Chapter 5
New Product Development and Manufacturability Techniques and Analytics

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ABSTRACT

The following case study evaluates the New Product Development (NPD) techniques utilized by Forest City Technologies, Incorporated (FCT). Through insight gathered via interviews conducted with the company's product development and materials purchasing management teams, and supported by literature, this study attempts to show how Forest City Technologies, Inc. integrates specific components into its product development process to: 1. Meet its NPD goals, and 2. Achieve better supplier and customer relationships. This study focuses on the components of: NPD models employed by FCT, early customer and supplier involvement, NPD-innovation integration techniques, demand change factors during the NPD process, and risk-mitigation strategies implemented by FCT during the NPD process. The study is segmented into three main sections: Introduction to NPD and FCT, the components of FCTs new product development process, and NPD implications on FCTs supplier and customer relationships.

INTRODUCTION

Role of Technology and Analytical Approaches in Manufacturing

The achievement of innovation through the development and marketing of products and services has been a key source of competitive advantage for many large and small manufacturing firms in order to improve upon operations efficiency. Numerous process modifications, modeling and simulation techniques, and design for manufacturability projects can be found through the academic and practitioner's literature. Managers typically spend much time and resources in prototyping and putting new products on the market, constantly weighing the factors that they feel as though will make the products ultimately sell or fail (Smith & Rupp, 2015; Wee, Peng, & Wee, 2010; Whitten, 2004; Yao & Carlson, 1999; Zang

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& Fan, 2007). Essentially, new product manufacturability (NPM) is a strategic fit between the product design specifications from the new product development (NPD) team and the actual capabilities of the manufacturing/production processes (Fumi, Scarabotti, & Schiraldi, 2013; Helo, Anussornnitisarn, & Phusavat, 2008; Hu, Wang, Fetch, & Bidanda, 2008; Ifinedo & Nahar, 2009; Johansson & Sudzina, 2008). There are many dynamic factors associated with successful global NPD/NPM strategic ventures that are not related to performance factors alone (Baxter & Hirschhauser, 2004; Bhat, 2008; Park & Min, 2013).

As suggested by Durham (2002), manufacturability and related manufacturing research into processing technologies and systems analysis must include evaluation of the environmental and energy impacts, as well as the economic considerations. The entire process of manufacturability is complex and requires the ability to assess process or systems modifications in terms of their impacts on resource use, at both the global as well as the local evaluation. "The need to conduct this assessment on several levels induces system complexity. Current models and methods either simplify, provide bulk assessment of events, or serve in a reductionist fashion, providing decision-makers with limited information" (p. 37). Poor manufacturability due to poor NPD and team integration processes can enact significant costs and loss of market share. Managerial integration issues associated with the ability of a firm to accelerate NPD activities may have significant impacts on generating initial production start-up problems, increased employee morale problems, cost over-runs, increased complexity, delays in quality assurance programs, and increased customer dissatisfaction from increased in products' defects and resultant failures.

Websites and scanning equipment provide not only a direct contact between the organization and its customers, but also present an opportunity for innovation in both the manufacturability and delivery/sell of products. One factor determining whether the organization will use its website for the electronic delivery of its products may be the firm's pre-existing distribution structure and channel relationships. Hence, "Some innovative organizations are attempting to provide customers greater value by using this technology within their value chain" (Palmer & Griffith, 1998, p.47). Companies can gain significant advantage by utilizing the Web and the associated IT technologies of automatic identification and data capture (AIDC), especially smart cards, for communication and product management purposes. Information sharing within a technical project environment can make use of these tools, such as shared-secret symmetry cryptography together with smart-card technology. The access key of a person is carefully encoded and stored on a smart card, which can also be used for many other purposes. Thus, for example, access records are kept on these smart cards in a distributive fashion and with duplication.

The information intensity of the product/service is a key element, which is greatly aided by the timeliness and accuracy of the associated AIDC-related systems. Highly information-intensive products and services require a higher frequency of contact with customers to achieve effective communication that may be achieved through the use of RFID and related technologies (Aldaihani & Darwish, 2013; Azadeh, Gholizadeh, & Jeihoonian, 2013; Bhamu, Khandelwal, & Sangwan, 2013; Chen, Wu, Su, & Yang, 2008; Dutta, Lee, & Whang, 2007; Fisher & Monahan, 2008). "The more information-intense the product, the more likely the website will utilize promotional activities to stimulate repeat consumer patronage of the site" (Palmer & Griffith, 1998, p. 47). Therefore, the Internet coupled with AIDC systems integration offers a method of distribution and project managerial control of information to a vast host of potential users. In addition, this union of IT systems can provide accurate and timely information as well. These methods of information management strategies are allowing manufacturers leverage and streamline the tremendous volume of data flows. As Keller (2002) noted: