Int. J. Production Economics 120 (2009) 221–232

Contents lists available at ScienceDirect

Int. J. Production Economics

journal homepage: www.elsevier.com/locate/ijpe

The product-relationship-matrix as framework for strategic supply chain design based on operations theory

Stefan Seuring *

Department of International Management, Faculty of Organic Agricultural Sciences, University of Kassel, Steinstr. 19, 37213 Witzenhausen, Germany

ARTICLE INFO

Article history:
Received 1 September 2007
Accepted 1 July 2008
Available online 17 October 2008

Keywords:
Supply chain management
Supply chain design
Operations strategy
Case study research
Performance frontier
Swift-even flow

ABSTRACT

The strategic design of supply chains can be analysed building on recent theory development in operations management. Schmenner and Swink [1998. On theory in operations management. Journal of Operations Management 17 (1), 97–113] have identified the theory of performance frontiers and the theory of swift, even flow, which integrate various concepts from operations strategy and management. Transferring these theories to the supply chain level allows five strategic decision fields in supply chain management to be outlined: Products and Services, Partners and Partnerships, Plants and Stocks, Processes and Planning and Control. These decision fields form the backbone of the product-relationship-matrix, a conceptual framework for supply chain management. This is built by combining a life-cycle dimension with a partnership dimension. The framework conceptualises both the content and process of such decisions. This is illustrated by five case studies from different industrial sectors.

© 2008 Elsevier B.V. All rights reserved.

1. Introduction

Supply chain management (SCM) is often referred to as a concept required for strategic (re-)organisation of all stages of production and logistics processes among involved companies (Bechtel and Jayaram, 1997; Frohlich and Westbrook, 2001; Rudberg and Olhager, 2003; Cigolini et al., 2004). While SCM has seen a major increase in academic and practitioner interest, related theory development has seemed to lag behind (as argued by e.g. Croom et al., 2000; Mentzer et al., 2001). Recent papers aimed to provide more holistic frameworks (see e.g. Giannakis and Croom, 2004; Chen and Paulraj, 2004; Paulraj and Chen, 2005). Related to this, several definitions of supply chains and SCM can be found (see e.g. the overviews in Croom et al., 2000; Mentzer et al., 2001). Here, only one example is provided: "The supply chain encompasses all activities associated with the flow and transformation of goods from raw materials stage (extraction), through to the end user, as well as the associated information flows. Material and information flow both up and down the supply chain. Supply chain management (SCM) is the integration of these activities through improved supply chain relationships to achieve a sustainable competitive advantage" (Handfield and Nichols, 1999, p. 2).

One field supply chain strategy could build on is operations strategy. Fisher's (1997) now classical paper on matching products and supply chains can be seen as one such attempt (for a wider discussion on how SCM relates to other fields see in particular Handfield and Bechtel, 2004). Operations management and strategy are by now established topics which have even seen the development of two major theories (Schmenner and Swink, 1998). One of these is the theory of performance frontiers, which rests on the focused factory concept. This offers a valid basis to transfer such thought to supply chain strategy (Handfield and Bechtel, 2004). Furthermore, a number of papers on supply chain strategy propose criteria to establish

* Tel.: +49 5542 98 1206; fax: +49 5542 98 1207.
E-mail address: seuring@uni-kassel.de
URL: http://www.uni-kassel.de/agrar/ima

0925-5273/$ - see front matter © 2008 Elsevier B.V. All rights reserved.
doi:10.1016/j.ijpe.2008.07.021

different types of supply chains, such as Fisher's (1997) model of efficient and responsive supply chains. The process of how the supply chain is formed and which decisions are made is rarely combined with this, leaving the process of strategy formulation and implementation aside. A second theory is attributed to swift, even flow of material and information up and down the supply chain, which Fisher's (1997) model also relates to.

The paper aims to take up operations theory as comprised of the theory of performance frontiers and the theory of swift, even flow and discusses how it is to be amended in supply chains. Furthermore, the question arises on how this can constitute a conceptual framework for supply chain design outlining different decisions and pointing towards the process of forming a supply chain. In this respect, the paper contributes to theory building through conceptual research (Meredith, 1993; Weick, 1995). For this theoretical development empirical research formed a key insight, so five related case studies are presented.

This leads to the following structure of the paper: First, theory development in operations management is briefly outlined. Building on this, the theory of performance frontiers and the theory of swift, even and their constituting laws are outlined. Next, SCM is defined and some remarks on supply chain strategy literature are made, which point out the shortcomings of the previous research. Third, the concept of focus is transferred to SCM. This leads to the formulation of the five Ps for supply chain strategy: Products and Services; Partners and Partnerships; Plants and Stocks; Processes; Planning and Control. Separating configurational and managerial issues allows the five Ps to be arranged to form the "product-relationship-matrix." The application of the two theories, as embodied in the concept will be outlined. This is in particular done in five case studies. Therefore, the related research methodology is briefly presented. The single cases are introduced before a cross-case analysis is offered. Finally, theoretical and empirical research findings are discussed before the paper is concluded.

2. Theory development in operations management

2.1. The concept of the focused factory as a foundation for operations strategy

Due to the close link between SCM and operations management, operations management and strategy provide a valid starting point. Building on the work of Skinner (e.g. 1969, 1974, 1985, 1996), the drive to reach a performance frontier (Schmenner and Swink, 1998; similar also Porter, 1996) forms a theory development informed by the original concept of the focused factory. A definition for the term "focused factory" is provided by Pesch (1996, p. 33): "The focused factory is a factory with a limited, strategically linked, and internally consistent set of demands that derive from the plant's products, processes, customers and suppliers. Limiting the demands placed on the plant in turn limits the number of manufacturing tasks in the plant, and establishes a clear set of priorities for both workers and managers." The concept of focus does not mean just reducing the number of tasks performed or products produced. Hill (2000, p. 160) expresses this as "the homogeneity of tasks and the repetition and experience involved in completing these [..] form the basis of focused manufacturing." Therefore, the focus needs to be specified for each company. Various systemisations (Skinner, 1969, p. 141; 1974, p. 120; 1985, p. 61, also Hill, 2000, p. 160) developed for a focused factory allow analysis of the concept for a certain company, as they specify which decisions have to be made to conduct a business. This implies that other options are not followed, which has led to the so-called "trade-off" debate.

The questions addressed build on the trade-off decision to be made (see e.g. Corbett and Van Wassenhove, 1993). Skinner (1974) lists five important trade-off decision areas in manufacturing. Based on this, various lists have been proposed (see the overview in Rudberg and Olhager, 2003, p. 32), they have made their way into operations management textbooks in different names, where the five Ps (for the terms given in brackets: Chase et al., 2006, p. 378; also Hayes and Wheelwright, 1984, p. 31) might be the simplest to mention, while offering a valid description:

- Product design/engineering (products or parts),
- Plant and equipment (plant),
- Organisation and management (processes),
- Labour and staffing (people) and
- Production planning and control (planning).

Skinner (1974, 1985) links these basic trade-off decisions to five key characteristics of the focused factory, which are to be limited in their deviation: process technologies, market demands, product volumes, quality levels and manufacturing tasks. These criteria can be used to describe the business a company operates. They help to comprehend the major strategic choices a company has to make in focusing operations, leading to ideal types of market orientation or process/resource orientation. This provides a direct link to the supply chain strategy issues discussed earlier. Therefore, the five Ps take up these characteristics and detail how the operations system is set up.

The most classical concept that has been proposed when building on focused factory thought is the product-process-matrix (Hayes and Wheelwright, 1979a, b), which is widely adopted and has already had a great impact on SCM and associated research. Related empirical survey research has been conducted to verify the concept of the focused factory (Hayes and Wheelwright, 1984, pp. 110–117; New and Szwejczewski, 1995; Pesch and Schroeder, 1996; Vokurka and Davis, 2000; Spina et al., 1996). All surveys find some evidence that focused factories achieve better performance than unfocused ones. In line with strategic management thought, it has already been mentioned that this might only be a temporary advantage. The ideas incorporated in the concept of the focused factory have triggered many other frameworks in the area of operations management and strategy.

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات