

Chapter 10

Hybrid Supply Chain Strategies in Wind Business

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ABSTRACT

The present chapter aims to increase the understanding of possible supply chain models and their fit and most effective configuration in a typically engineer-to-order sector, namely the wind business. Our findings argue the pertinence of a Hybrid Supply Chain model combining elements of the Lean, Agile and Leagile paradigms upstream and the Project Management paradigm downstream in the case of a Wind Turbine Manufacturer. We also find that, depending on the complexity of the market and supply diversity, multiple decoupling points emerge. Through the present Wind Energy Supply Chain case, we find that for effective management of a global supply chain characterized by a high number of references and multiple technologies, it is necessary to mix different manufacturing paradigms in order to provide a quick, agile and competitive response to the customer.

INTRODUCTION

Key enabling technologies generating smart industries and alternative sources of energy contributing to sustainable societies have become an economic priority.

The wind business (WB) is a relatively new industry and in Western Europe its origins date back to the 1970s. Despite its relative infancy, the global wind energy market has experienced a steady 25% annual growth rate over the past 10 years. Nowadays, wind energy represents a major trend as countries

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try to establish renewable energy technologies and diversify their energy mix. Wind energy is the world's fastest growing energy source and will power industry, businesses and homes with clean, renewable electricity for many years to come.

In terms of manufacturing and operations, the wind energy business has the following characteristics: i) low-volume, ii) high-variability, iii) highly-customized, iv) high-technology, v) high-quality and vi) short life wind turbines. The supply chain model (SCM) becomes a powerful strategic weapon, but is also an order-winning criterion when contracts are awarded.

Currently, one of the principle challenges facing wind turbine manufacturers (WTM) is trying to balance the capacity of their supply chain with demand uncertainty and variability, while attempting to ensure supply capacity, lower working capital, reduce work in process, decrease costs, lessen the lead time for components and reduce delivery times to final customers.

It is in this complex panorama that the questions, *Which manufacturing strategy best fits the manufacturer?* and *What are the critical elements in the supply chain?* arise. The aim of the present research is to reach a better understanding as to which supply chain model is best in a complex and typically engineered-to-order sector such as the WB. In consequence, the research questions (RQ) we formulate are:

RQ1: How can a supply chain co-exist with other manufacturing paradigms e.g. Lean, Agile, Leagile and Project Management?

RQ2: What are order decoupling points in the supply chain and how do they vary?

RQ3: What type of strategy needs to be adopted when the product can require variable lead-times? Does a one-size-fits-all supply strategy apply?

Literature Review

According to Russell and Taylor (2006), several authors assume that organizations are facing some challenges at present, which are interrelated and include: intense competition, global markets, global sourcing, global financing, global strategies, enhanced product variety, mass customization, service businesses, quality improvement, flexibility, advances in technology, employee involvement, and environmental and ethical issues. To cope with these challenges, an organization use strategies and required technologies to form a virtual organization, in which participants collaboratively respond in a more agile manner to any unexpected changes in customer demand.

The present contribution focuses on developing a flexible understanding of supply chains to enable mass customization of products and services. The main idea is to use concepts which, while are not new, have either not been integrated or have not been included in the same supply chain.

The literature review is divided into two main sections. We focus first on supply chain management to explore paradigms related to the supply of components and raw materials, and second on project management because project management has become the main generator of supply orders in this complex industry. The final integration in the supply chain is monitored by project managers because of the complex business of selling power capacity rather than selling a product which generates wind energy.

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