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# Toward A New Operations Strategy in the Network Economy

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**Abstract:** The rapid development of information technology has dramatically changed the dynamics of the market and altered the rules of competition. Inter-organization information systems make it possible for firms to achieve effective integration both in decision-making and operations processes, which brings enormous potential for supply chain cooperation. The scope of operations now is no longer confined to plant or strategic business unit (SBU) level. It has expanded to the whole supply chain.

In the network economy, almost every underlying assumption of old economy operations management comes into questions. Competitive advantages making firms success in the old economy may lose their utility in the new IT-based economy. New source of competitive advantages should be identified and cultivated. This study conceptually extends existing operations strategy models: (1) to reflect the substantial change brought by the network economy and the new characteristics of emerging operations mode; (2) by extending the unit of analysis from plant and strategic business unit to supply chain organization; (3) by adding new construct and at the same time extending the connotation of prior constructs used in traditional operations strategy models. A conceptual framework of the new operations strategy is recommended.

**Keywords:** operations strategy for E-commerce, supply chain, network economy

## I. Introduction

Ever since Skinner (1969) pointed out the missing links between the manufacturing function and strategy [1], manufacturing strategy, or what is now called operations strategy, has received considerable attention both in academic world and business world. Manufacturing strategy is often advanced as a source of competitive advantage [2] [3].

The development of information technology has dramatically changed the dynamics of the market and altered the rules of competition. A key feature of present-day business is the idea that it is supply chains that compete, not companies [4]. Competitive advantages in the old economy may lose their utility in the new network economy. A key question that the operations management community needs to consider is whether the tools, models and concepts from the old economy can still serve operations management in

new economy organizations and their evolving business models [5]. Under this circumstance, a new strategic thinking is required in response to the challenge posed by the network economy. As Sampler and Short (1998) state, the new “information-driven competitive dynamics require researchers to develop new theoretical constructs and managerial perspectives to re-evaluate the firm and its extended set of relationships because failure to manage information and information-related resources can produce undesirable side-effects” [6].

This paper first examines the basic assumptions underlying traditional operations strategy. New factors and characteristics that should be taken into account in the formulation of operations strategy are then identified. Based on the work of existing literature, mainly the work of Hayes and Wheelwright, a conceptual framework incorporated the influence of new environment is presented.

## II. The Impact of the Network Economy and the Limitation of Existing Operations Strategy Models

Hayes (2002) identifies five underlying assumptions of old economy operations management [7].

- (1) The organizational unit of analysis is an operating unit (e.g. factory, company, division or business unit of a company);
- (2) Operations management is primarily concerned with stable “products” and “processes”;
- (3) The dominant activity of the operations manager is to control the flow of materials (and/or information) through a sequence of process steps;
- (4) A major concern of operations managers is reducing the variable cost of production;
- (5) Your competitors are your enemies, and the key to prevailing against them lies in differentiation (e.g. through lower cost and superior performance, etc.).

Yet, in the network economy, almost all of these underlying assumptions come into questions. With the advent of inter-organizational information systems, and E-business in particular, electronic links between separately owned organizations could be established, which brings enormous potential for the supply chain partners to develop and enhance their cooperation. Therefore, within the context of the network economy, more factors should be taken into account in the process of operations strategy formulation.

(1) The network characteristics of the new operations mode should be incorporated. The scope of operations

strategy should be extended from a single operations unit to the whole supply chain..

(2) Besides “products” and “processes”, supply chain relationship should also be included as a primary decision area in response to the dramatic increase of reciprocal interdependencies between separate organizational units in the supply chain.

(3) Cooperation instead of competition should be emphasized.

### III. Operations Strategy and Structure: A Brief Literature Review

Since Chandler’s seminal study in 1962 [8], the strategy/structure approach has been widely used in strategic management literatures. Review of the operations strategy reveals that structure decisions lies at the heart of traditional operations strategy field. Hayes and Wheelwright (1984) categorized the decision elements of operation strategy as structural and infrastructural. Structural decisions included those relating to capacity, facilities, production equipment and systems, and internal/external sourcing. Infrastructural decisions included human resource policies, quality systems, production planning, new product development, organization and performance measurement [2]. Nigel and Michael (2002) [9] held a different view. According to their analysis, all the decision areas have both structural and infrastructural implications. It is inadequate to categorize decision areas as being either entirely structural or entirely infrastructural.

The product-process matrix proposed by Hayes and Wheelwright [2] describes manufacturers’ choices about manufacture structure along two dimensions: process structure and product structure. Process structure ranges from the relatively unstructured job-shop environment to the highly structured continuous-flow production environment. The product structure dimension ranges from low standardization in product design (highly customized products) to commodity-like products that are highly standardized [10]. The underlying assumption of the product-process matrix is that the fit between process structure and product structure results in superior performance.

In their generic manufacturing strategy model, Kotha and Orne (1989) [11] defined manufacturing structure along three dimensions: process structure complexity, product line complexity and organizational scope. Process structure complexity in this model includes the traditional concept of process maturity [2] but has a broader scope. It has three sub-dimensions: (1) the level of mechanization of production processes; (2) the level of systemization of production processes and activities; (3) the degree of interconnection of production process tasks and stages. Production line complexity is a measure of the type and variety of product lines which could be represented by the complexity of end-products produced, individual product volumes and end-product maturity or experience. Kotha and Orne (1989) did not explicitly define organizational scope

but indicated ‘underlying variable’ of the third dimensions including geographic manufacturing scope, geographic market focus, vertical integration, customer-market scope, and the scale [10].

The scope of operations strategy evolves over time. The unit of analysis of Product-process matrix and generic manufacturing strategy model are two typical examples to reflect the evolution process. The product-process matrix was developed at the plant level, while the generic manufacturing strategy framework was developed at the strategic business unit (SBU) level. Yet most of the operations strategy models are developed in the context of old economy. Little work to date that integrates the characteristics of the operations in the network economy has been made.

### IV. A Conceptual Framework of the New Operations Strategy

The authors agree with Nigel and Michael (2002) that the structural and infrastructural decisions in operations strategy are interwoven. Therefore, this paper does not distinguish the two concepts. Based on existing operations strategy literatures and relevant organization theories, this paper extend the traditional operations strategy frameworks by including aspects relating to inter-organizational supply chain management facilitated by the rapid development of information technology. Two core categories of elements of the new operations strategy are operations performance objectives and strategic decision areas. Figure 1 illustrates key elements of operations strategy and their interdependences.

#### IV. 1 Operations performance objectives

Objective reflects the state that a system is expected to achieve. The operations performance objectives reflect the aspects of operations performance that satisfy market requirements and therefore define what the operation is expected to pursue. Many authors on operations strategy have designed their own set of performance objectives. Similar constructs in the literature include “manufacturing task”, “competitive priority” and “competitive capability”. Though differences exist between definitions made by different authors, there are some commonly used categories. Four commonly accepted performance objectives are quality, speed, cost and flexibility. Quality refers to both product quality and service quality. Speed reflects how fast customers’ needs, also including product and service, can be met. Cost includes all the financial input required to satisfy customers’ needs. Flexibility indicates the ability to adapt to the change of customer requirement.

#### IV. 2 Strategic decision areas

The first strategic decision area is product structure. The structure of products manufactured is an important characteristic of manufacturing environments. According to

the product-process matrix, this reflects the maturity of the product life cycle stage [10]. The product structure construct here encompasses five sub-dimensions:

- (1) Primary product type or product life cycle stage;
- (2) Variety of final product;

- (3) Volume of each final product;
- (4) Customization/standardization of final product;
- (5) Compositions and modularization of key components of final product.

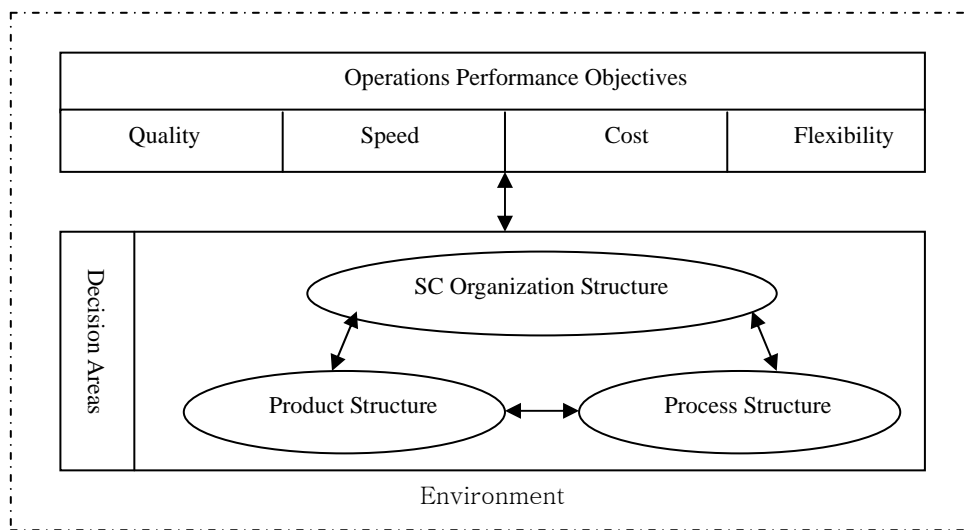


Figure 1 Key elements of operations strategy and their interdependences  
Fig.1 Supply chain strategy analysis elements and decision areas

### IV. 3 The external fit and the internal fit of operations strategy

The main tasks of operations strategy are identifying key elements of strategic operations decisions and integrating these elements in a pattern so that two kinds of “fit” can be achieved. The first fit is external fit or environmental fit. The external fit concerns how the operations strategy matches with the environment. The second fit is internal fit, including the fit among different structures and the fit between objectives and structures. Harmonized together, the whole of these mutually supportive elements can be a far greater source of competitive advantage than any single elements of the strategy.

### V. Conclusions

Most of existing operations strategy models are developed in the context of old economy. Review of the operations strategy literature reveals that little work to date has been made to integrate the characteristics of the operations in the network economy. Our intentions in this paper are to extend the traditional operations strategy models in the context of network economy by incorporating factors enabled by the rapid advancement of information technology. A conceptual framework that demonstrates the elements of new operations strategy and their interdependences are proposed. This is just a nascent step toward the understanding of emerging operations management pattern. In the future, more work is required to refine and operationalize the constructs proposed

here as the basis of empirical research to further investigate and test the interrelationships among key elements of operations strategy as well as their links to performance.

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