



An outsourcing provider decision model for the airline industry

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A B S T R A C T

Outsourcing has become the next critical business process that needs to be addressed by airlines. Successful outsourcing depends on the selection of the appropriate provider. However, this practice is not always successful and its theoretical justification has not been fully explored. Some significant efforts have been made based on the transaction cost economics framework. Different from previous studies, we propose a new hybrid Multiple Criteria Decision-Making (MCDM) model, which combines the Decision Making Trial and Evaluation Laboratory and the Analytical Network Process (DANP) method. Our model overcomes problems with previous methods. Our results show that: 1) employees with good knowledge skills contribute to better service quality; 2) a good relationship between airlines and their partners is the foundation of a successful outsourcing activity; and 3) risk plays a major role in the outsourcing evaluation system, and has the greatest effect on the other dimensions. The model can be extended to other service sectors.

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1. Introduction

Outsourcing has become one of the key restructuring tools for companies seeking to boost their growth and business performance (Mol, 2007). Outsourcing is often applied in many places within the airline industry (e.g., customer sales, ticketing and maintenance) and is viewed as a critical business process in today's stressed economic climate (Lindegarrd, 2004). Airlines are able to increase their efficiency and service abilities by the outsourcing of non-core activities, allowing them to focus on core competencies, which in turn should produce real profits and increase customer satisfaction. However, in practice, the advantages of outsourcing are not always clear. For example, ineffective outsourcing activities, derived from improper strategies or methods, can lead to a loss of core competencies and capabilities, exposure to unexpected risk, and there have been instances where the hoped for advantages have not materialized (Wang and Yang, 2007; Rasheed and Gilley, 2005; Steensma and Corley, 2001). A rational, systematic and scientific decision process for choosing the outsourcing provider is very important to increasing the success rate of the process.

Early studies most commonly illustrated outsourcing decisions by using transaction cost theory (TCE) (Williamson, 1985, 1991). TCE is fundamentally concerned with the question of whether it is

advantageous, in terms of cost, for transactions to occur within the hierarchy of an organization or externally in the open market (Rieple and Helm, 2008). However, there have been a number of criticisms of the model (Murray and Kotabe, 2005; Zhang and Reichgelt, 2006). One is that TCE assumes an industry context that is stable and does not deal adequately with situations that are dynamic (Gulati, 1995; Zhang, 2006). Airlines are currently increasing their outsourcing activities in an industry that is rapidly evolving and is anything but stable. In recent years, aspects of strategy such as core competencies, risk analysis, and organizational flexibility have been growing in importance. This trend has led both researchers and practitioners to become more interested in applying the multi-criteria decision model (MCDM) for outsourcing. The MCDM method has already been applied to various outsourcing problems (Yang et al., 2007; Wang and Yang, 2007), but its application for airline outsourcing partner selection has not been discussed. Also, it has been assumed in prior studies that the criteria are independent. In the real world, criteria are seldom independent but always have a degree of interactive relationship, sometimes with dependence and feedback effects (Tzeng et al., 2007; Tsai and Chou, 2009). For example, higher cost is usually associated with better quality. The culture of outsourcing companies could have a feedback effect on the airline. Moreover, service is a continuous process in the airline industry that is very difficult to divide into many independent activities. Airlines and their outsourcing partnerships need to work as an integrated team so that the service provider sees and understands the business issues and

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requirements and can reach inside their organization to provide solutions (Jenner, 2009). To neglect those complex relationships between airline and its partnerships could not be adequate.

In this study, we apply a model which considers multiple criteria and uses the graph-theory based Decision Making Trial and Evaluation Laboratory (DEMATEL) method combined with the analytical network process (ANP) (called DEMATEL-based ANP, or DANP) to construct the relationship and weights of the criteria. The DEMATEL technique confirms the relationship between various perspectives, enhancing our understanding of the complex issues related to the performance of outsourcing providers. The ANP method also deals with the weights of interdependent criteria. Our model solves the previous problems encountered when applying pair-wise comparison during ANP analysis and offers a quantitative decision model that can more accurately reflect real world situations. In this study, we utilize data for an international airline's maintenance, repair and overhaul (MRO) activities to illustrate the model. The knowledge gained by understanding the mechanism of the outsourcing of airlines' MRO activities can be further extended to other industries.

2. Airline outsourcing

Against the background of globalization and intensifying competition, many major carriers are going through a process of de-integration as they contract-out large parts of their businesses to networks of suppliers in the search of greater efficiency and improved competitiveness (Rieple and Helm, 2008). The main reasons for outsourcing include cost savings, a focus on core competency, and flexibility in management. Although cost savings are still a very important consideration, Hamel and Prahalad (1994) argue that companies which measure competitiveness solely in terms of price are actually contributing to the erosion of their core competencies. Their main idea is that only products and services, which are regarded as core competencies, should be produced internally. Outsourcing of non-core activities also increases flexibility, for example, through better use of international resources. It enables a quicker response to customer needs and decreases financial risk by reducing capital investment demands (Ellram et al., 2008). However, management needs to carefully consider the shortcomings related to outsourcing along with its benefits. The generally recognized disadvantages include: information security, loss of management control, morale problems, and labor union issues. Furthermore, many companies have found that outsourcing activities have introduced unexpected complexities, added costs and friction to the value chain, and can require more senior management attention and deeper management skills than initially anticipated (Howells, 1999).

In the airline industry, the outsourcing of maintenance, repair, and overhaul activities to low-cost labor regions is often planned for cost reduction due to high fuel costs and the weak dollar. Furthermore, the MRO expenditures of commercial aviation are expected to increase 6% annually, up to \$43.3 billion by 2013. Outsourcing for low-cost carriers (LCCs) and regional airlines is increasing the MRO business by an optimized mix of selective outsourcing (Mecham, 2008). TCE theory has been used in many prior studies to explain outsourcing decisions (Ellram et al., 2008; Bustinza et al., 2010; Ngwenyama and Bryson, 1999). Although costs may be saved through contracting-out as a result of factors such as economics of scale, low-cost locations, flexibility, risk and the resulting competences that come from experience these costs may be increased by the need to protect against the risk of a hold-up of valuable assets. In the airline industry, the relative weighting of various mitigating factors is further complicated by

government intervention and regulation. Assessing the relative costs or strategic benefits of outsourcing in the airline industry is therefore likely to be challenging (Rieple and Helm, 2008). Recently, though MCDM methods have been utilized to analyze strategic considerations such as competency, risk analysis, and organizational flexibility in many other industries. For example, Hsu and Hsu (2008) presented an entropy-combined technique for order preference by similarity to the ideal solution (TOPSIS) based decision-making method for medical information system outsourcing. Lee and Kim (2005) analyzed the structural relationship among the determinants of an outsourcing partnership and identified the relationship between partnership-related variables and outsourcing success. They proposed six key inter-related factors: shared knowledge, organizational linkage, mutual dependency, benefits, commitment, and predisposition. Others have used different MCDM models to investigate information system outsourcing (Yang et al., 2007; Wang and Yang, 2007; Hafeez et al., 2007; Saaty and Shang, 2011). However, these studies did not consider the inter-relationship between criteria. Jharkharia and Shankar (2007) applied the ANP method to help firms select logistics service providers but did not clarify how to generate the relationship between criteria. Our new approach, which involves a hybrid model combining DEMATEL and ANP, accounts for the more complex relationships among relative criteria/factors and feedback effects, and can be utilized as an outsourcing decision model for the airline industry, and may also be easily extended to other industries in the real world.

3. Proposed model: a novel hybrid model combining DEMATEL and ANP

In this section, we simply introduce the concepts of the DEMATEL-based ANP to establish the relations-structure model problem evaluation and to determine the criteria weights with dependence and feedback.

3.1. DEMATEL technique for building a network relation map (NRM)

The DEMATEL is an analytical method for structural modeling, mainly used to solve all kinds of complex problems and to clarify the essentials of the problem. The method employed can be summarized as follows (Ou Yang et al., 2008):

Step 1 Calculating the direct-influence matrix using scores

Managers are asked to indicate the direct effect that they believe factor i will have on factor j as indicated by a_{ij} . The contextual relationships between the factors can be shown as in Fig. 1. Matrix A of direct relations can thus be obtained.

Step 2 Normalizing the direct-influence matrix

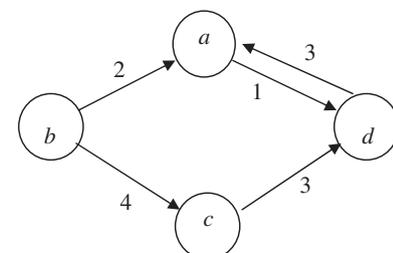


Fig. 1. The directed graph.

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