Sborník vědeckých prací Vysoké školy báňské - Technické univerzity Ostrava
číslo 4, rok 2009, ročník LII, řada hutnická
článek č. 1587

SCORING SUPPLY CHAIN

B. RODAWSKI[1]

[1]Wrocław University of Economics

ABSTRACT: One of the most influential supply chain management theoretical constructs, used by both practitioners and academics is SCOR model (Supply Chain Operation Reference), a framework developed and endorsed by Supply Chain Council (SCC). This cross-industry standard not only defines the set of universal supply chain processes, but also provides information on their design, best management practices, technologies and measures, all necessary to make supply chains a truly competitive tool. In most publications SCOR is perceived from a static angle, as a hierarchical model, consisting of three layers, each describing supply chain processes in greater details. However, SCOR could be also used as a six-stage supply chain improvement process map. The article accommodates description of the model. Additionally, the author provides insights, gained during implementation of SCOR pilot project in pharmaceutical company.

KEY WORDS: supply chain, Supply Chain Operations Reference, improvement project

1 INTRODUCTION

From its inception in 1982[3], the term supply chain management is used to represent a bulk of different meanings. With the exponentially growing number of academic publication devoted do supply chain management [6], the variety of SCM definitions has been adopted by the authors [2]. The above situation is reflected among practitioners, as their perception of what supply chain management embraces, differs from company to company [5]. Most people use the term as a synonym of logistics [4] that includes suppliers and customers, others as a merger of logistics and operation [9] or logistics and marketing [3], while still others as a set of all the cross-functional processes that creates value for the final customer [8].

Considering the mentioned facts, the attention of both academicians and practitioners should be shifted towards supply chain reference models, which allows to build a consistent and sharp cross-industry frames of the analysed, still evolving field of management. Among numerous approaches to SCM model building, two constructs are the most recognizable:

1. Disseminated by the Global Supply Chain Forum – pictures SCM as a set of three interrelated elements: network structure (supply chain members as nodes along with links connecting them), supply chain management processes (include 8 cross –functional and inter-organizational processes that creates value for the final customer) and management components (methods harnessed to integrate and manage 8 processes) [8];
2. SCOR (Supply Chain Operations Reference) endorsed by Supply Chain Council – being developed voluntary by practitioner companies associated within SCC. SCOR is the subject of further investigation in the remainder of the article.

2 THE BASICS OF SCOR

[3] It is agreed that the phrase *supply chain management* was coined by Oliver and Webber in 1982, although the main ideas and assumptions of SCM were formulated much earlier, just to mention research conducted by J. Forrester on industrial dynamics in late 1950's.

Since its foundation in 1996, Supply Chain Council has developed the framework for supply chain management. Two courses of action have been taken:

1. SCOR amendments: through 12 year long period SCC introduced 9 version of the model; compared to its initial release, SCOR was supplemented among others by the additional process – return, risk and environmental management issues, broader set of metrics, best practices and technologies supporting SCM; what is more its convergence with lean management and six sigma techniques is advocated [13,14].
2. As SCOR embraces production and logistics processes only (narrow view of SCM), two complementary reference models were proposed: CCOR (Customer Chain Operations Reference) [12] in 2004 and DCOR (Design Chain Operations Reference)[12] in 2006. Both models, akin to SCOR, are organized among five basic business processes that are further broken down into process categories and elements. CCOR describes marketing and sales as well as post – delivery services, while DCOR addresses research and development activities. Taken together the three models reflect the broadest perception of supply chain management, also called value chain management (fig. 1)

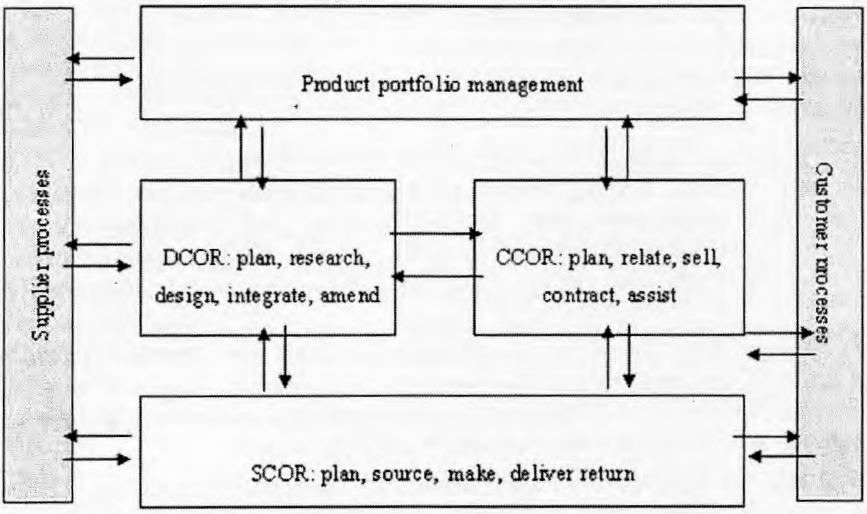

Figure 1 Value chain Model

Source: Bolstorff P., Rosenbaum R., *Supply Chain Excellence,* AMACOM 2007, s.5, Supply Chain Council, *Customer Chain Operations Reference Model (1.0), 2004,* www.supply-chain.org, Supply Chain Council, *Design Chain Operations Reference Model (1.0), 2006,* www.supply-chain.org, Supply Chain Council, *Supply Chain Operations Reference Model (8.0), 2008,* www.supply-chain.org,

Beyond any doubts SCOR development and dissemination should be regarded as a mainstream of SCC activities. The model itself is based on three main pillars:

1. Processes – the model defines and describes processes that supply chain management includes; it should be highlighted that the model has a hierarchical (3 level) structure – at the top level five main processes are listed and introduced (plan, source, make, deliver and return) – at this level the boundaries of SCM are defined; at the middle level the main processes are broken down into categories (e.g. make is divided into make to stock, make to order and engineer to order categories) – level two allows for SCM configuration; at bottom level each process category is described as a set of interrelated actions, each with its specific inputs and outputs;
2. Performance measures – the model defines five performance attributes of supply chain, three of them customer focused (reliability, responsiveness, agility/flexibility) and internal facing. The attributes stand for the sources of competitive advantage. To each attribute a set of

performance measures is prescribed. They allow analyzing and evaluating the supply chain against competitive chains. The measures have also a hierarchical structure.

3. Best practices – the SCOR model provides one or more best practices for virtually each of the process categories. Best practices apply to management methods (e.g. vendor managed inventory) as well as technologies (e.g. electronic data interchange).

3 SCOR AS A SCM PROJECT ROADMAP

It should be stated flatly that SCOR should not be boiled down to a set of definitions, metrics and best practices. Along with project management discipline, change management approach, problem solving techniques, the model facilitates supply chain management improvement. P. Bolstorff and R. Rosenbaum advocate the six step approach SCM project [1]:

- Step one – project organization;
- Step two –supply chains identification;
- Step three – analysis and measurement of the basis of competition (performance attributes);
- Step four –analysis and design of material flows;
- Step five - analysis and design of workflow;
- Step six – prioritization and implementation of improvement projects;

Each step will be described in turn. Additionally author's experiences steaming from SCOR pilot project, henceforth referred to as Pharma project, are accommodated.

The first step includes: forming project team, providing its members with the necessary knowledge on supply chain management and SCOR model and identifying the project goals. Executive sponsor (reviews and approves changes), project manager, steering team (approves recommendation) and design team (analyses and redesigns supply chain) constitute SCOR project structure.

Based on his experience, the author believes that the project team should consist of employees representing each of the analysed SCOR processes. Accordingly, the most important benefit stemming from the fist step is the formulation of cross-functional team, which members are granted an unique opportunity to cooperate with each other for the first time.

The goal of step two is to identify supply chains that cut across the company. They are usually defined by a set of combination: product, geography and customer. To each of identified supply chain sales and costs should be prescribed, so that the prioritization of the former is possible (table 1).

Table 1 Pharma supply chain segmentation

customer / products	Wholesalers	Other pharmaceutical producers	Costs
Make to stock	SC1		81%
Make to order		SC2	19%
sales	85%	15%	

Source: author's own

According to the author's observations, the perception of supply chains among team members differs, depending on functional area that certain member represents. People from purchasing or production tend to segment supply chains according to products (specification of their manufacturing process), while sales and marketing employees analyse supply chain through the lenses of markets and clients. Only by merging the ideas of both angles, the reasonable supply chain types could be identified. Moreover, the level of details while segmenting supply chains should be also determined by availability of financial data (namely sales and costs pertaining to each supply chain). Theoretically, supply chain could be defined for each product and each client, however it is not always possible to gather necessary financial and business data (they cannot be measured). Accordingly at this stage cooperation with controlling/ financial department is crucial.

During step three performance attributes of each identified supply chain (as described in the previous chapter) are ranked. To each of the five attributes one or more metrics are ascribed (SCOR defines more than 100 metrics). Next the data from the company and its sector are collected, so that the attributes are measured and the company's position in the sector is established. Last but not least the competitive gaps between actual and desirable attribute level are identified, and then the gaps are translated into profits potential (table 2).

Table 2 Analysis of Pharma's SC2 top ranked performance attribute (Competitive Basis)

Attribute	Metric	Actual	Sector parity 50th percentile	Sector advantage 70th percentile	Sector superior 90th percentile	Gap/ improvement goal
Supply chain response-veness	Order fulfillment cycle time (weeks)	25	35	30	17	8

In Poland, the most important problem presents gathering benchmarking data. Usually it is not possible, as required data bases does not exist, and companies are not willing to participate in potential research. Besides, such a field research (collecting data among companies) would increase the costs and time of the project. Accordingly, author advocates identifying improvement goals without benchmarking competitors or using international SCOR data-basis [10]. The most important point during this step is to realize what are the competition basis and how to measure them. Such an approach provides the strategic character of the improvement project.

Stage four starts with mapping current material flow (including planning activities that triggers moves of material throughout the chain), identifying disconnects and their negative impact on basic metrics and performance attributes. Next, based on available best practices, improvements within material flows (and the planning process) are proposed. Obviously, the way, proposed improvements are expected to influence measures and performance attributes are investigated (potential to feel the identified earlier gaps). During the above stage, SCOR level two process categories are used to build the map of supply chains – both, current and desirable (figure 2).

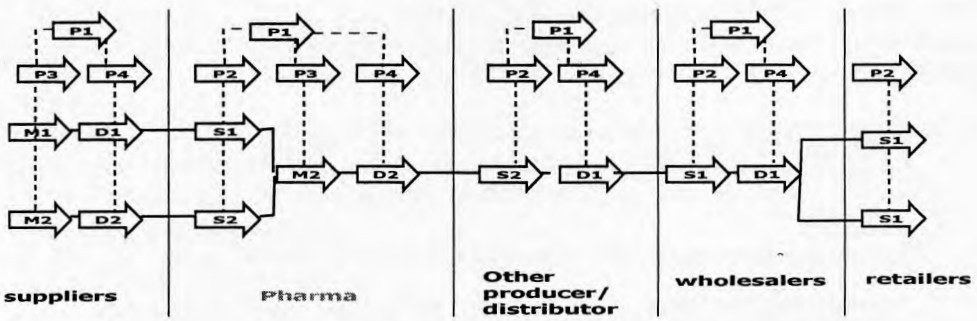

Figure 2 Pharma's SC2 material flow diagram using SCOR process categories
Source: author's own

According to the author, during supply chain mapping, the project team learn the whole system and gains an understanding of how decisions made within each functional area affect the other parts of supply chain. As Pharma project team members underlined, one of the most important points stemming from mapping, is that functional areas (within a company not to mention suppliers and customers) have usually conflicting goals that cause inefficiencies in other parts of supply chain. The Pharma project team experienced some problems with identifying processes categories for suppliers and wholesalers, hence the author advocates inviting representatives of supply chain partners, especially if improvement potential lies in better cooperation with them.

Step five includes the most detailed analysis. Each process category, identified during stage four, is broken down into elements (operations connected by information or transactions that triggers them). It is suggested that the project team walks each process category in order to get the proper understanding of how the work is done, to collect the information on business rules, IT technologies harnessed and eventually time of each operation. As a result the work flow diagram for each process category is created and disconnects are identified (figure 3). Next based on identified disconnects, SCOR best practices pertaining to each process category and element, possible solutions (improvements) are ascertained (desirable workflow map is created).

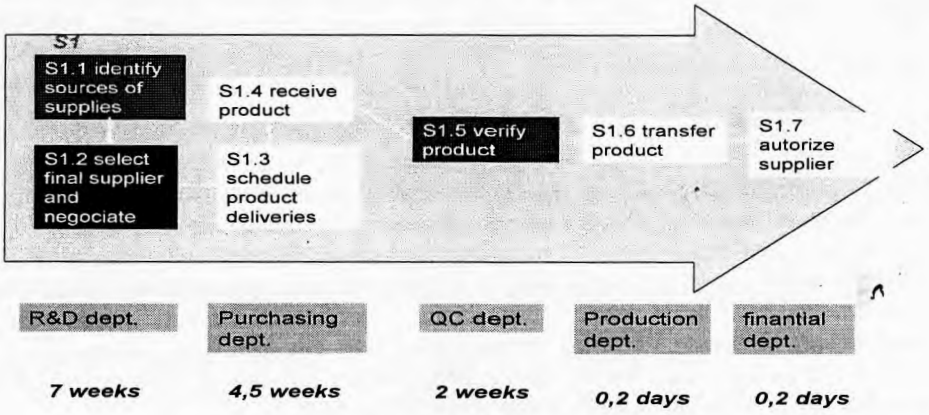

Figure 3 Workflow diagram of Pharma's "source stock product" process category
Source: author's own

The author does not recommend mapping workflow at the desk. First because coordinator from outside the company will never be able to understand the workflow, second because team members are not able to identify all the necessary information concerning operations and their interconnections. Therefore it is necessary to walk the processes and interview its actors.

Step six: based on outputs of material as well as work flow mapping the list of possible SCM improvement projects is built. Each project idea should be ranked in order of their potential to close the competitive gaps identified during stage three. Highest ranked projects should be implemented in turn (figure 4).

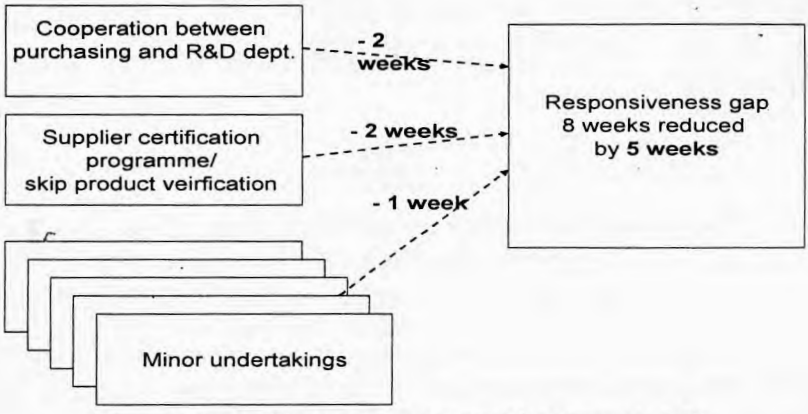

Figure 4 List of improvement project for Pharma's SC2
Source: author's own

According to the author, not only potential benefits but also costs pertaining to each project should be carefully investigated. CPFR (Collaborative Planning Forecasting and Replenishment)

might for example necessitate substantial IT investment. Therefore potential benefits and foreseen costs of each project should be balanced against each other (discounted cash flow technique is advocated), and then projects should be ranked in order of their potential and profitability.

4 CONCLUSION

Improving supply chain by means of SCOR in not an easy task. First of all the SCOR itself is sophisticated and large (description of version 9 fills 650 pages). Hence, before embarking on SCM improvement, a few weeks should be devoted to SCOR studying. Second, project team plays the critical role. Academician or any other consultant from outside the company is not able to ascertain supply chain improvement ideas. His/ her role should be reduced to project coordination and education. Other work should be done by the team. Last but not least, having participated in SCOR team, employees change the way they perceive their work. They start considering how their decision will influence other parts of the chain, which in author's opinion is one of the most important precondition to build world class supply chain.

5 REFERENCES

[1] BOLSTORFF P., ROSENBAUM R., *Supply Chain Excellence,* AMACOM 2007.

[2] BURGESS K., SINGH P.J., KOROGLU R., *Supply chain Management: a structured literature review and implications for future research,* International Journal of Operations & Production Management, vol. 26, nr 7, 2006.

[3] CHRISTOPHER M., Supply Chains: A Marketing Perspective, in New S., Westbrook R., (eds.), Understanding Supply Chains. Concepts, Critiques and Features, Oxford University Press, 2004.

[4] COYLE J.J., BARDI E.J., LANGLEY JR., C.J., *Zarządzanie logistyczne,* PWE, Warszawa 2002.

[5] GIBSON B.J., MENTZER J.T., COOK R.L., *Supply Chain Management: the pursuit of a consensus definition,* Journal of Business Logistics, 2005, vol 26, no 2.

[6] GIANNAKIS M., CROOM S.R., SLACK N., *Supply Chain Paradigms*, in New S., R. Westbrook (eds.)., *Understanding Supply Chains. Concepts, Critiques and Features,* Oxford University Press, 2004.

[7] LUMMUS R.R., VOUKURKA R.J., ALBERT K.L., *Strategic Supply Chain Planning,* Production and Inventory Management Journal, 1998, nr 3.

[8] LAMBERT D.M., (ed.), *Supply Chain Management, Processes, partnerships, Performance,* SCMI, Florida 2006.

[9] RUSSEL R.S., TAYLOR B.W., *Operations Management Along the Supply Chain,* Wiley, 2009

[10] SCORmark, www.apqc.org/promos/partners/channel/SCC.html.

[11] SUPPLY CHAIN COUNCIL, *Customer Chain Operations Reference Model (1.0), 2004* www.supply-chain.org.

[12] SUPPLY CHAIN COUNCIL, *Design Chain Operations Reference Model (1.0), 2006,* www.supply-chain.org.

[13] SUPPLY CHAIN COUNCIL, *Supply Chain Operations Reference Model (9.0), 2008*www.supply-chain.org.

[14] SWARTWOOD D., *Converging with Six Sigma and Lean*, www.supply-chain.org.

Reviewer: doc. Ing. Radim Lenort, Ph.D.