

# COSTING METHODS FOR SUPPLY CHAIN MANAGEMENT

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## **Abstract:**

Today's organizations, operating in an increasingly competitive conditions, are characterized by a network of relationships with suppliers and customers. Thus, the key resources, being a source of competitive advantage, are located not only within the organization but are part of network relationships. The most important task of managers is to achieve supply chain cost efficiency while maintaining high flexibility.

This article focuses on the potential role that management accounting information can play in supply chain management. It describes key methods that can be used in practice to implement management accounting practices that facilitate effective supply chain management.

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**Key Words:** Cost management, costing, supply chain management

## **The Concept of Supply Chain Management**

Over the past two decades, Supply Chain Management (SCM) has come to be regarded as one of the key factors of competitiveness and organizational effectiveness (Porter, 1985; Jones, 1989). Supply chain management is a major concern in many industries as companies are aware of the importance of integrated relationships with suppliers and customers. The pressure of global competition and the need for broad inter-organizational cooperation forces companies to take action to improve supply chains, so that they are flexible and responsive to change.

Key resources which are the source of competitive advantage, are located not only within an economic entity but are part of a network of relationships. This relative perspective of perception of the firm suggests that individuals critical resources can be embedded in the procedures and processes constituting inter-organizational network of relationships.

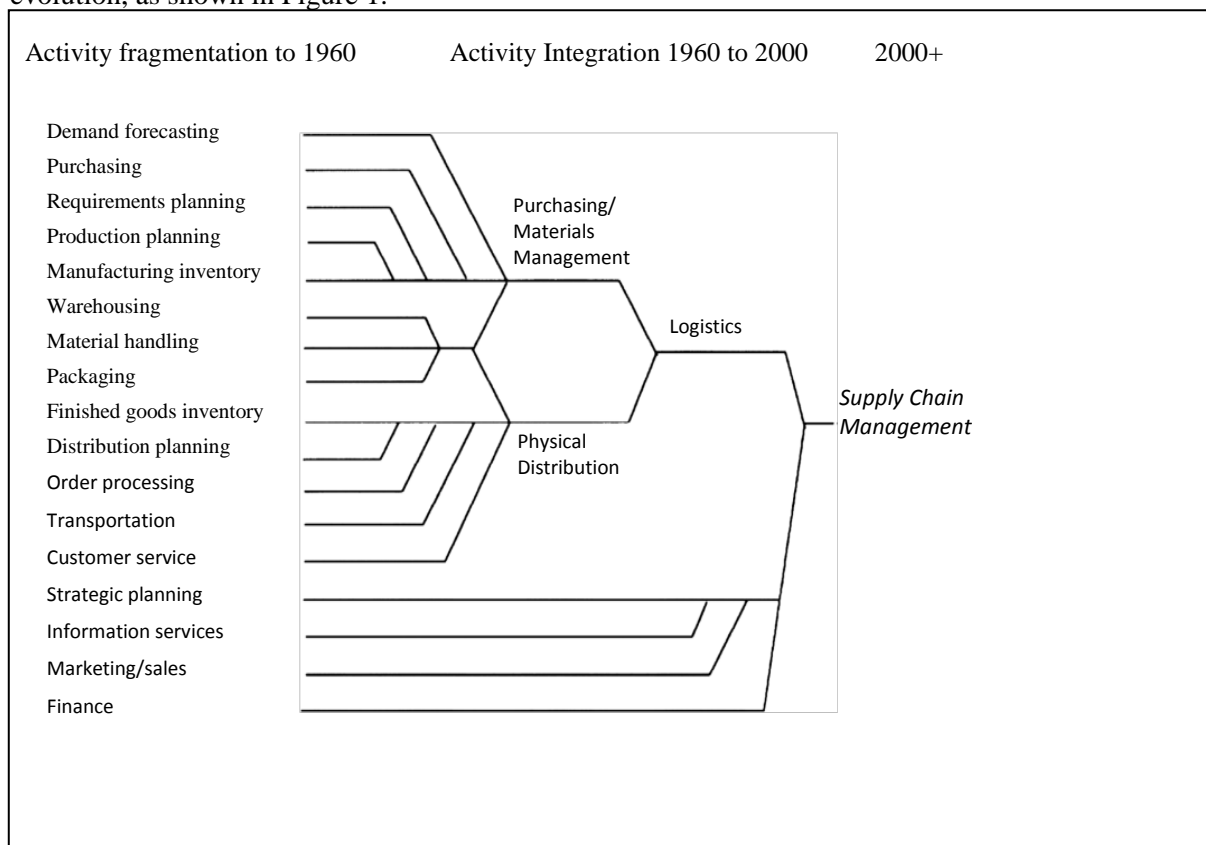
At present organizations are competing rather at the level of effective flow of materials, intermediates and products to customers throughout the supply chain than at the level of efficiency of the production process. This perception of supply chains and their pursuit of continuous improvement are an important factor of profitability.

The literature on the subject cites various definitions of supply chain management. Among the commonly used is the definition formulated by Handfield and Nichols (1999), according to which: the supply chain encompasses all activities associated with the flow and transformation of goods from the phase of acquisition of materials, through successive stages up to the end user, as well as activities associated with the flow of information. Resources and information are moving up and down the supply chain. Supply chain management is the integration of these activities through the improvement of supply chain relationships in order to achieve competitive advantage.

In other words, the supply chain management can be perceived in three dimensions: it is the administration of activities and processes, coordination of business functions in an enterprise (inter-functional) and the inter-organizational coordination.

Administration of activities and processes has much in common with the logistics management and refers to activities such as transportation management, inventory, warehousing and order management, which are the responsibility of the logistics function. Inter-functional coordination refers to cooperation and building relationships with other functional areas within the same company, such as marketing and finance areas. Inter-organizational coordination concerns collaboration and coordination of products flow between the participants of the supply chain. Supply chain management is thus seen as a product flow management in many companies, while logistics management is only seen as the product flow operations within the separate company.

The concept of supply chain management has been formed as a result of progressive evolution, as shown in Figure 1.



**Fig. 1** – The evolution of supply chain management. Source: Ballou, 2007.

Currently, SCM is perceived as a set of management processes, where the process is defined as a group of activities important to achieve a specific purpose, such as order fulfillment. All these processes constitute the whole of SCM. These processes should be coordinated through collaboration and relationship management throughout the supply chain, from the initial suppliers to final consumers.

Supply chains should be managed in an integrated way. Integrated approach to supply chain management focuses on managing relationships, information and material flow in the inter-organizational dimension in order to reduce costs and improve flows. Companies using integrated concept of supply chain management are looking for ways of integration of its logistics, procurement, operational activities and marketing functions with other participants in the supply chain, so that the flow of materials, information, components and finished products run smoothly from point of origin to the end user, providing a low cost of unit and a high level of service.

Functioning of the organization in an integrated supply chain contributes to gaining competitive advantage and at the same time meets a greater extent of customer requirements in the field of on time delivery and quality of products and services.

A significant reconfiguration of operation conditions of the organization poses challenges for traditional management accounting, which was primarily to control costs and improve performance mainly through the use of conventional methods, such as traditional cost accounting and budgeting. In terms of integrated supply chains, these methods are inadequate and largely insufficient.

With the increased competition value creation became therefore a function of effective relationships with suppliers. The supply chain is a network of such relationships. Its operation is based on the creation of a reliable and continuous networks of collaboration and a comprehensive thinking, which results in the creation of value. Such co-operation is based on the pursuit of common goals, open communication and information sharing among supply chain participants. Importantly, each participant of supply chain is motivated by a common goal, which is to create value in order to gain competitive advantage.

The functioning of the supply chain raises a number of new challenges resulting from the extended form of organization. A prerequisite for the development of strong relationships along the supply chain is to ensure the effectiveness of cooperation between the supplier and the buyer, the management of communication and negotiation among the participants in the supply chain, exploiting the opportunities offered by the continuous improvement and co-ordination, but also, for example, eliminating opportunistic behavior.

### **Cost Management of Supply Chain**

Cost control is one of the key factors ensuring the financial efficiency.

The financial result, despite the simple formula for its calculation, in fact, is a very difficult value to determine. Further difficulties associated with the proper measurement of financial results occur especially in a dynamically changing business environment (Białas, 2011).

Collection of accurate and adequate information on costs is a key element in the management process both considering the separate company as well as inter-organizational dimension of management. More and more managers are aware of the fact that effectiveness is a source of competitive advantage and are trying to improve and develop the methods of analysis and management of costs and processes. An area where it is possible to achieve significant cost savings is supply chain.

Cost reduction is one of the most frequently mentioned goals in supply chain management. In addition, efforts to reduce costs are forcing companies to focus increased attention on the relationships with other participants within the supply chain, so that both suppliers and customers are able to improve the competitiveness and profitability. In response to these realities the literature on the subject lists the specific concepts of cost management within the supply chain, as shown in table 1.

**Tab. 1** – Concepts of cost management of supply chain. Source: Seuring, Goldbach, 2002.

Concept	Characteristics
Supply Chain Costing	Three cost levels need to be analyzed: direct, activity-based, and transactions cost to account for all costs in a supply chain and find the right partner to control them.
Proactive Cost Management	Proactive cost management is a market oriented, anticipatory system. Specific techniques are used to coordinate activities, as a case study from the car industry shows.
Lean Management Accounting	Linking strategic and operational levels to understand customers and processes, and thus enhance customer value. A case study from car sales offers details.
Interorganizational Cost Management	Managing supplier and customer costs in coordinated cost reduction programs are carried out during product design and manufacturing.
Organizational Settings	Cost Management has a functional and an institutional dimension. Principal-agent relationships are important in the application of cost management in a supply chain.

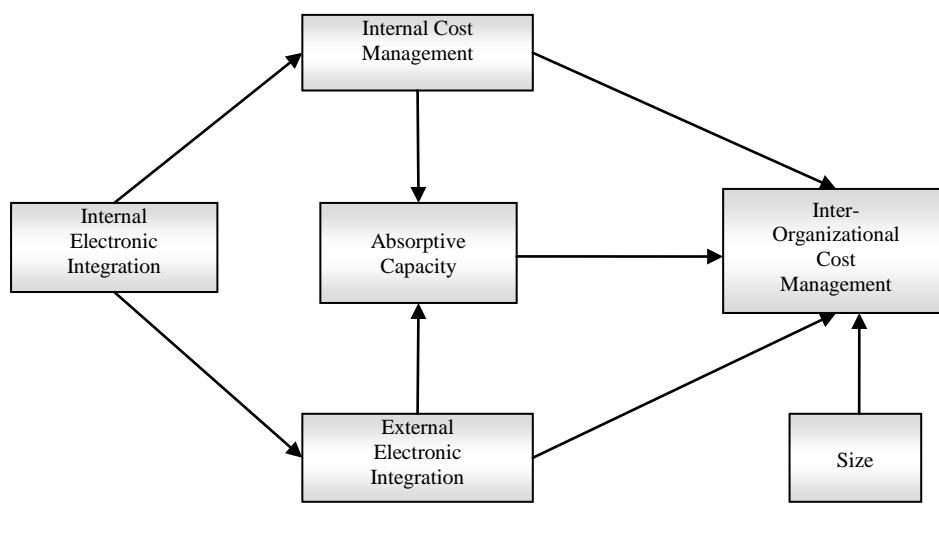
These concepts show that traditional cost management ignores the needs of the supply chain cost management. An important element of the concept of cost management in the supply chain are the two dominant perspectives. The first uses target costing assumptions, determines the way in which goals are set and can be achieved. The second perspective is based on activity based costing. Reference to target costing and activity based costing as the instruments of cost management plays a major role in the presented concepts (Seuring, Goldbach, 2002).

Cost management of an enterprise (so-called intra-organizational cost management) can be described as a portfolio of activities and procedures that enable organizations to manage their internal costs and to make cost decisions. This portfolio in order to manage costs may include a number of measures, applied within its own internal value chain, such as Activity Based Costing, Target Costing and continuous improvement (Kaizen Costing).

On the other hand, in the context of supply chain management, occurs the concept of inter-organizational cost management, described as an extension of intra-organizational efforts to manage costs.

The domain of inter-organizational cost management are buyer-supplier formalized interactions, the objective of which is to identify opportunities for joint cost reduction (Cooper, Slagmulder, 2004). It can be expected that organizations with high levels of internal cost management will be able to use their knowledge and experience to develop similar activities as part of the inter-organizational cost management. The same planning and control skills that are the foundation to manage costs internally may be useful for the wider benefit of all partners in the supply chain.

The business practice shows that particular activities of the internal costs management can be translated into inter-organizational environment. Knowledge and experience in the use of internal cost management tools can be applied to develop inter-organizational cost management tools designed for the supply chain participants to their common benefit. Therefore, the ability of organizations to manage costs internally is an important determinant and the foundation that allows inter-organizational cost management, as shown in Figure 2.



**Fig. 2** – Effect of intra-organizational cost management, information systems integration and absorptive capacity of organization on inter-organizational cost management in supply chains. Source: Fayard, at al., 2012

The application of inter-organizational cost management in a company requires the fulfillment of a number of conditions, including:

- determining the specific objectives of reducing costs with regard to suppliers,
- collaboration with suppliers and customers in finding ways to reduce their costs,
- taking into account the profitability of suppliers when negotiating the purchasing price,
- ensure effective collaboration with suppliers and customers.

Due to the far reaching consequences of close cooperation between companies, it is important to think not only about how to develop relationships in the supply chain, with whom participants, and under which forms of contract, but also how to coordinate that relationships and which management control mechanisms and processes should be used to support, plan, measure and assess the activities and their results (Ramos, 2004).

One of these inter-organizational processes allowing the establishing and maintaining cooperation in the long term, is the exchange of information generated by the accounting system.

With the increasing integration of suppliers, manufacturers, contractors, it is reasonable to adjust the management accounting system in order to generate information that is useful in the formulation, implementation and execution of strategy aimed at achieving competitive advantage.

The information generated by management accounting are the primary source of data for decision-making and control. Proper management accounting techniques may have important implications for inter-organizational supply chain primarily due to:

- the provision of timely and accurate information to support and facilitate the decision-making throughout the organization and
- provide information on the effectiveness of its activities, as well as the performance of individual business units to ensure that activities are consistent with the plans.

Developing a long-term inter-organizational cooperation usually involves a complex process of negotiations. In addition, mechanisms and activities that play a role in supply chain relationships have to be controlled in some way. This also entails the specific information needs. Management accounting is seen as an appropriate set of techniques capable of providing this type of information.

### **Management Accounting Techniques for Supply Chain Management**

In order to meet the requirements of supply chain cost management it is essential to engage a variety of management accounting techniques, especially the newest, currently being developed. These techniques are gaining popularity as means by which companies, including those operating in the supply chain, are able to meet the new challenges, gain competitive advantage and continually improve management systems. These new techniques are used in a wide range of businesses in response to changing economic trends.

It should be emphasized that the new management accounting techniques are considered to be new, not because they provide very different ways of calculation, but because they allow to look at the economic performance in the context of the supply chain. While the traditional management accounting is aimed at providing information on how profit can be maximized by rigid forms of control and accountability mechanisms, new techniques seek to determine how the value that is acceptable to all participants in the value chain can be maximized, and thus what level of performance can be achieved in the supply chain. The new management accounting techniques meet a number of requirements that are specific to supply chains. The most important are:

- ensuring effective cooperation between suppliers and customers,
- management of communication and negotiation among the participants in the supply chain,
- exploit the possibilities of continuous improvement,
- eliminating opportunistic behavior
- enabling continuous learning and coordination.

A common feature of modern techniques of management accounting is their strong focus on operations and processes and a horizontal look at the organization, what enable crossing the traditional boundaries of the company.

Although most popular are primarily two techniques of management accounting: Target Costing and Open Book Accounting, actually also other techniques can be useful in the process of supply chain cost management, for example the Activity Based Costing, Kaizen Costing, Theory of Constraints, Value Chain Analysis or the Balanced Scorecard.

Open Book Accounting is a technique involving the sharing of reliable accounting information among supply chain participants. This approach reflects the ideal collaboration between buyers and suppliers through the disclosure of cost information of individual companies.

Open Book Accounting enables the supply chain participants to obtain information about the structure of the production costs of other participants, assessing the effects of changes made by others, estimate the costs of new products, identify areas of significant cost savings and better control of production costs of finished products (Sobańska, 2010).

Target Costing provides the ability to control the level of costs and profits in the context of the opportunities arising from the competitive environment. It is a cost management technique that allows a look back at how the products should be designed in order to achieve the target cost. This procedure determines the required cost savings and enables the implementation of improvements in the supply chain.

Target Costing technique applied in the supply chain environment can be extended to inter-organizational co-ordination of the activities undertaken in the process of cost management (Ramos, 2004).

The use of Activity Based Costing (ABC) for the supply chain is becoming quite common and replaces the traditional method of cost allocation system with a more accurate cost assigning. ABC improves the allocation of overhead costs to activities, processes, products, services and customers. This costing system focuses on the activities and provides valuable information useful to coordinate the activities in the supply chain. It also allows the observation of causal relationships in the cost

structure. ABC allows the identification of additional services provided by suppliers like designing and development of products that increase the value of the final product and reduce internal costs, including control and service.

Kaizen Costing is a similar technique to Target Costing because of the assumption of cost reduction, with the exception that Kaizen Costing focuses on reducing costs in the production phase of the product life cycle. According to Cooper and Slagmulder (1999), Kaizen Costing is the basic technique of inter-organizational cost management in the phase of production process. Kaizen system allows buyer set specific cost-reduction objectives for its suppliers. Suppliers, in turn, use their own system of Kaizen Costing to identify which areas have the opportunity to reduce costs, and translating this information into price negotiations with their suppliers.

Theory of constraints allows companies to focus on managing constraints that slow down the rapid movement of products through the supply chain. This in turn can help the supply chain participants to optimize financial performance through the use of their potential and resources (Simatupang, et al., 2004).

Value chain analysis can be carried out by a single company taking into consideration external perspective, or jointly by buyers and suppliers in the supply chain.

This approach involves not only the cost of buyer but also the activities and costs of other companies in the value chain (for example suppliers and buyers) and recognizes the interdependence of these activities and costs (Dekker, 2003).

Balanced Scorecard is an approach that complements traditional financial measures of performance of the enterprise. Modifying the Balanced Scorecard as a performance measurement method can be used to develop a comprehensive method of measuring supply chain performance. An essential task is to link the balanced scorecard with the main objectives of supply chain management. The best results for cost management purposes gives the connection of Balanced Scorecard with other methods used to manage, for example, the combined use of the BSC and Activity Based Costing and Activity-Based Management.

The adoption of the perspective of supply chain for the Balanced Scorecard expands the internal perspective of Balanced Scorecard so that it includes both internal functions and effects resulting from the partnership and co-operation in the supply chain. From this perspective, a balanced scorecard combines integrated and non-integrated measures and allows the perception of the success of enterprise as resulting from the success of the whole supply chain (Brewer, Speh, 2000).

The concept of Balanced Scorecard distinguishes four perspectives: internal processes, customer satisfaction, financial performance, as well as ways of improvement, innovation and growth of companies. Linking these perspectives to the concept of supply chain management requires the selection of appropriate measures, which are not limited to a single organization, but take into account the processes resulting from inter-organizational relationships.

The concept of linkages between supply chain and the balanced scorecard allows to evaluate the ability of the supply chain to meet management objectives, which can be evaluated by measures, identified with the perspective of internal business processes.

Total Cost of Ownership (TCO) is a technique that analyzes the costs of acquisition and use of goods or services during their life cycle. TCO can be used not only to build and manage effective relationships between the participants in the supply chain, but also to identify potential opportunities for improvement and to promote co-ordination and learning between partners in the supply chain.

Most Total Cost of Ownership related literature investigates this tool from a buyer perspective and consequently does not study TCO from an inter-organizational perspective. However within the supply chain management, Total Cost of Ownership in particular is a significant tool, since it can be an effective way of tracking the hidden indirect costs associated with supplier transactions, especially given that purchasing divisions are considered to be strategically relevant.

## **Conclusion**

The purpose of costing system is to rationalize processes of business management. Both the costs at the planning stage as well as being recorded provide a valuable information about the degree of improvement of performance in the management system of both business units as well as the entire supply chain.

In a changing environment, management accounting must follow the changing economic trends. For the purpose of supply chain management it is necessary to develop new methods of

management accounting, or modification of existing techniques. It is also important to look at the supply chain as a whole. Although it is often considered that only the large corporations introduce innovations, there are many smaller and medium-sized companies that are participants in the supply chain together with large of companies. The condition of their subsistence to a great extent is the ability to function in larger organizations, being a member of the supply chain.

Efficient supply chain cost management is possible by the use of appropriate methods and tools, which include new cost accounting systems that generate information on the level and structure of costs in the desired cross-section information.

In recent years, it can be observed a growing interest in the field of supply chain management accounting. The combination of operational and financial dimension can provide a competitive advantage and operational stability. Managerial accounting has therefore an important role to play in improving competitiveness by improving supply chain management processes.

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