


Fig. 3. Supply chain synchronization – applicable approaches

Literature concerning supply and demand synchronization is numerous, but in general based on. On assumption that the mechanism of synchronization is determined by the specific features of demand or more general (as Porter positioning theory states) market specifics. The significant importance here should be assigned to Fisher, who on the basis of demand character, introduced division of products into two broad categories: innovative (uncertain demand – make to order strategies suitable) and functional (certain demand – production and distribution based on demand forecast). Each of the groups should be served by different supply chains[42]. Fisher's model has been further developed by various authors. Christopher and Towill, as dominant criteria of demand

[42] M. Fisher: *What is the right Supply Chain for Your Product?* „Harvard Business Review", March-April 1997, pp. 95-105; M. Fisher: *Making Supply Meet Demand in an uncertain world.* „Harvard Business Review", May-June 1994, p. 83-93.

and supply synchronization, next to demand uncertainty, introduced lead time[43]. Based on combination of these two elements, they segmented possible ways of synchronization. (fig. 4)[44].

Lead time	Long	Lean supply chain Plan and execute	Leagile suppy chain postoponement
	Short	Continous replenishment	Agile supply chain Fas adjustment to demand changes
		High	Low
		Demand certainty	

Fig. 4. Demand and supply synchronization

Source: M. Christopher, H. Peck, D. Towill: *A taxonomy for selecting global supply chain strategies.* „International Journal of Logistics Management" 2006, Vol. 17, No. 2, p. 283.

Next to two basic supply chain models (called by Christopher lean and agile), intermediary solutions has been introduced, which, according to the cited authors, are more pragmatic[45]. The first model is called continuous replenishment. Here certain portion of inventories is located at each echelon of supply stream. The replenishment of inventory is based on real demand (inventories are controlled by real demand not demand forecast). The second intermediary solution, called postponement and or decoupling point[46], gained more attention not, only in logistics/ supply chain but also marketing literature. According to the model, material flows within supply chain are controlled by two different mechanism. Material flows in the lower part of supply chain are controlled by real demand (the main goal here is speed and flexibility), while material flows in the upper part of supply chain are regulated by demand forecast (basic issue are costs). Usually between two parts of supply chain, safety inventory

[43] See: M. Christopher, D. Towill: *Developing Market Specific Supply Chain Strategies.* „International Journal of Logistics Management" 2002, Vol. 13, No. 1, pp. 1-14; M. Christopher, H. Peck, D. Towill: *A taxonomy for selecting global supply chain strategies.* „International Journal of Logistics Management" 2006, Vol. 17, No. 2, pp. 277-278.

[44] Very similar brake down war introduced by Lee, who next to demand uncertainty implemented supply uncertainty as a synchronization segmentation criteria. H. Lee: *Aligning Supply Chain Strategies with Product Uncertainties*. California „Management Review" 2002, Spring, Vol. 44, No. 3, pp. 105-119.

[45] M. Christopher, D. Towill: *Don't lean to far – evidence from the first decade.* „International Journal of Agile Systems and Management" 2007, Vol. 2, No. 4, p. 406.

[46] R. Mason-Jones, D. Towill: *Using the Information Decoupling Point to Improve Supply Chain Performance.* „International Journal of Logistics Management" 1999, Vol. 10, No. 2, pp. 13-35.

is held (called material decoupling point). It should be underlined that two modes of postponement concept are identified. First, postponement of product form (stage of production which execution is delayed until real demand data is gathered). Second, suspension of distribution from central warehouse to next distribution nodes or even client[47]. Postponement of production activities has been additionally broken down by Zinn and Bowersox, who identified for stages of product manufacturing that could be delayed: labeling, packaging, assembly and production of semi products[48]. Production systems within which postponement is implemented are called configure to order.

Obviously the critical issue, in case of postponement, is choice of right location of material decoupling point[49]. Pagh and Cooper propose set of qualitative and quantitative criteria including product/market features, specifics of production and logistics processes which allow for right location of decoupling point[50]. On the other hand Zinn and Bowersox advocate cost model that underpins postponement decision.

As already mentioned, synchronization of supply chain is not limited to the choice of the right material decoupling point location. Cited above Fischer, as an issue of basic importance regards postponement of forecasting[51]. What is more, one of three basic synchronization approach within Supply Chain Operation Reference is engineer to order strategy, according to which not only material flows but also design activities are initiated by real demand[52]. As Reeve explains engineer to order is indispensable in case of prototypes, job-shop production which serve single customer needs[53].

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[47] W. Zinn, D. Bowersox: *Planning Physical distribution with the principle of postponement*. „Journal of Business Logistics" 1988, Vol. 9, p. 118; J.D. Pagh, M.C. Cooper: *Supply chain postponement and speculation strategies: how to choose the right strategy*. „Journal of Business Logistics" 1998, Vol. 19, No. 2, pp. 16-19.

[48] W. Zinn, D. Bowersox: Op. cit., pp. 123-125.

[49] The issue concerning location of decoupling point is explained by J. Nayol, M. Naim, D. Berry: *Leagility:Integrating the lean and agile manufacturing paradigms in the total supply chain.* „International Journal of Production Economics" 1999, No. 62, pp. 107-118; R. Mason-Jones, D. Towill: *Using the Information Decoupling Point to Improve Supply Chain Performance.* „International Journal of Logistics Management" 1999, Vol. 10, No. 2, pp. 13-35; M. Johnson, E. Anderson: *Postponoment Strategies for Channel Derivatives.* „International Journal of Logistics Management" 2000, Vol. 11, No. 1, pp. 19-35; H. Lee, C. Billington, B. Carter: *Helwet Packard Gains Control of Inventory and Service through Design for Localization.* „Interfaces", July-August 1993, pp. 1-11.

[50] J.D. Pagh, M.C. Cooper: Op. cit., pp. 24-25.

[51] M. Fisher: *Making Supply Meet Demand in an uncertain world.* „Harvard Business Review", May-June 1994, pp. 88-89.

[52] SCOR – Supply Chain Operations Reference, www.supply-chain.org

[53] M. Reeve, M. Srinivasan: *Which Supply Chain Design Is Right for You?* „Supply Chain Management Review", May-June 2005, p. 52.

Conclusion

Three main types of supply chain strategic decisions have been described: value system decomposition along with number capacity and location of supply chain nodes, crafting relations with other supply chain members as well as synchronizing demand and supply stream. The above decision could be broken down into each level of strategic decisions. Value system construction includes development form of the company, hence it reflects decisions undertaken at corporate strategy level. Building right set of vertical and horizontal relations mirror decisions within competitive strategy, while location and capacity of logistics/production functional strategies. Synchronization is a specific form of strategic decision, as it interlinks functional strategies (production, logistics, marketing and sometimes research and development).

Strategic supply chain management necessitates changes in strategic thinking. While traditionally the own resources of the company were the subject of strategic analysis and planning, supply chain approach is based on analysis of competences and resources of supply chain members, as they form the value system. Moreover, decisions regarding relations and synchronization must be accepted (more or less) by independent companies (other supply chain members) that they affect. In that context, mutual vision and goals is critical.

Concerning inter-organizational angle of supply chain strategy, two economic theories are of significant importance. First transaction cost theory by Williamson[54], second strategic positioning, the core of competition theory of Porter authorship[55]. As Nicerson, Hamilton and Wada a notice, in both theories, the basic unit of analysis is vertical chain of companies (supply chain members)[56].

Transaction cost theory is focused on relations between organizations that handle subsequent elements of production process and behave according to limited rationality and opportunism[57]. It could stand for a proper framework to explain why company decides to shift from market/hierarchical relations to

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[54] O. Williamson: *Strategizing, economizing and economic organization*. „Strategic Management Journal" 1991, No. 12, pp. 75-93.

[55] M. Porter: *Competetive Advantage. Creating and Sustaining Superior Performance*. Free Press, New York 1985; M. Porter: *What is Strategy?* „Harvard Business Review" 1996, No. 6, pp. 61-78.

[56] J.A. Nickerson, B.H. Hamilton, T. Wada: *Market position, resource profile, and governance: linking Porter and Williamson in the context of international courier and small package services in Japan*. „Strategic Management Journal", Vol. 22, 3, pp. 251-273.

[57] See: O. Williamson: *Ekonomiczne instytucje kapitalizmu. Firmy, rynki, relacje kontraktowe*. Wydawnictwo Naukowe PWN, Warszawa 1998, pp. 58, 60.

partnership. Lack of trust (main precondition for partnership) needs to be compensated by formal agreements, regulations, sanctions execution, which may lead to negative economic results – higher transaction costs. If the latter are regarded to high, the best solution to eradicate them is development of trust, hence partnership.

Porter's theory regards proper strategic choices through building intra- and inter-organizational value systems. These systems should be based on the right understanding of customer needs (demand features, expected lead time) and reflect the latter, which means that Porter's theory provide universal basis for demand – supply synchronization models.

Mentioned theories should be regarded as complementary. The basic assumption of transaction cost theory – limited rationality is accompanied by the lack of axiom concerning companies attitudes in Porters theory, which does not answer the question what types of behavioral patterns allow for competitive advantage gain. On the other hand, tenet of Porter's theory, concerning diversity of clients and as a result, necessity of adjustments to changing demand is not tackled by Williamson's model.

Strategies of companies are formulated as a result of strive to gain certain market (competitive) position, utilization of resources that allow for minimization of production and transactional costs as well as the management system of resources. Hence, the choice of the right supply chain strategy can be boiled down to the combination of market position, resources and management system that allows for increase of value added[58].

Thus, both theories allow a unique view of strategic management within supply chain – the strategy should be formulated as a result of interactions between current and future market position, management systems, resource pool within value system subject to savings within transaction and production costs. Combination of the listed elements determines goals and means of supply chain strategy is presented on fig. number 5.

[58] M. Ghosh, G. John: *Governance Value Analysis and Marketing Strategy*. „Journal of Marketing" 1999, No. 63, pp. 131-145; J.A. Nickerson, B.H. Hamilton, T. Wada: *Market Position, Resource Profile, and Governance: Linking Porter and Williamson in the Context of International Courier and Small Package Services in Japan*. „Strategic Management Journal" 2001, No. 22, pp. 251-273.

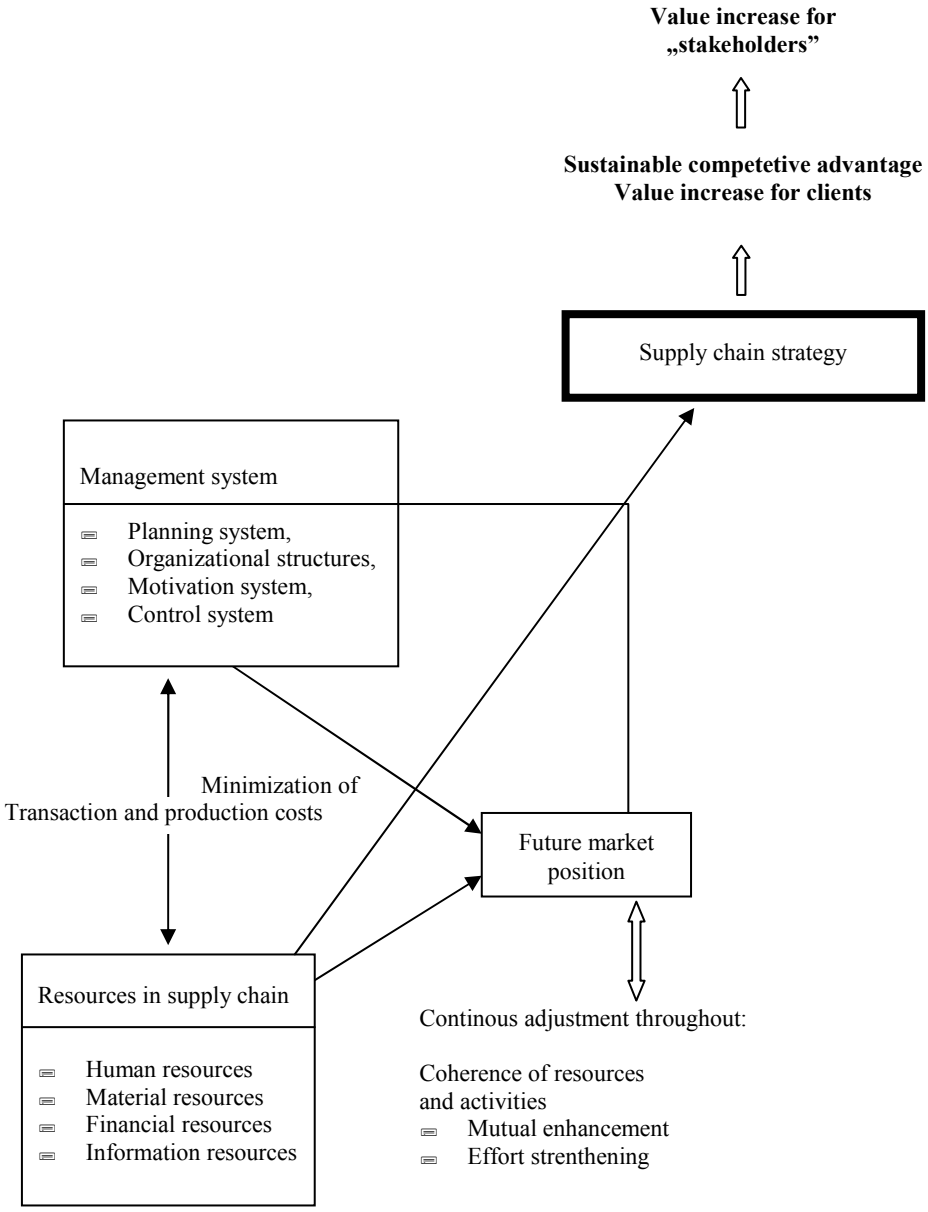

Fig. 5. Interdependence of factors crucial for building and pursuing supply chain strategies

Source: J. Witkowski: *Zarządzanie łańcuchem dostaw. Koncepcje, procedury, doświadczenia*. PWE, Warszawa 2010, p. 65.

The choice of the right market position increase the chances of gaining competitive advantage. However, to make it sustainable, continuous adjustments of strategic decisions and activities undertaken by supply chain members are necessary. Otherwise followers will reach the same competetive position.

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