Trust Management in Virtual Product Development Networks

Eric T.T. Wong
The Hong Kong Polytechnic University, Hong Kong

INTRODUCTION

Business-to-business partnerships are gaining rising attention in management and academic research. Increasingly, companies are advised to pursue their collaborative advantage (Dyer, 2000) in order to co-create world-class products, attract the most valuable customers and generate exceptional profits. Today, there is significant global overcapacity in most industries. In this environment of scarce demand, customers are becoming more demanding of customised and innovative products or services. With the advance of information and communication technology (ICT) and the resulting globalisation of markets and manufacturing, innovative product designs are generating new opportunities. In such a change-driven environment, a single manufacturer rarely provides everything on its own anymore. Rather, the most attractive offerings involve buyers and suppliers, allies and business partners in various combinations. Consequently, manufacturers or suppliers do not really compete with one another anymore. Rather, it is offerings that compete for the time and money of customers. The networked business can take different shapes ranging from integrated product development through a key player, to virtual production networks, strategic alliances, virtual organizations, extended enterprises, and so forth.

A review of business publications indicates that companies are extensively using ICT in their new product development activities. Based on an analysis of numerous industrial, high-tech, and business-to-business applications, it appears that ICT can facilitate new product development in a number of areas. These areas can include: speed, productivity, collaboration, communication and coordination, versatility, knowledge management, decision quality, and product quality (Ozer, 2000).

The number of strategic alliances between large, established firms and small, new ventures is on the rise, especially in industries affected by technological change. Theoretically, the combination of a smaller firm's innovative design capabilities with a larger firm's production system and financial prowess promises synergies that can contribute to both firms' competitive advantage, for example, Parts Manufacturers Approval (FAA, 2006) parts as an alternative to Original Equipment Manufacturer (OEM) parts in the aviation industry. Yet, not many of these partnerships result in successful collaboration.

New product development is inherently risky, particularly when new technology or emerging markets are involved. Although collaborative product development has been promoted as a means for reducing or at least sharing risk, such partnerships have their own limitations. Collaboration can also accentuate many of the risks inherent in product development projects. In the case of virtual production networks (VPN), this challenge is even greater because the new product development team spans geographical as well as organizational boundaries.

The basic hypothesis forwarded in this chapter is that a major cause for VPN failure is managerial, and therefore controllable and potentially avoidable. Although today's managers are well-trained in competitive behavior, cooperative processes in VPN require special trust management(TM) skills, skills that a majority of managers do not possess. As a result, cooperation often appears to be managed reactively, rather than being based on a deliberate, proactive cooperation strategy. For a VPN to be competitive and successful in a dynamic environment characterized by constantly changing customer demands and technological innovations, it must be capable of rapid adjustment in order to reduce the time and cost needed to deliver to the customer quality products. The main objective of this chapter is to propose essential guidelines for developing and maintaining partnership trust in Virtual Product Development Networks (VPDN) such that these networks can be managed in a proactive manner. In the following sections, the background of VPDN collaboration will be described, followed by an analysis of the key factors likely contributing to successful VPN collaboration. Based on findings reported in the trust and product development literature, basic requirements for developing and maintaining effective partnership trust in VPDNs have been proposed. Barriers likely to occur in practice are also outlined.

BACKGROUND

The advantages of VPDN collaboration can be significant. The pooling of resources and capabilities can generate synergistic growth between virtual organizations, either in terms of

developing a current product or service offering, or through the creation of an entirely new venture. Increased competitive power can help firms to leapfrog jointly over larger competitors, and generation of higher returns on investment levels can provide the means for further expansion into new market areas at relatively little cost. In an increasingly unpredictable and complex international arena, the flexibility and speed of entry associated with collaboration is opening up new opportunities and possibilities which outright investment through merger or acquisition cannot offer. Indeed, sharing the risks and costs of new product development through collaboration has been advocated by various authors. Securing access to new processes or technologies or gaining information for product development is another frequently mentioned benefit of collaboration. The apparently increasing complexity of technological and product development and convergence of industries provides a strong motive for such collaborative product development relationships.

Marketing considerations may also play an important role in collaborating for product development, especially in the face of increasing globalization of industries. The rapid rate of product obsolescence does, according to some, focus attention on securing rapid access to markets so that new products can be marketed virtually simultaneously in several regions. Collaborative product development relationships may also be seen as a means of overcoming various barriers to entry to foreign markets.

Collaboration can, however, have its shortcomings. History is strewn with the wrecks of failed partnerships left as a warning to the unwary. Many more struggle on without realizing their full potential, frequently to be ultimately bought out by one partner

or the other. With almost 50% deemed as failures, collaborative partnerships are proving to be complex relationships which demand a particular level of expertise and trust management skill in order to navigate the relationship through the hazards associated with this form of virtual network.

Such failures might be due to various causes. For example, there can be a leakage to collaborating partners of a firm's design and analysis skills, experience, and product knowledge that may form a significant part of the basis of its competitiveness. There is a danger that its partners not only acquire the competencies that the design partner brings to the product development, but also gain access to the knowledge and skills that the firm uses in other business areas. A VPDN partner may also fire the opportunism of its collaborators by providing information and insights into possible markets and future possibilities that otherwise may have been its exclusive domain.

Although collaboration is frequently suggested as a means of reducing the cost and duration of the product development process, one would need to consider the additional financial and time costs incurred in managing the collaboration, including the time involved in harmonizing what are likely to be fundamentally different management styles and budgeting processes of the collaborating parties. Furthermore, there can be significant potential opportunity costs because undue effort and resources are directed toward the collaborative product development project, such that the maintenance of the VPDN collaboration itself becomes the prime objective, at the expense of the specific product development. Given the small but growing number of studies reporting dissatisfaction with the outcomes of collaborative product development by one or more of the parties involved, it is understandable that attention should be directed toward key factors affecting the chance of success.

Defining success in product development has been the subject of much research attention and has been shown to be less than straightforward. Defining success in collaborative product development is similarly problematic, given that the perspectives of two or more organizations are involved. The most straightforward measure of the success of a collaborative product development project is likely to relate to whether or not the product was developed as planned and to cost and time allocations. The termination of an agreement cannot inevitably mean the collaboration has been unsuccessful, because the original objectives may have been met. Moreover, the objectives might change as product development progresses. It also has to be recognized that "success" in collaborative product development, as in any product development project, can be multifaceted. There can, for instance, be unintended advantageous side effects, whereas even a prematurely terminated collaborative product development project might yield beneficial experience and knowledge and assist in developing future products.

MAIN FOCUS OF THE CHAPTER

The main focus of this chapter is to examine factors affecting VPDN collaboration with the objective of proposing essential guidelines for developing and maintaining effective partnership trust in VPDNs.

Factors affecting VPDN Collaboration

There has been considerable research into the factors affecting both the success of product development and the outcome of collaborative projects (Lam & Chin, 2005; McDonough, 2000). A number of factors that appear to have some bearing on the success of collaborative ventures have been identified and these will be briefly reviewed here. It is recognized that some of these factors might also have an impact on product development per se, whether collaborative or not, but other factors referred to here are clearly of importance specifically to collaborative product development through the VPN.