

# Impact of supply chain management on the financial performance in aerospace indus...

[Business](#), [Management](#)



\n[[toc title="Table of Contents"](#)]\n

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1. [Supply Chain Management](#) \n \t
2. [Supply Chain Configuration](#) \n \t
3. [Supply Chain Planning](#) \n \t
4. [Supply Chain Execution](#) \n \t
5. [Information Technology & System Support](#) \n

\n[/toc]\n \n

In literature review initially the theoretical works of the pioneers of the management field are reviewed. These theoretical concepts have been instrumental in the development of Supply Chain Management (SCM). Moving forward some of the concepts of supply chain management and its aspects are reviewed. Finally, emerging issues in supply chain management are studied in detail and all these dots are connected so as to serve as a framework for the current topic.

In recent times, the forces of globalization of industries, the total quality management (TQM) movement, rapid advances in technology and a shift in the balance of power toward customers have fundamentally changed the rules for business success (Gruen, 1977). Gruen (1977) suggests that, as result of these changes, there has been a shift in relationships from adversarial to cooperative and the key to obtaining a higher share of customers. He further suggests that the key to obtaining a higher share of each customer's life time business is the systematic development and management of cooperative and collaborative partnerships. The results of

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cooperative strategies are positive: A survey by Coopers and Lybrand found that involved in alliances increased their revenues faster by generating 23% more goods and services than those not involved in them (Gruner, 1996). Cooperative strategies have become increasingly popular since the mid-1990s (Hitt, Ireland, & Hoskisson, 1999). Porter (1985) argues that coordinating and jointly optimizing with channels (downstream) and suppliers (upstream) lowers cost and/or enhances differentiation. He refers to the capabilities of buyer-seller relationships as vertical linkages that reflect interdependencies between a firm's activities and the value chains of suppliers and channels. In the same context, Stern and Reve (1980) suggest that cooperative behavior facilitates coordination and programming of activities within the channel that, in turn, provide potential cost advantages and improve competitive strength. Given this, there is a positive relationship between the level of cooperation within the channel and the joint profits obtained by it.

According to Porter (1985), the cost leadership and differentiation are two basic types of competitive advantages. Value chain activities, brought about by cost leadership offer an equivalent product at relatively lower cost than competitors (Porter, 1985; Day & Wensley, 1988). Linkages, whether inside or outside a firm, create the opportunity to lower the total cost of the linked activities (Porter, 1985). Cost saving through cooperation is also possible, even in past moving technology based industries. Generally speaking, technology is more expensive when acquired through a merger/acquisition; it must pay for the control. An alliance, on the other hand, allows a firm to

avoid acquiring superfluous technology and assets (Hamel & Prahalad, 1994). Many times, the locus of innovation is other than the manufacturer (i. e. with suppliers and members of the supply chain) (Urban & Hauser, 1993). For example, DuPont invented Teflon cookware, which benefited cookware manufacturers as well as DuPont, and Alcoa pioneered the idea of aluminum truck trailers for heavy-duty hauling (Urban & Hauser, 1993). Therefore it can be said that supplier linkages establish the win-win relationship with suppliers (porter, 1985). As such, uniqueness in meeting buyer needs may be the result of cooperation with suppliers. This is also the case in channel linkages with customers. For example, discussions with the butchers in grocery stores led Mrs. Budd's Foods to develop a fresh meat pie that would increase the margins for the fresh meat section of the store (Urban & Hauser, 1993) Burt (1989) also argues that allowing suppliers to review the design of the entire subassembly before committing to it not only teases out new ideas but also helps the supplier understand what its customers really needs-or may need in future. Over the past years the structure of the market economy has fundamentally changed. As a result of the individualization of customer demand as well as receding market and technology cycles, businesses are increasingly concentrating on their core competencies. Customer satisfaction and service have become the highest priority. The realization of these objectives demands extensive cooperation with customers and suppliers. (Buxmann, Dirks and Heintz, 1998; Stich and Wrede, 1999) However, the new focus on the customer requires a rethinking of corporate processes (Baumgarten, 2000; Schonsleben, 1998). For this reason the companies have to reorganize their material and information

flows oriented by an inter-corporate view of their processes along the supply chain.

## **Supply Chain Management**

The concept of supply chain management (SCM) encapsulates methods and procedures for the comprehensive configuration, planning and control of cross-business and companywide supply chains. (Thaler, 1999; Walther and Bund, 2001) The core philosophy of SCM is the integration of all value-added levels from the extraction of raw material to the sale of the finished product to the ultimate customer, whilst taking into account organizational, technological, and human factors (integrated supply chain). In this way the lack of transparency and in particular the complexity of supply chain processes can be reduced and flexibility enhanced. The potential of integrated supply chains is considerable. For example, a global study conducted by the Supply Chain Council demonstrated the potential for cost reductions between 3 and 6 per cent of turnover (Supply Chain Council). The planning tasks can be divided into three different levels which encapsulate the following areas of responsibility within integrated supply chains: 'supply chain configuration', 'supply chain planning' and 'supply chain execution'.

These levels temporally and logically follow from each other and differ with respect to the planning horizon and planning objects. (Hartweg and Wrede, 2001; Supply Chain Council) The underlying basis of cooperation is a suitable organizational, technological, and relationship management. In this context, organizational management comprises the implementation of business processes. Technological management focuses, in particular, on the

structure of suitable IT support for company-wide and cross-business production, planning, and control. Finally, relationship management entails the building and strengthening of trust between participating companies. (Walther and Bund, 2001). In particular, within the organizational management of integrated supply chains, considerable demands are placed on the planning and control procedures of interconnected businesses.

## **Supply Chain Configuration**

The task at this level is the optimal configuration of the production and logistic network in order to implement a long term business strategy. This requires the analysis and modeling of customer's supply channels, from raw material suppliers to end-user markets. (Hartweg and Luczak, 2001) This is usually done on the basis of annual production and sales figures, as well as existing stock. Besides these statistical data, the model must take into account capacity and time-related information, e. g. the production and storage capacity of individual sites or the lead time of the various production levels and logistics processes. The object of this modeling task is to provide a realistic picture of the actual supply chain structure and its restrictions.

In addition to quantity and capacity-related information, cost data from the various divisions of the supply chain must be incorporated as well, e. g. production, storage, and transportation costs for individual products. The inclusion of cost data facilitates numerical comparisons between alternative configurations, which are partly IT supported by SCM systems. This comparative analysis is a first step towards a simulative approach to optimize the logistical structure.

## **Supply Chain Planning**

The level of supply chain planning includes the coordinated mid- to long-term planning functions to establish a synchronized master production planning across the supply chain while taking into account capacity and time-related factors. Besides the structure of the supply chain, forecasted and actual customer needs are entered as information into the planning of the supply chain. The possibility of incorporating information relating to factors internal to the supply chain as well as actual capacity utilization facilitates a simulated check on availability when customers make inquiries (ATP - Available to Promise). (Luczak, Eversheim, and Stich, 1999)

## **Supply Chain Execution**

The production plans generated at the planning level have to be executed by the partners. The implementation of these plans forms the interface between the planning conceptions of SCM and the execution carried out by Material Resource Planning (MRP) or Enterprise Resource Planning (ERP) systems (Luczak and Eversheim, 1999). In the implementation of SCM, existing organizational structures can be utilized for production planning and control. However, these have to be expanded to consider also the interdependencies to external partners. The fast transmission of information about the current product status within the production process across the value-added levels in the supply chain from the raw material up to the enduser's sale facilitates a more rapid response to unscheduled events (e. g. faults or specialized orders at short notice). Especially on behalf of the IT support, this demands

extensive communication with all external partners (Luczak, Eversheim and Stich, 1999).

## **Information Technology & System Support**

In order to plan and control all processes along the supply chain, a transparent flow of information and an integration of different information systems are becoming more and more essential. In this connection information technology is the enabler and the key for an effective implementation of SCM. In recent years SCM systems have developed as a new form of information system for the integrated, cross-organizational planning of supply chains. Building on the model of planning tasks, a consideration of the various functions facilitates a detailed description of SCM Systems. This forms a key prerequisite for the systematic selection of a suitable system. For corporate users it is then possible to both create a catalogue of requirements and to subsequently select a suitable SCM System according to a standardized format. A preliminary study indicates that SCM systems can be classified according to the supply chain levels, into the following categories (Luczak, Eversheim and Stich, 1999):

- Strategic planning systems,
- Optimization tools, and
- Extended ERP systems.

Strategic planning systems focus on the configuration of the supply chain. They support the long-term planning of the production and logistic network configuration. In this context SCM Systems support the efficient structuring of the supply chain.



Essential components are: planning of system configurations, selection of production sites or warehouses through simulation, distribution of production quantities, and representation of transport relations, make-or-buy decisions, as well as the determination of production, transport, and storage capacities. Based on 'what-if-analyses', the planner can determine the effects of different network configurations on performance figures such as lead time or service level.

The second category, the optimization tools, offer support for the planning of individual SCM tasks, e. g. production scheduling, demand forecasting, or distribution planning, often as an extension to existing ERP systems. This system category is also known as Advanced Planning and Scheduling (APS) systems. In contrast to standard ERP systems that use MRP-based planning approaches, APS systems employ simultaneous, constraint-based planning methods. Thus, it is possible to accomplish a realistic and up-to-date representation of the planning situation within a company. Moreover, a company is given the capability to make realistic promises to its customers regarding delivery dates, which take all planning restrictions into account (Available-to-Promise/Capable-to-Promise). Usually, the use of these optimization tools requires additional transaction systems such as ERP systems.

Extended ERP systems comprise both execution and planning capabilities. They provide an expansion of conventional ERP systems to include individual functions which support SCM tasks. Execution functionalities serve the purpose of inter-corporate management and control, and offer decision

support for operational tasks. This ensures the flexibility of the supply chain. These tasks establish the link to transaction-focused ERP systems and are therefore not directly SCM tasks. Typical planning features of extended ERP systems consist, for example, of collaborative planning and forecasting or production scheduling.