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An operational profit sharing and transfer pricing model for network-manufacturing companies

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Abstract

New age companies are forging partnerships with other firms to market products that have been assembled through manufacturing activities distributed at different locations. These locations belong to more than one company and the product passes through these different sites during its manufacturing stages. This manufacturing collaboration is known as network-manufacturing. According to the network philosophy, companies form alliances to manufacture a product and share in its operating profits. This paper proposes a framework and methodology for profit sharing and transfer-pricing between network companies. We propose a paradigm that enables maximization of operating profits by the manufacturing-network in its larger supply chain, suggesting a departure from the model that maximizes profits for the individual company within the sphere of its own supply chain.

Keywords: Pricing; Supply chain management; Networking; Operating profit sharing; Extended enterprise

1. Introduction

The contemporary business environment in the Western world has created a knowledge-driven culture, and corporate networks that are structured to enrich the knowledge-based commercial sector (Achrol and Kotler, 1999; Carr and Karmarkar, 2005). Within the overarching ambit of this paradigm, network-manufacturing is being widely used as a seminal business model. The companies that use this model typically enter into a partnership to manufacture a product and share the operating profit in proportion to each company's investment in the manufacturing process. Network-manufacturing ventures tend to reduce irregular

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investments in fixed assets and technologies, and are inherently flexible and responsive to changes in business environments. However, network-manufacturing ventures still need to resolve certain impediments to evolve as a viable business paradigm. These difficulties relate essentially to two principal areas of network-manufacturing partnerships: firstly, the transference of commodities produced in one unit to another unit needs to be monitored and managed more effectively; and secondly, an equitable and efficient formula needs to be devised for the distribution of profits generated by the network.

The method of Transfer Pricing should be employed to address the complexities involved in the transference of goods from one company to another. When a product crosses frontiers and accrues customs duty its value can be determined by the transfer pricing method, enabling each company to draw up its balance sheet. Transfer pricing is commonly used in the cost accounting of single companies that are scattered in many locations. As Tang (1997) and Lewis (1998) have shown, this single company paradigm represents 40% of US foreign trade and 20% of world trade. Two principal approaches can be adopted to make transfer pricing operational in complex situations: the Economic approach and the Mathematical approach (Pfeiffer, 1999).

- *The economic approach*: This approach is applied to problems that have no capacity constraints. It uses the method of marginal analysis to determine transfer prices (Madan, 2000; Pfeiffer, 1999).
- *The mathematical approach*: This approach was developed to overcome the limitations of the economic approach and is based on the dual decomposition principle (Yong, 1998 and Avila and Ronen, 1999). Generally, it does not use the bill of materials and the bill of resources in the manufacturing firms.

The economic approach takes into consideration only one or two intermediary products and one or two resources, or production factors. It does not use bill of materials but a Cobb–Douglass production function, which may not be appropriate in many manufacturing cases. Furthermore, both approaches focus on decentralized (divisional) multinational firms (MNF), emphasizing interaction either between governments and MNF, or between various branches of MNF (Elliot and Clive, 2000; Madan, 2000). Neither of these cases covers network-manufacturing firms. As Zhao (2000) has pointed out, both these approaches neglect the model that entails interaction between different firms.

This paper proposes a mathematical model for the calculation of transfer prices. It highlights interaction between industrial manufacturing network firms, and also studies the key characteristics of company networks. The initial impetus of this paper stemmed from the Advance Pricing Agreement (APA) rules that have been promulgated by several Western countries since the middle of the 1990s.

Tax authorities in various countries have intensified their audit activities in recent years. According to Borkowski (2000), appeals against transfer pricing allocations in US federal courts increased by 40% in 1999, going up from $3.4 billion to more than $4.8 billion. In order to reduce the risk of a transfer pricing tax audit, companies reach an advance pricing agreement (APA) with the tax authorities. According to the Organization for Economic Co-operation and Development (OECD) and the US Internal Revenue Service (IRS), an advance pricing agreement (APA) looks at a set of criteria to determine transfer pricing for transactions between organizations or businesses over a fixed period of time. This paper develops a framework and generic model for network-manufacturing ventures. The proposed model is designed to use the network concept to allocate optimum resources and derive maximum profits for the entire venture, suggesting a departure from the idea that each firm should focus on maximizing only its own profits. This approach has been proposed for individual companies by Gjerdrum et al. (2002), Horngren and Foster (1991), Kaplan and Atkinson (1989), Lakhal et al. (2001), Vidal and Goetschalckx (2001) and Zimmerman (1997), among others. This paper constructs a paradigm where a network of modern firms agrees to jointly manufacture a commodity and share in its profit and/or loss. It is an underlying assumption that all firms in a network-manufacturing venture are willing to allocate durable resources to maximize profits of the network, without undue consideration of company limitations.