THE EMERGENCE AND EVOLUTION OF THE CONCEPT OF THE SUPPLY CHAIN MANAGEMENT

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1. Introduction

The supply chain concept can be studied from many perspectives and one of them is management of business relations. According to Drucker [1], business management has entered the era of inter-network competition and the ultimate success of single business will depend on managers ability to integrate the company's network of business relations. Modern supply chain concept puts emphasis on relationships and collaboration between members.

The key words we can trace in almost all supply chain definitions are: *flow, relationships, network and value.*

2. Modern Manufacturing and the Concept of Supply Chain Management

The origins of supply chain concept can be traced in manufacturing. Forrester [2] showed that the lack of flow co-ordination causes the increase of inventory levels in all supply chain ("Forrester effect"). From the production point of view supply chain comprises purchasing and materials management and the product distribution is left for marketing or marketing logistics. At the same time, the emphasis on inventory flow co-ordination indicated the advent of modern supply chain concept.

New challenges of the marketplace in 1980 forced to review the logistics management tasks and techniques. "Supply chain management: logistics catches up with the strategy ", an article written by Oliver and Webber [3], resulted in fundamental shift in managers perceptions about materials management. Oliver and Webber [3] defined the difference between supply chain and classic materials and manufacturing control.

According to Oliver and Webber [3] supply chain:

1. Has to be managed as a single entity
2. Depends on strategic decisions

Key word	Author	Definition
Network, value	Christopher [4]	The supply chain is a network of organizations that are involved, through upstream and down stream linkages, in the different processes and activities that produce value in the form of products and services in the hands of ultimate consumer
Flow	Cooper and Ellram [5]	Supply chain management is an integrative philosophy to manage the total flow of distribution channel from supplier to ultimate user
Value/value chain	Frayer & Montzka [6]	Integrated supply chain management implements a co-ordinated total supply or value chain from determination of external customer needs through products/service development, manufacturing/operations and internal/external distribution
Relationships	Lambert, Cooper, Pagh [7]	Supply chain represents a new way of managing the business and relationships with other members of supply chain.

3. Uses inventories as balancing mechanism
4. Requires an integration versus simple transaction

In other words, Oliver and Webber [3] based supply chain concept on two key issues: system approach and strategic thinking.

Cox [8] defines the operational (or, according to Cox "orthodox") paradigm of supply chain management as a set of tools and techniques that provide increased effectiveness and efficiency. The operational paradigm heavily bases on conception of lean production developed and implemented by Toyota company. According to Cox [8], lean approach to manufacturing seeks to minimise inventory and to move towards a "just-in-time" environment wherever possible. "Just-in-time" conception represents the change in buyer-supplier relationships and bases on trust and long time relationships versus bargaining and single transactions. At the same time I would like to stress that "just-in-time" technique doesn't go into supply chain and concentrates mostly on buyer-supplier relationships management.

As Maskell [9] pointed out, lean or word class manufacturing bases on doing things you can control. Agile deals with things we can not control. Definitions "things we can not control" reflect the shift in consumer demands. Maskell [9] stress that consumers require small quantities of highly customised, design-to-order products where services and value-added benefits are as important as the product itself. According to Mason-Jones, Naylor, Towill [10], the essence of the difference between leannes and agility in terms of the total value provided to the customer is that service is the critical factor for agility whilst cost is crucial for leannes.

Christopher and Towill [11] applied the concept of agility to supply chain management. They stress that "Forrester effect" still exists. According to Christopher and Towill [11], conventional logistics systems are based upon the paradigm of optimal quantities of inventory and its spatial location. Virtual agile supply chain is information- rather than inventory- based and has the following features:

1. Market sensitive
2. Process integrated
3. Virtual
4. Organised as network

Agile supply chain has sold "the inventory problem". EDI and, more recently, Internet enabled partners to act upon the same data and there is no need to keep the inventories as the buffer from market uncertainties. Christopher's [11]definition of agile supply chain is close to conception of buyer-driven global commodity chain developed by Gereff [12]. Gereff [12] stress flexibility, co-ordination, contract production as the key features of buyer driven commodity-chain. The concept of outsourcing or contract production is one of the cornerstones of agile supply chain. Such industries as personal PC or fashion goods widely practise the outsourcing techniques and the supply chains of personal PC and fashion goods are the examples of agile supply chains (see Christopher and Towill 2000 [8], Mason-Jones[10]).

Summing up, we can say that supply chain concept has changed considerably and presents the emphasis shifts:

from inventories to information,
from local to global,
from forecast driven to demand driven,
from chain to network,
from physical to virtual,
from interface to integration.

3. System approach to supply chain concept

In broad sense, the system is a set of components and relations among them. In 1950 general systems theory was implemented to re-design manufacturing operations. Success in this area encouraged the further use systems methodology. It is thought that the extension to this methodology can be used to go beyond the boundaries of individual company to the supply chain. This thinking represents the attempts to implement logistics concepts to supply chain management. For example, Christopher [13] says that the concept of supply chain management is in fact no more than an extension of the logic of logistics. There below I'll briefly describe the conventional view to logistics and supply chain and I'll try to go a little bit further arguing that modern supply chain needs new system approach.

Arbnor and Bjerke [14] give 4 system models:

1. Mechanical systems
2. Biological systems
3. Self-organizing systems
4. Value-laden systems

Traditionally, the logistics and supply chain systems are considered as self-organizing systems. Ac-

cording to Arbnor and Bjerke [14], self-organizing system uses his energy (in case of companies – resources) to correct its course if there is any deviation. In response to environment changes (market demands higher customer service levels) logistics system uses basic trade-offs to create new service level at a certain total cost level. The logistics system activity centres are: transportation, warehousing, inventory management, order processing.

Schary and Skjott-Larsen [15] argue that supply chain is a distinct form of organization with the following attributes: supply chain includes all functions and activities in product and material flow; the supply chain links materials management and physical distribution into a single system; the supply chain is driven by customer demand and service requirements. It is more than technical interchange but a process of co-ordination of the activities as a single entity. Schary and Skjott-Larsen [15] define logistics as to be oriented primarily to the processes of a single firm. The supply chain embraces the entire set of processes and organizations from the source to final customer. In other words, the supply chain concept is the extension of logistics system thinking. Logistics and supply chain concepts differ in system magnifying levels. A low magnifying level is the logistics system and a higher level is the supply chain. In case of supply chain the system parts are companies.

The value-laden system approach is a new challenge for supply chain concept. According to Christopher and Towill [11] modern agile supply chain represents a new style of relations as companies go towards co-operation and integration. The new phenomenon is called "extended enterprise" with blurred company's boundaries, trust and commitment relations. Rigby [16] points out that: "Any agile supply chain supply chain must have a common element of human, subjective social experiences which influences purposeful action which is shaped by the shared histories of actors in a supply network". In other words, *modern supply chain represents value-laden system model rather than simple self organizing system.* Christopher and Towill [11] stress that agile supply chain has network pattern.

Supply chain has become a fashionable concept in business management and at the same time it definitely lacks the theoretical approaches. The question is: if we speak about relationship management, what kind of relationships we have in supply chain?

According to Arbnor and Bjerke [14] value-laden system has his culture consisting of basic values and perceptions. How is it possible to create basic common values within the entire supply chain? I argue that contributions from network theory should be relevant to the application of the model of value-laden system. Johanson and Mattson [17] define two kinds of network relations:

1. Exchange
2. Adaptation

Exchange processes include exchange of information, goods, services as well as social exchange. Through adaptation processes actors are adjusting to each other's needs. Technical, social and legal bonds create lasting relations between the network actors. In other words, actors gain knowledge about their network partners. Through exchange and adaptation actors create basic values and perceptions. Summing up, the network concept of inter-organization relationships provides the background for value-laden system model application.

4. Conclusions

In this article I have discussed some theoretical approaches to supply chain management. We can trace the origins of supply chain management in the seminal book of Jay Forrester "Industrial Dynamics" where the need of physical flow co-ordination was pointed out. New challenges of the marketplace in 1980 forced to review the logistics management tasks and techniques.

The supply chain concept was defined as the strategic and system approach to logistics management.

Lean manufacturing and agile processes represent the shift in the supply chain management thinking.

System	System unit	System target
Logistics / intra company level	Company activity centers	Customer service level
Supply chain / inter company level	Organizations	Strategic contingency

Modern supply chain concept bases on integration and network co-operation issues. The key concepts of IMP network theory and value-laden system model were taken as the theoretical background to describe the inter-organizational relationships within the supply chain context.

Literature

1. P. F. Drucker. Management's New Paradigms // Forbes Magazine, 1998, October 5, p. 25–38.
2. J. W. Forrester. Industrial Dynamics. Productivity Press: Portland, OR, 1961. 369 p.
3. K. R. Oliver, D. M. Webber. Supply Chain Management: Logistics Catches up with Strategy // M. Christopher. Logistics: The Strategic Issues". Chapman & Hall, 1992. 304 p.
4. M. Christopher. Logistics and Supply Chain Management. Strategies for Reducing Costs and Improving Services. Pitman Publishing, 1992. 258 p.
5. M. C. Cooper, L. M. Ellram. Characteristic of Supply Chain Management and the Implications for Purchasing andLogistics Strategy // The International Journal ofLogistics Management, Vol 4, No 2, 1993, p. 20–31.
6. D. J. Frayer, R. M. Montzka. Enhanced Strategic Competitiveness Through Global Supply Chain Management // Annual Conference Proceedings. Council ofLogistics Management.
7. D. M. Lambert, M. C. Cooper, J. D. Pagh. Supply Chain Management: Implementation Issues and Research Opportunities // International Journal ofLogistics Management. Vol 9, No 2, 1998, p. 1–19.
8. A. Cox. Power, Value and Supply Chain Management. Supply Chain Management // International Journal, Vol 4, No 4, 1999, p. 1–15.
9. B. Maskell. The Age of Agile Manufacturing Supply Chain Management // An International Journal, Vol 6, No 1, 2001, p. 5–11.
10. R. Mason-Jones, B. Naylor, D. R. Towill. Engineering the Leagile Supply Chain // International Journal of Agile Management Systems, 2000, p. 54–61.
11. M. Christopher, D. R. Towill. Supply chain migration from lean and functional to agile and customised. Supply Chain Management // An International Journal, Vol 5, No 4, 2000, p. 206–213.
12. G. Gereff. The Organisation of Buyer-Driven Global Commodity Chains: How U.S. Retailers Shape Overseas Production Networks. Commodity Chains and Global Capitalism. Praeger, Westport, Connecticut,London, 1994. 292 p.
13. M. Christopher. Logistics and Supply Chain Management. Second Edition. Pearson EducationLtd, 1998. 294 p.
14. I. Arbnor, B. Bjerke. Methodology for Creating Business Knowledge. SAGE Publications, 1997. 548 p.
15. T. Skjoet-Larsen. Supply Chain Management: A new Challenge for Researchers and Managers inLogistics // International Journal ofLogistics Management, Vol 10, No 2, 1999, p. 41–53.
16. C. Rigby, M. Day, P. Forrester, J. Burnett. Agile Supply: Rethinking Systems Thinking, Systems Practice // International Journal of Agile Management Systems, 2000, 2/3, p. 178–186.
17. J. Johanson, L-G. Mattsson. Interorganisational Relations in Industrial Systems – A Network Approach Compared with the Transaction Costs Approach // International Studies of Management and Organisation, Vol 17, No 1, 1987, p. 34–48.

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TIEKIMO GRANDINĖS KONCEPCIJOS ATSIRADIMAS IR EVOLIUCIJA

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Santrauka

Nagrinėjama tiekimo grandinės, kaip tarporganizacinių santykių valdymo būdo, atsiradimo priežastys ir raidos etapai. „Foresterio efektas" paskatino kompanijas atkreipti dėmesį į koordinacijos ir bendradarbiavimo svarbą. Kompanijos suprato, kad, norint efektyviai valdyti atsargas, būtina į tiekimo kanalą žiūrėti kaip į visumą, o ne kaip į firmų sumą. Viena iš svarbiausių tiekimo grandinės valdymo koncepcijos atsiradimo priežasčių buvo ta, kad atsargų valdymo ir kitoms logistikos problemoms spręsti pradėti taikyti sistemų teorijos metodai. Tačiau tradiciniai logistikos metodai negali išspręsti strateginių koordinavimo problemų. Todėl Oliveris ir Webberis (1982) teigia, kad kuriant kompanijos strategiją tiekimo grandinės valdymo koncepcija turi atlikti ne tik operatyvinį, bet ir strateginį vaidmenį.

Modernioji tiekimo grandinės koncepcija remiasi „lieso" (*lean*) ir „aktyvaus" (*agile*) proceso metodais. Jų tikslas – kuo geriau ir operatyviau patenkinti vartotojo poreikius. Tradiciniai sistemų teorijos požiūriai į tiekimo grandinę kaip į mechaninę-biologinę sistemą jau nebetinka. Reikia atsižvelgti į kompanijų elgesio ir tarpusavio bendravimo ypatybes. Todėl šiuolaikinei tiekimo grandinei labiau tiktų ne mechaninės, bet vertybių sistemos paradigma. IMP tinklo teorija teigia, kad tinklo narių (kompanijų) tarpusavio santykius galima paaiškinti remiantis tokiomis sąvokomis kaip „apsikeitimas" (informacija, žiniomis) ir „adaptacija". Straipsnio pabaigoje autorius siūlo tiekimo grandinės, kaip vertybių sistemos, procesams nagrinėti taikyti IMP tinklo modelį.

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