Review Article

SUPPLY CHAIN IN A CONSTRUCTION PROJECT
A Case Study

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Abstract

Supply chain management (SCM) is getting attention from companies involved in the delivery of capital projects. Some companies have been pursuing supply chain management for many years. The intention of this paper is to recognize different levels of supply chain maturity among engineering and construction firms. The paper will pique the interest in supply chain management for those companies that are not yet practicing it. The paper explores multiple supply-chain tactics, fabricates, components and pre-engineered metal building products. Competitors in the engineering and construction industry after recognizing the value of supply chain management may want to assess the circumstances under which these supply-chain tactics applies to their business. They might latter correspond to supply-chain strategy as a business opportunity.

Key words: *Supply-Chain, Supply Chain Management, Construction Project.*

Introduction

Supply chain management is the practice of a group of individuals and companies working in a network of interrelated processes, which are structured to satisfy customer needs by rewarding all members of the chain. The greatest potential benefits of supply chain management come when it is practiced at the enterprise level, where it involves multiple companies. Supply chain management involves managing a dynamic and complex network of organizations that operate to meet conflicting and numerous business objectives. The success of supply chain management relies on aligning the objectives of the production system of all organizations fully possible (Pryke, 2009).

Integration of supply chains has a tremendous impact on delivery time, costs, project schedules and customer satisfaction. Individuals and companies that do not engage in supply chain management fall rapidly behind in performance compared to their competitors who are supply chain conscious.

Supply chain management builds advances in fields such as operations, logistics and purchasing. Supply chain management must be considered to be of strategic importance for it to be implemented successfully. Supply chain management entails implementation aspects in which everyday operations are managed below the senior management level.

This paper describes supply chain tactics that have been implemented by Butler Manufacturing Company. Butler Company supplies products and services in the pre-engineered metal market. The pre-engineered metal building provides unobstructed open floor space that can be used in manufacturing plants, schools, shopping centre and warehousing (Butler, 2000).

Butler Company serves the non-residential construction for both domestic and international market. Butler Company is a vertically integrated firm because it can design and erect pre-engineered metal buildings and components. In addition, it

is a horizontally integrated firm in that it owns several subsidiaries that supply doors, architectural wall panels and windows. Butler Company has patents for several products in the cladding system.

In Butler Company, the term manufacturing refers to the process of designing and making building components through welding steel plate, cutting and drilling. Its products are standardized to suit individual projects needs. Its facilities are referred to as fabrication plants; the supply chain tactics applied by the company is applicable to other engineering and construction companies, as well (Butler, 2000).

Methods

The method used is Network Design Methods, which tend to be large scale and is used at the inception of supply chain. The method is used to decide what products to produce, where and how to produce it and the resources to use. General motors' have successfully used the method. The network design method adds value to the firm because it lay down the manufacturing strategies into the future.

Results and discussion

Butler Company has three functional groups, which include building systems, architectural products and construction services. The company has a network of local independent general contracting firms. The company offers structural engineering and design detailing phases, fabricating components and delivering them to the site. Builders on site make erect the structure with their own labour force or through subcontractors. Butler uses its builders to market its products but is also maintaining its own forces to pursue a wide range of products independently (Out-law.com, 2012).

The global competition in the market has heightened customers' expectation, which as in the term forced firms to invest in their supply chain and strategically established various kinds of preferred relationships. Form Butler's organization it is possible for companies to manage has and pursues vertical integration as well as horizontal integration. Butler's integrated nature creates a unique opportunity for superior supply chain performance. The companies manage it owns subsidiaries in a hierarchical fashion by holding individuals accountable for maximizing profits. Butler uses performance metrics to manage its integrated business and achieve different levels of integration with external suppliers (Theses.ncl.ac.uk, 2013).

Butler Company is strategically pursuing supply chain management by taking a leadership role in shaping its supply chain it participates. The company has defined a core competence in its design and fabrication of its name brand product. The company has pursued several product developments in its history. Butler has exploited core competence in maintaining strategic functions in-house (Out-law.com, 2012).

Butler Company can engineer, fabricate and erect metal components the company always performs these functions in-house. The company optimizes supply chain roles and functional responsibilities based on individual project needs. For example, Butler is involved in reaching across company boundaries to third-party

suppliers and downstream to independent contracts (Scm.ncsu.edu, 2013).

Butler has a production distribution network established through its builders, which gives the company a geographic presence around the world. The company has numerous potential customers and local labour market for steel erectors. The company has standardized its products by offering limited products that serve a specific market segment. The selection of raw materials, inventory control, sourcing and fabrication is easy and fast. The modular system has a lot of advantages because it reduces the need for design computation and reduces fabrication equipment setups and erection (Out-law.com, 2012).

The customization of products is done at a marginal cost because each product is defined by means of parametric design. Customized products optimize materials because the cost incurred in design is less compared to the cost of manufacturing. More unique designs made from steel plate and using standardized parts; the company has achieved a structural solution with economy in materials enabling their buildings be completed by delivery time (Scm.ncsu.edu, 2013).

Butler Company has streamlined its processes for design and fabrication, for example, it has designed computer program, which is tailored to each plant's design specifications and matches plant capabilities. Butler has several products for improving ease and safety of construction. For example, the company has developed a system to provide construction worker from falls and provide support for roof insulation. The safety benefits all in the supply chain. The safety measure consists of an open mesh fastened around the perimeter of the building. The mesh protects the workers from falling off during construction. In addition, Butler Company extends its performance warranties by building the appropriate degree of quality for all its products (Scm.ncsu.edu, 2013).

Butler Company has a centralized sourcing of raw materials such as steel, wood and aluminium. Butler has more than 70 percent of its products cost are made from steel thus the company annually enters into national agreements for steel purchases to buffer against potential price fluctuations. The company recaptures any cost increase in product sales prices. The company establishes each supplier with one contract and each supplier is based on the material requirements for its forecast products. Butler can provide better pricing by reducing the seasonal variability of its demand for steel (Butler, 2000).

Butler Company has proprietary products with third parties, which it has licensing agreements with companies it does not own. For example, it has an agreement with coil metal suppliers and roof panels, which are delivered, coated. The coat should not deteriorate during cold-forming process. Butler assesses performance by carrying systematically samples and test for each coil received (Tayur & Ganeshan et al., 1999).

Butler Company has invested its equity in supplies of related products by increasing the attractiveness of its buildings as compared to its competitors. For example, it packages the sale of the structure with other building components, this increased competition among builders in the market depending on the project.

After building the structure, the company may supply doors, ventilation, and wall panels.

Butler Company has expanded its competence by buying supply of related products, for example, it acquired Vistawall, which offers a broad line of engineering aluminium frame, windows, skylights etc. Recently the company has formed a strategic alliance to market Acsys Pannel System, which is a cost effective substitute for insulated metal wall assemblies. The alliance has made the company to a competitive edge in the commercial market.

Butler Company has invested on in-house customers by creating construction subsidiary BUCON. It also obtains performance feedback by meeting its builders to understand the challenges facing the business. In addition, the company has established a Corporate Alliance group that provides a central contact location to the large corporate owners. Butler has developed a close relationship with owners' facilities to promote the use of its products and improve its ability to forecast demand (Shoemaker, 1999).

Supply chain management is practiced in the engineering and construction industry and Butler's case study demonstrates how supply chain for delivery of capital projects may be set up to suit project requirements. It has illustrated that organisations may change over time through expansion and exploitation of their competence in order so that it can be more competitive in offering greater value to its customers. From Butler Company, it is vivid that suppliers play a major role in the capital project supply chain (Aurecongroup.com, 2013).

An intergrated supply chain focuses on the processes associated with the reducing the total cost of the supply chain. An integrated system enables end-users effectively manage manufacturing ans transaction costs in an integrated supply relationship.

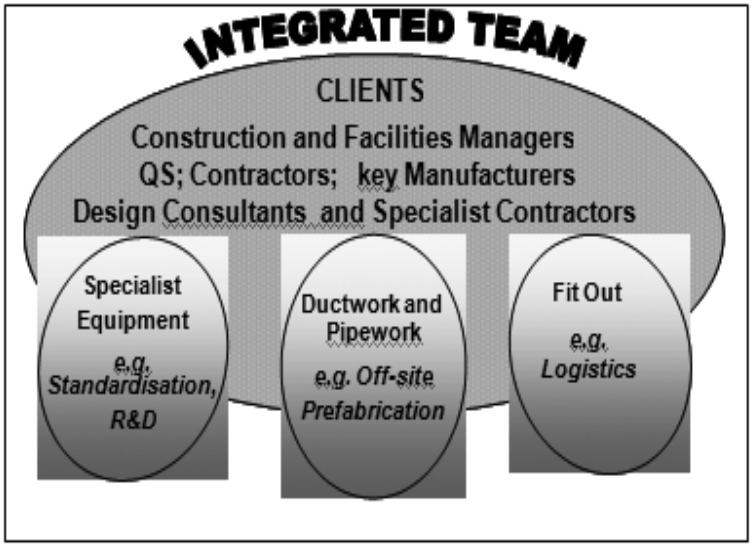

Fig1: Supply Chains as Part of the Team

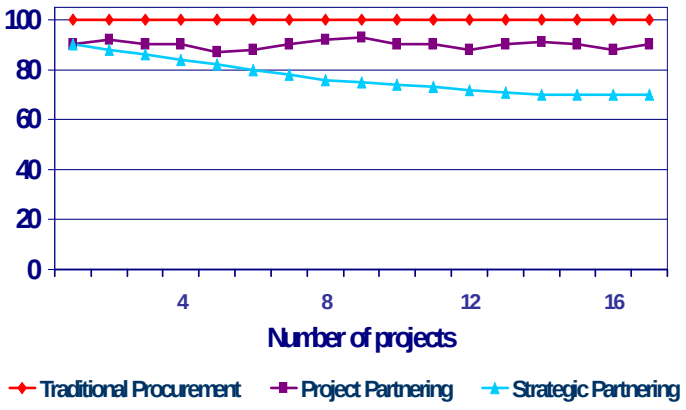

Fig 2: The Cost Benefits of Collaborating

In a stable supply chain, project based collaborating can deliver a 10 percent saving compared to traditional procurement method. There is need for continuous improvement to achieve better performance when lessons of the project-based partnership are improved upon.

Conclusion

In this paper wide range of supply chain tactics presented, which are applicable to engineering and construction firms that are willing to increase the competitiveness of their business. The tactics are not only applicable in pre-engineering metal industry but also in other sectors. This paper will provide industry practitioners in different sectors with the benefits offered by the supply chain management.

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