



Suppliers capability and price analysis chart

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Abstract

To remain competitive in customer-oriented economics, the major parties in the supply chain should be integrated and managed effectively to respond to customer needs. Thus, the efficiency of the entire supply chain is a main concern, and is determined by the members of that supply chain. Partner selection thus becomes one of the key steps in supply chain construction. Given buyer–supplier information asymmetry, obtaining complete information from suppliers is difficult, since some supplier attributes cannot be definitely and quantitatively measured. This study establishes a suppliers capability and price analysis chart (SCPAC) focused on the case where the specification limits are symmetric about the target for evaluating supplier performance which applies the process incapability index C_{pp} introduced by Greenwich and Jahr-Schaffrath (International Journal of Quality & Reliability Management 12 (1995) 58) to measure supplier quality performance and the price index I_p is proposed here to display the difference between budget and component price. Practitioners can instantly and visually obtain information based on the locations of suppliers and price indices on SCPAC. SCPAC also provides clear directions for quality improvement, such as process accuracy and precision. SCPAC thus is an effective and efficient method for evaluating suppliers, which can simplify supplier evaluation, facilitate their effective visual selection, and provide insights into the process situation of suppliers who can become technological innovation partners.

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1. Introduction

To remain competitive in customer-oriented economics, the major parties in the supply chain,

including suppliers, manufacturers, contract manufacturers, distributors and retailers, must synchronously participate in designing, manufacturing, distributing, marketing and even standing. All of these parties thus should be integrated and managed effectively to respond to customer needs and contribute the profit to the whole supply chain. Members of the supply chain thus are the

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critical determinant of supply chain behavior. Partner selection thus becomes one of the key steps in constructing the supply chain. Thomas and Janet (1996) investigated the importance of supplier selection, and noted that: 'it commits resources while simultaneously impacting such activities as inventory management, production planning and control, cash flow requirements, and product quality.' Moreover, Burton (1988) and Carr and Pearson (1999) found that purchased materials and services represent up to 80% of the total product costs of high-technology firms. Additionally, Weber et al. (1991) found that automotive manufacturers spend over 50% of their revenues on components and parts purchased from outside vendors. Clearly, careful supplier evaluation and selection is essential. Good suppliers allow enterprises to achieve good manufacturing performance and make the greatest benefits for practitioners.

Supplier selection is complicated by the need to consider various criteria. Dickson (1966) examined the importance of supplier evaluation criteria and presented 23 supplier attributes that managers consider in such an evaluation, including quality, delivery, price, performance history and others, following a survey of industrial purchasing managers. Additionally, Choi and Hartley (1996) presented 26 supplier selection attributes from a survey of US automotive companies. Nakato and Michael (1998) presented 14 supplier selection attributes from a survey of Japan automotive and electronic companies. Moreover, Lamberson et al. (1976) and Monzcka and Trecha (1988) proposed linear weighting techniques for assessing supplier performance. These methods frequently considered many supplier performance attributes simultaneously, and weighted those attributes based on the opinions of purchasing managers or staff. The experience and knowledge of purchasing staff thus significantly compromises the reliability of supplier evaluation using the above methods. Such methods thus are not objective and may lead to arbitrary decision-making, due to human psychological bias. Additionally, simultaneously considering all supplier attributes is complex and difficult and requires spending considerable time and money to obtain relevant correct information,

especially in buyer–supplier informational asymmetry, as well as some attributes cannot be quantitatively and definitely measured. This study applies the process incapability index C_{pp} introduced by Greenwich and Jahr–Schaffrath (1995) to develop a graphic evaluation model for measuring supplier quality performance, and moreover provides the price index I_p to indicate the difference between budget and price. Furthermore, this study combines process incapability index C_{pp} and price index I_p to create a suppliers capability and price analysis chart (SCPAC). This chart proposed here focuses on the quality characteristic with nominal-the-best specifications, that is, the specifications limits are symmetric about the target. Practically, this is the common situation. Practitioners can consider the two factors of quality and price simultaneously to assess suppliers, and moreover can instantly and visually obtain information through the locations of suppliers and price indices on SCPAC.

Good quality is essential to corporations in maintaining competitiveness and customer loyalty. In supply chain management, improving product quality is no longer merely the responsibility of the manufacturer, but is also the responsibility of the suppliers who provide the parts and components. Supplier manufacturing capability determines finished product quality and customer satisfaction. Supplier manufacturing capabilities thus are the key consideration in supplier selection. Dickson (1966) identified price, quality and delivery performance as the three most important criteria in supplier evaluation. Moreover, Weber et al. (1991) reviewed 74 articles from 1967 to 1990 based on the 23 vendor selection criteria presented by Dickson (1966) and concluded that quality was the most important factor, followed by delivery performance and price on supplier evaluation, with quality being of "extreme importance" and delivery being of "considerable importance". In the Just-In-Time (JIT) manufacturing system, quality and delivery are still the two most important criteria for supplier selection. Pearson and Ellram (1995) examined supplier selection and evaluation criteria in small and large electronics firms and concluded that quality was the most important criterion in supplier selection and

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