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## MODEL OF SUPPLY CHAIN MANAGEMENT PROFICIENCY

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**Summary:** The article focuses on supply chain management proficiency. According to the authors, companies have to go through four stages in order to develop supply chain management expertise. Each of the stage is described by means of enablers (features of a management system that allow to reach higher stage) and elements (features of supply chain management at each stage).

**Key words:** supply chain management, supply chain proficiency, stages to develop SCM expertise, enablers, elements.

### 1. Introduction

Supply chain can be defined as a group of companies (starting from first suppliers, ending at retailers) that cooperate to provide a final customer with a value (product and/or service that she/he expects). Accordingly supply chain management should be comprehended as managing all intra and inter organizational activities that create value for the final customer. The article focuses on supply chain management proficiency. According to the authors, companies have to go through four stages in order to develop supply chain management expertise.

### 2. Supply chain management best practice

World class supply chain management that is perceived as a sustainable source of competitive advantage, has the following features:

- supply chain members share common goals and formulate mutual supply chain strategies;
- supply chain members cooperate in the development of mid- and short-term business plans;
- supply chain performance is measured globally (not only locally), which facilitates eradication of sub-optimization;
- intra and inter-organizational processes are co-managed by various departments and companies (supply chain partners);

- market data drives supply chain activities (e.g. procurement, manufacturing or delivery);
- new products are launched in a fast and effective manner;
- sophisticated IT technologies are utilized to gather, analyze and share business information between supply chain partners in a real time.

Presumably most of the supply chains do not meet all the listed features. Only a few companies could name their supply chains world class systems. Those organizations are global industry leaders. They have already managed to implement sophisticated SCM solutions. But foremost they have shifted their mindset, being now able to “think outside the box” i.e. they are willing to partner with members of their supply chains, i.e. other independent organizations.

On the other hand, most of the companies have been trying to undertake some supply chain initiatives, doing it more or less consciously. Those are usually internal projects aiming at streamlining value adding processes or eliminating conflicting business goals. In some instances the initiatives in question go beyond a single company, and lead to cooperation with strategic suppliers or customers.

Therefore, it should be stated flatly that a world class supply chain management is a long term, multi stage process/project, and most companies are at different stages of their route to supply chain management proficiency. Below the four stages model is briefly described.

### 3. Evolution model

The model consists of two parts: enablers and managements elements. Enablers facilitate reaching the next stage of supply chain proficiency. They should be regarded as a supply chain management environment. The enablers were divided into soft and hard ones. The first group is connected to organizational culture and seems to be the most difficult to change (improve) in a short run. Unfortunately, according to observations cultural elements are most often ignored while implementing supply chain projects. Hard enablers embrace organizational structure, IT technologies and cost management systems. Organizational issues are usually omitted, similarly to cultural elements. However, sophisticated IT technologies and cost management approaches are more often implemented. Nonetheless the potential they provide is not fully utilized, mostly due to cultural and organizational elements that lag behind.

Management elements consist of strategic issues and processes. At strategic levels supply chain goals, design, plans and measures have to be considered. Based on observations, the authors assume that most supply chains have no goals and long term plans set, accordingly supply chain efficiency and effectiveness are not measured. Mastering supply chain processes is closely connected with their streamlining and integration. At the first two levels of supply chain proficiency internal integration is achieved. Afterwards inter-organizational integration of processes should be accomplished.

**Table 1.** Soft enablers of supply chain management proficiency

Feature	I	II	III	IV
	No – integration (conflicting goals)	Internal integration (consistent goals)	Selective external integration (aligning goals with strategic partners)	Full integration (adaptive supply chain)
Atmosphere	Internal Conflicts, Internal Competition	Vision of common goal, Educations, Understanding	Interesting in collaborations ” outside of the box”	Partnership Equality of all partners
Attitude	“I have nothing to do with it”	“we are jointly responsible for all internal processes”	“we have mutual goals and processes with selected supply chain members”	Leader is a “role model”, others follow and help him. We all are authors of long term supply chain success
Supply chain innovation driver	Logistics	Top management	Managers of Sales, Purchasing, etc. (Business unit leaders)	Top management Top management
Dominating relations	Put pressure on other departments (suppliers, clients)	Joint inter-departmental cooperation	External visits, talks, project teams, first initiatives	Cyclical meetings with supply chain members, mutual initiatives, exchange of staff among supply chain members

Source: authors own descriptions.

**Table 2.** Hard enablers of supply chain management proficiency

Feature	I	II	III	IV	
	No – integration (conflicting goals)	Internal integration (consistent goals)	Selective external integration (aligning goals with strategic partners)	Full integration (adaptive supply chain)	Partnership
Costing systems	Traditional, budgets of departments	Traditional, business plans, costs of processes	Costs of joint processes	Activity based costing implemented by chosen partners	Activity based costing
Organizational structure	Functional	Matrix	Process	Varies across the supply chain	Adjusted to supply chain strategy
IT technologies – data processing	MRP	ERP	ERP, CRM, SRM, APS (limited), data warehouses	ERP, CRM, SRM, APS, data warehouses	ERP, CRM, SRM, APS (including ATP); data warehouses
IT technologies – information exchange	–	Intranet	Intranet, extranet, EDI	Intranet, extranet, EDI, integration of IT systems	Intranet, extranet, EDI, integration of IT systems across supply chain

Source: authors own descriptions.

**Table 3.** Elements of supply chain management proficiency – strategic issues

Elements	No – integration (conflicting goals)	Internal integration (consistent goals)	Selective external integration (aligning goals with strategic partners)	Full integration (adaptive supply chain)	
				Leadership	Partnership
Goals SCM	None	Costs	Costs/ service	Formulated for each customer segment. Leader migrates to the most profitable areas of SC	Formulated for each customer segment
SCM strategy	None	Internal supply chain designed; lean approach	Only selected part of external supply chain designed; usually lean approach	Leader designs supply chain. Lean/agile, leagile approach imposed by the leader	Join design of supply chain. Lean/agile, leagile approach with regards to capacities of partners
Areas of interest	Budgets	Process approach, IT technology	Activity based costing, CPFR, VMI	Leader: orchestrates the supply chain using sophisticated approaches (e.g. QR, ECR); others: meet leader's instructions and customer needs	Advanced IT technology, demand; sophisticated technologies (e.g. QR, ECR)

Source: authors own descriptions.

**Table 4.** Elements of supply chain management proficiency – customer facing processes

Elements	No – integration (conflicting goals)	Internal integration (consistent goals)	Selective external integration (aligning goals with strategic partners)	Full integration (adaptive supply chain)	
				Leadership	Partnership
Forecasting Planning	Individual forecasting, planning and scheduling in each functional area (e.g. budgets of departments)	SOP, comprehensive accessibility of business information within a company	Sharing forecasts, plans or schedules with selected clients and suppliers (first CPFR, VMI, CR initiatives)	Leader mainly responsible for long and mid term supply chain forecasts and plans. Other supply chain members have to adjust their plans to the leader. SCM strategy imposed by the leader.	Forecasting, planning and scheduling common in supply chain (e.g. CPFR). Implementation of SCM strategy;
Consumer Relationship Management	None (knowledge about clients in marketing & sales departments)	Initial initiatives enabling market data accumulation and processing	Access to market data granted to selected suppliers. Demand information shared with distribution partners	Co-operation on strategic level limited to selected members of supply chain. Basic elements of market segmentation implemented across the supply chain	Joint market data accumulation, processing and utilization across supply chain. Broad co-operation on consumer and service design. Category management
Marketing & Sales	Main goals: sales maximization, client satisfaction. Conflicts with other functional areas	Common goals for marketing, sales and other departments (e.g. profit maximization, client profitability optimization).	Clients participate in marketing programmes design and implementation. “Quality” discounts	All marketing activities in supply chain conform to marketing brands of the leader	Consumer Centric Organization. Joint marketing and sales programmes across the supply chain
Distribution, transportation warehousing	Responsibility for realizing and controlling decentralized (e.g. material flows in logistics departments, product flow in sales departments). Goals: costs minimization; no trade-offs considered	Logistics department responsible for realization and control. Goals: adapted to strategic goals of the company (e.g. profit maximization); trade-offs considered	Cooperation on the process with selected partners (e.g. VMI, CO). 3th party logistics often contracted	Leader designs distribution network or must accept long-term solutions. Cooperation in distribution channels is common	Joint design, realizing and controlling the process with all partners. Coordination provided by 3 <sup>rd</sup> or 4 <sup>th</sup> party logistics

Source: authors own descriptions.

**Table 5.** Elements of supply chain management proficiency – back office processes

Elements	No – integration (conflicting goals)	Internal integration (consistent goals)	Selective external integration (aligning goals with strategic partners)	Full integration (adaptive supply chain)	
				Leadership	Partnership
Research & Development	Activities focused on new products commercialization	Activities focused on commercialization of profitable products (co-operation with other departments, multifunctional teams)	Co-operation with consumer and clients; co-operation with suppliers to improve profitability	Co-operation on new product design and commercialization with limited trust. Leader orchestrates the process	Common (with suppliers and clients) product design and commercialization – project teams
Operations	“Isolated island” – no integration with distribution and procurement	Internal integration with procurement and delivery. Lean manufacturing initiatives	Production system integrated with procurement and distribution of selected partners	Production activities orchestrated by the schedule of the leader	Real customer demand drives and coordinates operations across the chain
Inventory Management	Responsibility for inventory management decentralized. Usually heuristic approach to inventory control	Company wide systematic approach to inventory management. Formal inventory control models utilized	Joint inventory management initiatives with selected supply chain members (e.g. VMI, Cross Docking).	Leader controls inventory throughout the supply chain	Joint approaches to optimize inventory levels, and allocate inventory throughout the chain (in cooperation with 3 <sup>rd</sup> or 4 <sup>th</sup> party logistics)
Supplier Relationship Management	<i>none</i> Knowledge about suppliers in purchasing, operations, logistics or quality control departments	Procedures enabling collecting and processing data about suppliers	Suppliers integration. Programmes to develop selected suppliers	Leader integrates and develops all suppliers	Partnership with suppliers
Purchasing	Reduction of buying costs. Conflicts with other functional areas	Common goals with other areas (e.g. profit maximization through purchasing costs reduction or suppliers profitability growth)	“Quality” based supplier assessment. Broad exchange of business information with selected suppliers. Relation marketing in purchasing	Leader controls and/or coordinates purchasing across the chain	Purchasing activities jointly coordinated across supply chain

Source: authors own descriptions.

**Table 6.** Elements of supply chain management proficiency – other processes

Elements	No – integration (conflicting goals)	Internal integration (consistent goals)	Selective external integration (aligning goals with strategic partners)	Full integration (adaptive supply chain)	
				Leadership	Partnership
Returns Management	Activities focused on re-distributions (“end of the pipe” activity). The main goals: reduce costs of returns flow and obey the laws	Realize and control of returns flow for the whole system. First “begin of the pipe” activity. Multifunctional teams	Co-operation with selected partners on returns management.	Leader cooperates with 3 <sup>rd</sup> party logistics to improve return management in supply chain	Co-operating with all partners to realize supply chain goals in returns management
Information Management	Data collection and processing within departments. Conventional methods of communications	Data collection and processing within departments. Information accessible for all departments	Data collection and processing with selected partners	Data collection and processing across the supply chain. Some information available to leader only. Leader defines the rules of information management	Data collection and processing across the supply chain. All partners have the access to information
Training	Intra-department trainings. Knowledge about suppliers and clients based on transactions. Basic data on products and service exchanged with external organizations.	Inter – department trainings. Basic data on products, technical specifications and service exchanged with external organizations. Sector specific or universal standards of co-operation harnessed (e.g. ISO, HACAP, GMP)	Inter – organization all trainings with selected partners focus on supply chain management improvement	Training programmes controlled by a leader. Usually the leader is a “teacher” sharing knowledge and ideas across supply chain	Inter – organizational trainings with all partners. Focus on supply chain management optimization – adaptation of supply chains to customer needs. Sharing knowledge and ideas across supply chain

Source: authors own descriptions.



## 4. Stages of the model

### Stage 1

No integration (conflicting goals): the main feature of this stage are conflicting goals between departments. Most frequent problems occurs between marketing (including sales) and logistics (understood as purchasing, production control and distribution). Common example of marketing goal is sales maximization, while logisticians have to decrease costs (eg. transport, inventories, production changeovers). Since the main focus is put on internal problems, cooperation with suppliers and clients is limited to “simple transactions” mostly based on price and sector quality standards.

### Stage 2

Internal integration (consistent goals): the common business goals are formulated, and broken down into functional areas of the company. Accordingly, conflicts of goals that occurred at stage one are eradicated. Processes are mapped, integrated and streamlined. Usually integrated IT system is introduced at this stage. Demand management (information management, forecasting, planning) is proving to be an important process – the better the knowledge about customer needs, the easier to orchestrate all the activities starting from purchasing, ending at delivery.

### Stage 3

Selective integration (aligning goals with strategic partners) – the company breaks the wall to integrate chosen processes with carefully selected partners (suppliers or customers). Bottle-necks are identified and improvements are sought as it comes to inter-organizational processes. Initiatives concerning collaborative sales and operations planning as well as new product design are launched (e.g. collaboration with chosen logistics provider who introduces warehouse and/or transport management system, improving efficiency of distribution network of the partner, collaboration with key account on product configuration). Online business portals are shared with chosen partners.

### Stage 4

Full integration (adaptive supply chain) – at this stage supply chain management becomes the source of sustainable competitive advantage. The companies design and manage various supply chains (nets) adjusted to the consumer needs/products. The employees are mentally and technically ready to cooperate closely with many external partners, formulating inter-organizational project teams. Wide range of sophisticated management methods and techniques are implemented to improve efficiency of inter-organizational processes. Within such an environment full potential of IT technologies and management tools is exploited and supply chain becomes demand driven.

It should be stressed that there are **two types of supply chains at the highest level**. First type (called “the lord of the ring”) is based on control, brought by a market leader (usually globally recognized brand) who designs and formulates the rules of material and information flows within supply chain. The leader, trying to optimize supply chain performance (and its own profits), distributes tasks among other members. Although

supply chain is orchestrated by the leader, it is possible that certain supply chain nodes (members) are not necessarily perfect as it comes to supply chain management. The leader mostly cares for strategic and tactic issues. The every day operations are left to other members. Not every member is capable of implementing best practices proposed by the leader. Such a member usually lags behind.

The second (called “the fellowship of the ring”), based on partnership, i.e. symmetry between business partners as it comes to the bargaining power and access to business information. In such chains leader is usually replaced by the group of two or more players that collaborate with other partners to improve innovativeness of the chain.

As noted earlier reaching higher level of supply chain proficiency should be considered as an important step towards the sustainable source of competitive advantage, hence affecting positively the bottom line of a company. However, next to potential benefits, supply chain management development necessitates costs, including investments (e.g. IT systems), consulting, trainings, etc. Accordingly, projects aimed at improving the supply chain proficiency should be assessed with due diligence. In other words benefits (e.g. decreased inventories) as well as costs should be forecasted.

The main goal of the presented above model was to simplify the supply chain management reality. Probably companies would not feet neatly into a certain stage. The initial research conducted among pharmaceutical companies proves that each of them reached various stages, depending upon enabler or element. However, the authors suggest that the stage of supply chain proficiency is determined by the dominating number of identified enablers and elements at a certain stage. For example, based on interview conducted with logistics manager, it has been proved that a pharmaceutical producer has most of the features typical for stage one, although IT technologies implemented were characteristic for stage three. “Soft enablers” were diagnosed as the main obstacle to move to the higher, second level. Below some other short cases are presented.

#### **Example 1**

##### **Producer of packaging for pharmaceutical products,**

##### **Current stage: 1**

**Enablers (soft):** Closed organizational culture; focus on internal problems. Sub-optimization. Hierarchical relations.

**Enablers (hard):** Legacy IT systems for each departments without possibility of integrating them. Traditional budgeting methods. Traditional functional structure.

##### **Elements**

Conflicting goals between departments. e.g. marketing and sales departments goal is sales maximization, purchasing goal is to decrease buying and transport costs, production goal is to decrease production changeovers costs and quality stability, financial departments goal is to reduce inventory costs. Cooperation with suppliers and clients is limited to “simple transactions” mostly based on price and quality standards. Supply chain management philosophy does not exist.

	I	II	III	IVa	IVb
<b>Enablers – Soft</b>					
Atmosphere	X				
Attitude	X				
Supply chain innovation driver	X				
Dominating relations	X				
<b>Enablers – Hard</b>					
Costing systems	X				
Organizational structure	X				
IT technologies – data processing	X				
IT technologies – information exchange	X				
<b>Elements</b>					
Goals SCM	X				
Strategy of SCM	X				
Areas of interest	X				
Forecasting Planning	x				
Consumer Relationship Management	x				
Marketing & Sales	x				
Research & Development	x				
Distribution, transportation, warehousing	x				
Operations			X		
Inventory Management	x				
Supplier Relationship Management	x				
Purchasing	x				
Returns Management	x				
Information Management	x				
Training	x				

Fig. 1. Packaging producer profile

Source: authors own descriptions.

**Example 2**

**Pharmaceutical producer**

**Current stage: 2, trying to reach stage 3**

**Enablers (soft):** The culture is open for external cooperation but still focused on the internal common goal.

**Enablers (hard):** Integrated IT system is introduced but used only for selected departments and in small part of its potential. The company introduced Activity Based Costing but focused only on measures of product profitability. Matrix organizational structure (project teams are put on functional structure).

**Elements**

Common business goal (to maximize profit) is broken down into functional areas of the company. Processes are mapped, integrated and streamlined. Demand is planned but the responsibility for the process in question is not clearly defined. Sup-

ply chain manager post is created, however, it is responsible for internal processes only. Relations with suppliers and clients are still managed by heads of purchasing and sales (marketing).

	I	II	III	IVa	IVb
Enablers - Soft					
Atmosphere		X			
Attitude		X			
Supply chain innovation driver	X				
Dominating relations	X				
Enablers - Hard					
Costing systems		X			
Organizational structure		X			
IT technologies – data processing		X			
IT technologies – information exchange		X			
Elements					
Goals SCM		X			
Strategy of SCM		X			
Areas of interest		X			
Forecasting Planning	X				
Consumer Relationship Management		X			
Marketing & Sales		X			
Research & Development		X			
Distribution, transportation, warehousing		X			
Operations		X			
Inventory Management		X			
Supplier Relationship Management		X			
Purchasing		X			
Returns Management		X			
Information Management			X		
Training		X			

Fig. 2. Pharmaceutical producer

Source: authors own descriptions.

**Example 3**  
**Global chemical (pharmaceutical) producer**  
**Current stage: 3, trying to go to stage 4**

**Enablers (soft):** culture is wide open for internal and external relations but co-operation is possible only with selected partners.

**Enablers (hard):** for selected partners Company proposes the universal IT solutions. Support in trainings and supply chain infrastructure investment financing is also provided to the strategic partners. Online business portals are shared with chosen partners. The company introduced Activity Based Costing to measure product,

clients and suppliers profitability. The method is also promoted across the supply chain.

**Elements**

Demand management proved to be an important process, which is based on historical and real demand data. Initiatives concerning collaborative sales and operations planning are harnessed (e.g. collaboration with chosen logistics provider who introduces warehouse and/or transport management system, improving efficiency of distribution network of the partner, collaboration with key account on product configuration). Supply chain management departments are responsible for designing and implementing supply chain strategy.

	I	II	III	IVa	IVb
<b>Enablers – Soft</b>					
Atmosphere			X		
Attitude			X		
Supply chain innovation driver					X
Dominating relations			X		
<b>Enablers – Hard</b>					
Costing systems					X
Organizational structure					X
IT technologies – data processing					X
IT technologies – information exchange					X
<b>Elements</b>					
Goals SCM					X
Strategy of SCM					X
Areas of interest					X
Forecasting Planning			X		
Consumer Relationship Management					X
Marketing & Sales			X		
Research & Development			X		
Distribution, transportation, warehousing			X		
Operations			X		
Inventory Management			X		
Supplier Relationship Management			X		
Purchasing			X		
Returns Management			X		
Information Management			X		
Training			X		X

**Fig. 3.** Global pharmaceutical producer

Source: authors own descriptions.

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## MODEL DOSKONAŁOŚCI ZARZĄDZANIA ŁAŃCUCHEM DOSTAW

**Streszczenie:** Artykuł opisuje model doskonałości zarządzania łańcuchem dostaw. Zdaniem autorów przedsiębiorstwa muszą przejść przez cztery etapy, aby osiągnąć najwyższy poziom zaawansowania w zarządzaniu łańcuchem dostaw. Każdy z etapów jest opisany za pomocą uwarunkowań (cech systemu zarządzania, które umożliwiają przejście na wyższy poziom) oraz elementów (cech łańcucha dostaw charakterystycznych dla każdego poziomu).