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Design of a case based intelligent supplier relationship management system—the integration of supplier rating system and product coding system

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Abstract

The design of supplier relationship management to facilitate supplier selection using an integrative case based supplier selection and help desk approach to select the most appropriate suppliers together with their past performance records from a case base warehouse has become a promising solution for manufacturers to identify preferred suppliers and trading partners to form a supply network on which they depend for products, services and distribution. In this paper, an intelligent supplier relationship management system (ISRMS) integrating a company's customer relationship management system, supplier rating system and product coding system by the case based reasoning technique to select preferred suppliers during new product development process is discussed. By using ISRMS in Honeywell Consumer Product (Hong Kong) Limited, it is found that the outsource cycle time from the searching of potential suppliers to the allocation of order, as well as the delay in delivery of goods of suppliers after order allocation, are greatly reduced. In addition, performance of suppliers can be monitored effectively. © 2003 Elsevier Science Ltd. All rights reserved.

Keywords: Customer and supplier relationship management; Supplier selection; Help desk approach; Supply network; Case based reasoning

1. Introduction

Customer relationship management (CRM) has become very important in the competitive business environment since late 1990s and is now a multimillion-dollar industry. In increasingly competitive markets, customer satisfaction is a vital corporate objective. Key elements to increasing customer satisfaction include producing consistently high-quality products and providing high-quality customer service. In addition, the intensive global competition among manufacturers to co-ordinate and respond quickly the industry value chain from suppliers to customers has made customer–supplier relationship management important in the new business era. In such circumstances the decision-making in each business plays a key role in the cost reduction, and supplier selection is one of the important functions in the supplier relationship management (SRM) because doing business with appropriate suppliers is beneficial for the organization to provide a sufficient production volume with good quality. Very few manufacturers now own all the activities along the chain but integrate

the supply network from various supplier networks and the ability to make fast and accurate decision often constitute a competitive advantage compared with the competitors or other networks. The rapid advance in information technology is now deployed not only to improve existing operational effectiveness of a business, but also to build the new capability to meet today's business environment and complexity. Consequently, top management may feel hard to select the most appropriate supplier.

SRM, a new category of supply chain applications, contributes to the supplier selection and thus increases the competitive advantage of the manufacturer through three primary mechanisms: (1) support of improved business processes across the supply chain, (2) a next-generation architecture that can handle multi-enterprise processes, and (3) facilitation of rapid product cycles and new product introduction. Together, these mechanisms can drive competitive advantage through substantial reductions in the true cost of parts and materials, increased flexibility to respond to changes in customer demand, and faster cycle times which can enhance customer satisfaction and increase market share.

The design of a SRM to facilitate supplier selection using an integrative case based supplier selection and help desk

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approach to select appropriate suppliers together with their past performance has become a promising solution for manufacturers to identify preferred suppliers and trading partners to form a supply network on which they depend for products, components, services and distribution. The result is the formation of an integrated supply network that allows the most appropriate suppliers of the manufacturers to deliver the competitively priced, high quality products and services to their final customers according to their demand effectively. By using intelligent supplier relationship management system (ISRMS), manufacturers can shortlist appropriate suppliers according to the position the supplier is ranked, which in turn is made according to the suitability of the supplier attributes selected. In summary, the outsourcing cycle time from the searching of potential suppliers to the allocation of orders to the most appropriate supplier can be greatly reduced with high accuracy. In addition, performance of suppliers can be monitored effectively.

This paper is divided into seven sections. Section 2 introduces CRM and SRM. Section 3 discusses the suitability of adopting case based reasoning (CBR) technique in supplier selection, which is a function of SRM. Section 4 is the development of ISRMS using a CBR system incorporating major tasks in SRM to form a distinct intelligent supplier evaluation system with the aid of the help desk module to retrieve past performance records, which is important for manufacturers wishing to outsource operations to reliable, suitable suppliers and business partners. The procedures for constructing the case based supplier selection module (CSSM) integrating the company's supplier rating system (SRS) and product coding system (PCS), which are critical for the success of ISRMS, are also detailed in this section. Section 5 is about the application case study, results and benefits by using ISRMS as an intelligent SRM system in the purchasing department of Honeywell Consumer Product (Hong Kong) Limited, to aid the conventional human reasoning process of suppliers selection during the new product development (NPD) process as well as monitoring supplier performance periodically to ensure that satisfactory level of performance can be achieved. The results and benefits of using ISRMS are discussed in Section 6. Finally, a conclusion of the application of ISRMS is made in Section 7.

2. Customer and supplier relationship management (CRM/SRM)

CRM is a process by which a company maximizes customer information in an effort to increase loyalty and retain customers' business over their lifetimes. The primary goals of CRM are to (a) build long term and profitable relationships with chosen customers, (b) get closer to those customers at every point of contact, and, (c) maximize

the company's share of the customer's wallet (Shaw, 1999). In fact CRM is an information industry term for methodologies, software, and usually Internet capabilities that help an enterprise manage customer relationships in an organized way. Simply stated, CRM is about finding, getting, and retaining customers. Under the Internet age, CRM accesses the new markets in everywhere throughout the world wide web (www) to access the world class capabilities and consequently increase the commoditization by shortening the product life cycle, and eroding margins. CRM enriches the competitiveness by increasing the customer choices while purchasing product, making use of technology to perform the information empowerment, developing new markets and new business models and also increasing the connectivity between all relative parties within a business. As the trend toward use of technology to drive competitive advantage has taken root, visionary manufacturers are starting to take advantage of a new competitive opportunity called SRM. Herrmann and Hodgson (2001) defined SRM as a process involved in managing preferred suppliers and finding new ones whilst reducing costs, making procurement predictable and repeatable, pooling buyer experience and extracting the benefits of supplier partnerships. It is focused on maximizing the value of a manufacturer's supply base by providing an integrated and holistic set of management tools focused on the interaction of the manufacturer with its suppliers. In fact, there exists an interesting and satisfying symmetry between the role of CRM and SRM in the manufacturing environment, as shown in Fig. 1.

By integrating CRM with SRM properly through the process of product design and development, and the application of supply chain management under the same platform of an ERP system, SRM solutions can provide significant competitive advantage by delivering value in three important areas. They are (1) the dramatic cost savings, (2) the increasing flexibility and responsiveness to customer requirements, and (3) substantially faster cycle times. Together these benefits can lead to meaningful faster time to market share in the course of the product life cycle basing on the customer demand with a maximum degree of customization.

3. Suitability of adopting CBR technique in supplier selection

Under the issue of supplier/partner selection, a lot of articles have addressed the importance of selecting supplier attributes for making decision on supplier selection (Briggs, 1994; Chao, Scheuing, & Ruch, 1993; Ghodsypour & O'Brien, 1998; Lamming, 1993; Lamming, Johnsen, Zheng, & Harland, 2000; Petroni & Braglia, 2000; Weber, Current, & Benton, 1991; Wei, Zhang, & Li, 1997). It can be seen that the supplier/partner selection process should not only consider price, but also a wide range of factors such as quality, organization and culture, with a view of decision

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