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Relationships between two approaches for planning manufacturing strategy: A strategic approach and a paradigmatic approach

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ABSTRACT

Two approaches for planning manufacturing strategy, a strategic approach and a paradigmatic approach, are introduced. The key decisions of these two approaches are, respectively, located in the choices of competitive priorities and manufacturing paradigms. Three hypothesis models on the relationships between these two approaches in a turbulent environment are founded with the help of structural equation modeling and tested with 107 samples from the Chinese manufacturing industry. The results suggest that when established the relationships between manufacturing strategy and business strategy, the mediate function of competitive priorities is not suitable for manufacturing paradigms, and it is more appropriate to make the key decisions in each approach based on business strategy directly.

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1. Introduction

Manufacturing strategy has different paradigms, such as competing through manufacturing, strategic choices in manufacturing and best practices (Voss, 1995). Accordingly, there are different approaches for planning manufacturing strategy. Two approaches are introduced in this paper: a strategic approach and a paradigmatic approach. In the strategic approach, the key decisions on manufacturing strategy are located in the choices of competitive priorities, which are known as the manufacturer's choice of emphases from among key capabilities such as quality, cost, delivery and flexibility. In the paradigmatic approach, the key decisions on manufacturing strategy are located in the choices of manufacturing paradigms which include best practices and innovative manufacturing systems, such as lean production and agile manufacturing. A compatible and complementary relationship can be found

between these two approaches, and there are close relationships between the choices on competitive priorities and manufacturing paradigms. However, there exist different views on planning manufacturing strategy according to these two approaches. One issue in this regard is whether the decisions on manufacturing paradigms should be made based on competitive priorities, business strategy or both. As a decision in the manufacturing section, manufacturing paradigms should be consistent with manufacturing strategy, such as the decisions on competitive priorities. On the other hand, as a paradigm of manufacturing strategy, manufacturing paradigms should be directed by business strategy. Different choices will have different planning process models for manufacturing strategy and different performance in practice, too. Since manufacturing strategy must support business strategy irrespective of the approach used, we suggest that the relationships between the two approaches be examined through an analysis of the relationships among the key decisions of the two approaches and business strategy.

Research on the relationships between manufacturing paradigms, competitive priorities and business strategy

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can be also helpful for introducing and improving innovative manufacturing systems or best practices. In this paper, 31 such innovative manufacturing systems are collected. In addition, an increasing number of such systems and tools are entering the market, covering the whole supply chain, such as SCM packages provided by SAP, Manugistics and i2. However, it is reported that many firms have failed in the innovative activities. It has been widely accepted that in the absence of good integration with strategy, these innovative activities would not lead to good performance. Usually, manufacturing strategy is a suitable choice for most firms to build the integration. One reason for this is that these innovative activities are purposed to the production sections or the SCM. The other reason is that manufacturing strategy can mediate between business strategy and business performance (Ward and Duray, 2000). Another choice is to set up a direct linkage with business strategy but not with manufacturing strategy. The difference is that the second selection does not agree with the mediatory role of manufacturing strategy, such as in terms of competitive priorities, between manufacturing paradigms and business strategy. In general, the consistency between manufacturing strategy and business strategy has been taken for granted, and the difference has not laid sufficient emphasis on both theory and practice. In academic research, when setting up the relationships between systems and strategy, different researchers employ different selections, business strategies or manufacturing strategies (Miltenburg, 1995; Duda and Cochran, 2000; Kim and Lee, 1993; Carrie et al., 1994). Relationships between manufacturing strategy and business strategy have been studied from the 1960s; however, the links need to be further researched because environmental and other changes have caused manufacturing strategy to drift away from the mainstream strategy (Brown and Blackmon, 2005; Barnes et al., 2004; Skinner, 1969). In practice, according to a survey on the Chinese manufacturing industry in 2000, the implementation of JIT may be beneficial for quality, inventory turnover and flexibility; however, it may also have a significant negative relationship with the market share improvement in China (Robb and Xie, 2001). Based on the response to the implementation of TQM in China in 2003, there is a lack of complete understanding of strategic quality management in the surveyed firms, and they only have superficial knowledge of the connotations of some quality dimensions (Lau et al., 2004). The purpose of this study is to compare different linkages between manufacturing paradigms, competitive priorities and business strategy through an empirical study, and provide suggestions on planning manufacturing strategy based on these two approaches.

Questions on the relationships among manufacturing paradigms, competitive priorities and business strategy also reflect the coordination problems between two views on strategic management: the market-led view and the resource-based view. In the market-led view, changes within markets determine the market position and functional-level strategy; in the resource-based view, the firm should assemble and deploy appropriate resources that provide opportunities for sustainable competitive advantage in its chosen markets to maximize returns

(Brown and Blackmon, 2005). In the planning process, competitive priorities have often been used to reflect the market requirements and firms' choices, and the contingency between the choices of competitive priorities and the decisions in manufacturing strategy have been studied often (Ho, 1996; Ketokivi, 2006). On the other hand, in the resource-based view researchers hold that it is more appropriate to forget the trade-offs between competitive priorities in a hyper-competitive environment, and suggest a new planning process model for manufacturing strategy, which includes developing, protecting, and leveraging resources in a dynamic manner (Gagnon, 1999). Manufacturing paradigms are important choices for building manufacturing capabilities. How to match manufacturing capabilities with market requirements has become an important question under the changing environment. Acur and Bititci (2004) demonstrate how the business process-based approach (PROPHESY) facilitates the integration of resource- and market-based approaches to strategy management. Brown and Blackmon (2005) introduced the concept of 'strategic resonance' to dynamically link business-level strategy and manufacturing capabilities, market requirements and a firm's supply network. However, few empirical studies compared the performance between the strategic and paradigmatic links when planning manufacturing strategy. One reason for this is that it is difficult to hold a common view on the manufacturing capability since the competitive environment is under constant change.

Our study focuses on a turbulent environment. A turbulent environment is characterized as the changing and uncertain requirements on competition. In this environment, change is not an exception, but a rule. In order to rapidly respond to frequent and sudden changes, some innovative manufacturing systems, best practices and SCM tools have been proposed. In this study, 31 innovative manufacturing systems and four manufacturing paradigms are examined. These manufacturing paradigms are characterized as the capability of dealing with changes and uncertainty and cover the process of whole supply chains. By examining the requirements in a turbulent environment and the response in manufacturing, this study may provide suggestions to discover the co-evolution between innovative activities in manufacturing and the institutional factors in a different environment, which is also included in studies on the Science of Institutional Management of Technology (SIMOT).

The remainder of this paper is organized as follows. In the second section, literatures on the relationships between the two approaches are reviewed and three models on the relationships are established. The third section describes the research methodology. In the fourth section, the results of measuring manufacturing strategy and business strategy are reported. The hypotheses are tested in the fifth section. In the last section, we present the conclusion and discuss the results.

2. Literature review

Today's competitive environment is a turbulent environment full of changes such as ubiquitous availability and

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