

Setting manufacturing strategy for a factory-within-a-factory

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Abstract

Manufacturing strategy is a plan for moving a company from where it is to where it wants to be. Determining the best manufacturing strategy is not easy because of the wide range of choices and constraints a company faces. Manufacturing strategy frameworks or models are helpful because they identify the objects that comprise manufacturing strategy and organize these objects into a structure that enables a company to understand and use the objects to develop strategy. Many frameworks are possible and there is no single framework that is best for all companies.

In this paper, we are interested in the levels of cost, quality, delivery, and flexibility that manufacturing provides for each product family it produces. This is determined primarily by a company's factories-within-a-factory (FWFs) and so the level of analysis in this paper is the FWF. We identify and examine five manufacturing strategy objects (production systems, manufacturing outputs, manufacturing levers, manufacturing capability, competitive analysis), linkages between these objects, and the manufacturing strategy framework for an FWF that follows from these objects and linkages. We apply the framework to the FWFs of two multi-national companies. This paper is descriptive and exploratory. Strategy objects, linkages, and framework are presented and their use is illustrated. The work of rigorous empirical analysis is left for future research.

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1. Introduction

Marketing professionals talk about four types of value: form, time, place, and possession. Manufacturing is primarily responsible for the form and time value-types with some participation from marketing and accounting. Manufacturing forms products by completing design and production activities in a timely manner. Manufacturing and marketing generate the place value-type through their distribution activities. Marketing and accounting are responsible

for the possession value-type through activities such as pricing, credit, advertising, and customer service. Manufacturing creates value in its network of factories, distribution centers, offices, research laboratories, and so on. Factories can be large or small, and can consist of one or more factories-within-a-factory, FWFs (also called plants-within-a-plant, PWPs). See Hill (2007).

Manufacturing strategy can be analyzed at the level of industry, company, strategic business unit, network, factory, FWF, or product (Swink and Hegarty, 1998). In this paper, the level of analysis is the FWF. FWFs are important parts of a factory and a manufacturing network. Miltenburg (2005)

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examines the constraints a manufacturing network imposes on the factories and FWFs that comprise it. In an FWF the form and time value-types are operationalized as levels of cost, quality, delivery, and flexibility that the FWF provides for the products it produces. The goal of manufacturing strategy for an FWF is to determine the levels of cost, quality, delivery, and flexibility that are required, and the actions that are needed to achieve these levels.

Minor et al. (1994) and Dangayach and Deshmukh (2001) give good reviews of manufacturing strategy. At a macro level manufacturing strategy can be studied as one of several functional strategies in a hierarchy of industrial, corporate, business, and functional strategies (Gupta and Lonial, 1998), or as the way a company uses its assets and prioritizes its activities to achieve business goals and generate competitive advantage (Kotha and Orne, 1989; Miller and Roth, 1994). A distinction can be made between the content of manufacturing strategy and the process of formulating manufacturing strategy (Barnes, 2002; Papke-Shields et al., 2002; Platts et al., 1998). Pun (2004) gives an excellent review and synthesis of different processes for formulating manufacturing strategy. Ahmed and Montagno (1996), Devaraj et al. (2004), and others verify empirically a positive correlation between strategy formulation and company performance. Demeter (2003), for example, reviewed the literature from 1983 to 1999, completed an empirical analysis of the IMSS-II data (International Manufacturing Strategy Survey in 1996–1997), and found that “(T)he most important result ... is that ROS (return on sales, which is the ratio of profit before tax to sales) is significantly higher in companies with existing MS (manufacturing strategy)” (pp. 210–211).

Setting manufacturing strategy for an FWF is the subject of this paper. The next section describes the objects, linkages, and framework that comprise manufacturing strategy for an FWF. Section 3 illustrates the use of these objects, linkages, and framework by studying the manufacturing strategies of two multi-national companies. The paper finishes with a summary in Section 4.

2. New model for manufacturing strategy for a focused factory-within-a-factory

Boyer and Lewis (2002) show that there is some agreement among researchers as to the framework and contents that comprise manufacturing strategy

at the level of an individual factory. They describe a framework with two objects: competitive priorities and operating decisions. Competitive priorities are the levels at which the factory is required to provide cost, quality, delivery, and flexibility. Operating decisions are decisions the factory makes in the structural and infrastructural areas that comprise it. There are four structural areas: capacity, facilities, technology, and vertical integration/sourcing, and four infrastructural areas: workforce, quality, production planning, and organization. Boyer and Lewis describe this as the “prevailing model of the content of operations strategy ... (and this model) conveys the idea that operating decisions such as capacity, technology, workforce issues, and quality systems must be carefully matched with the organization’s key competitive priorities” (p. 10).

Morita and Flynn (1997) show that a framework with three objects, which is one more than Boyer than Lewis, is also an appropriate way to organize the contents of manufacturing strategy for a factory. Their three objects are strategy, processes, and structure. Their first object, strategy, corresponds to Boyer and Lewis’s first object, competitive priorities. It is “the choice of product-markets, positioning and competitive features” (p. 968). The second object, which has no corresponding object in Boyer and Lewis’s framework, is called processes. It is “the manufacturing and technological choice ... the process choice” (p. 968). The third object, structure, corresponds to Boyer and Lewis’s second object, operating decisions. This is “the choice of how to define roles of functional processes into specific tasks ... as well as the organizational mechanisms which integrate individuals, groups, and units ... It is the (object) where most of the practices identified as ‘best practices’ should be” (p. 968). Morita and Flynn emphasize the importance of the linkages between the three objects: the “thoroughness of the linkages between these (objects), especially with the manufacturing process, affects performance” (p. 969).

In the subsections that follow we show that a framework with five objects is a very useful way to organize the contents of manufacturing strategy when the level of analysis is an FWF. The five objects are competitive analysis, manufacturing outputs, production systems, manufacturing levers, and manufacturing capabilities. These objects are firmly grounded in the literature. They are, for example, related as follows to the objects in Boyer and Lewis, and Morita and Flynn. The competitive

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