Supplier Performance Prediction for Future Collaboration: Based on Markov Chain Model

Mohammad Azadfallah, Saipayadak, Tehran, Iran

ABSTRACT

Today, long-term relationship plays a vital role in supplier selection for supply chain management. The main reason is that long-term relationships can act as a mechanism for shifting the chain’s strategic focus from price to value and priorities long-term benefit over short-term gains. Since, in this paper we tried to address a method for optimal long-term alternative prediction and selection, focusing on purchase volume factor. For this, Markov chain model had been used and the final result showed improved effectiveness.

KEYWORDS

Long-Term Relationship, Markov Chain Model, Supplier Selection Problem, Supply Chain Management

INTRODUCTION

Today’s business environment is a turbulent, variable and uncertain environment. Wide range, numerous and basic changes in business setting has caused a change in strategic view and applied tools and methods, shortened product life cycle and a dramatic decline in worthiness of historical data in comparison to not many years ago. One of the major changes, which have befallen mostly in the 1990s, is the change in business unit from plant or firm to chain (Mohaghar, Kashef, & Khanmohammadi, 2014). Nowadays supply chain management is one of the most important affairs that applying its new approaches is essential among competitive industries and markets. For any company, the most significant decision is to purchase goods, materials and services from suppliers. Now the better suppliers perform the better company do. So, the role of suppliers is critical in the competitive markets. Supplier selection is the first step of the supply chain management. Supplier selection is a problem for any organization because of its role on reducing cost in the supply chain management (Tabar & Charkhgard, 2012). According to the viewpoint proposed by Mukhtar and Shaharoun (2002), a supply chain can be defined as a set of relationships among suppliers, manufacturers, distributors and retailers that facilitates the transformation of raw materials into final products. Since, the type of relationship that exists between and among these players holds the key to the success of the supply chain. In other words, supply chain management principles advocate close collaboration among all supply chain players. There are of course various variables that contribute or define the type of relationship between the players in the supply chain. These include formalization, intensity, frequency, standardization and reciprocity. A combination of these variables will give rise to various different buyer-supplier relationship structures be it collaborative or arm’s length type of relationships. At the same time, supply chain networks have expanded globally in today’s business environment (Rienkhemaniyom & Ravindran, 2014). In other words, the key to competitive success
in most industries has moved beyond the confines of any single organization. So, in today’s business environment, competitiveness is heavily influenced by the ability of multiple organizations in a supply chain to synchronize and integrate their business activities (Jitpaiboon, Qianmong, & Patel, 2015) in one hand, and a key feature of supply chain management is an early decision to reduce the number of suppliers in the chain (the elimination of multiple sourcing) because maintaining close, intense relationships can be very expensive in management effort. The intention is to have no more ‘partners’ than necessary and to work more closely, effectively, and over the longer term, with those who have the most critical impact on the overall operation. For instance, Japanese lean automotive producers have typically 300 suppliers compared to 1000-2500 in the west and operate a determined policy of supplier base reduction-moving from away from multi-sourced, adversarial trading-towards closer relationships with fewer, key partners (Wilding & Humphries, 2006) on the other. Nevertheless, in order to adapt to an uncertain and fast-changing competitive environment, relationships between organizations become increasingly important (Wang, 2004).

On the other side, many companies are trying to find tools for performance improvement in response to turbulent business markets and for efficiently controlling their business activities. The objectives of performance measurement are to improve the efficiency and effectiveness of a supply chain. Therefore, to achieve an efficient and effective supply chain, many companies have realized the importance of performance evaluation and what measures should be used. Buyer-supplier relationships in the supply chain are one of the most important elements of supply chain integration. Establishing and managing effective relationships at every link in the supply chain is becoming the prerequisite of business success (Hsiao, Rahman, & Purchase, 2002). So that, existing supplier relationships are a powerful competitive advantage for a company. Relational exchanges can contribute to product differentiation and create barriers to switching for suppliers and buyers. Today, large and small companies are making partnerships with suppliers a foundation of their supply strategies. At an operational level, the benefit to a buyer of developing close relationships with key suppliers comes in the form of improved quality or delivery service, reduced cost, or some combination thereof. At a strategic level, it should lead to sustainable improvements in product quality and innovation, enhanced competitiveness, and increased market share (Mohanty & Gahan, 2012). The fundamental assumption underlying this emphasis is that the long-term relationship makes both the manufacturer and the suppliers better off than when there is no such relationship (Kim, 2000). In addition, according to the viewpoint proposed by Koromyslova and Visser (2015), successful transmission of quality requirements through a supply chain is impossible without effective supplier relationship management. Also, According to the often-cited resource-based view, firms look for partners who have resource that they lack themselves (Patto, 2009). Since, they prefer to establish long-term and secure relationships, to the benefit of both partners (Svensson, Nilsson, & Ohlsson, 2004). Moreover, long-term relationships can act as a mechanism for shifting the chains strategic focus from price to value and priorities long-term benefit over short-term gains (Coles, 2010).

In continuation, according to the viewpoint proposed by Alipoor Talemi, Jahanbani, and Heidarkhani (2013), Management is defined decision in a simple form and the most important factor for decision-making is forecasting future. At present era, those organizations have high complexity and much information is available, so their arrangement and refine can help to management in a logical and accurate decisions. The use of various aspects of operations research is easier to deal with complex issues for managers. Markov chain is one of the techniques used in operations research with possibilities view that managers in organizational decision-making (industrial and commercial) use it. Successful decision is a picture of the future that this will not be achieved only from the prediction, based on scientific principles. Markov process is a chain of random events that by having information
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