Evaluating corporate social responsibility of airlines using entropy weight and grey relation analysis

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ARTICLE INFO

ABSTRACT

This paper applies entropy weight and grey relation analysis to evaluate corporate social responsibility (CSR) performance of eight Chinese major airlines. This paper intends to achieve two main aims. First, this study uses entropy to find the relative weights of performance measures of CSR. In so doing, we find that on-time performance, accident rate, flight frequency, growth of employees revenue, and employees revenue are relatively most important measures. Second, based on the results of entropy analysis, this study ranks the airlines in terms of CSR performance by grey relation analysis. This result shows that most of the larger state-controlled airlines perform better in performance of CSR. Furthermore, the private airline has made relatively large improvement in its CSR performance. In addition, the listed airlines are better than non-listed airlines in CSR performance.

1. Introduction

In today's competitive environment of the airline industry (Chang et al., 2013), corporate social responsibility (CSR) has become source of competitive advantages (Porter and Kramer, 2006). Several scholars have demonstrated that CSR has the positive impacts on firm performance by improving firm reputation (Brammer and Millington, 2005), increasing consumer satisfaction (Luo and Bhattacharya, 2006), enhancing employee motivation (Stodder, 1998), and so on. Therefore, airline industry has indicated an ever increasing interest in CSR and more airlines currently engage in various CSR activities. While implementing CSR, what the airline need is to identify its own strengths and weaknesses in CSR performance to further improve CSR. Hence, it is an imperative task for every airline to understand its relative level of CSR. The main purpose of this paper is to evaluate the CSR level of Chinese airlines and to find the gaps by comparing the CSR ranking of airlines, so that airlines can take their improvement strategies.

Evaluation of CSR mainly describes a firm's CSR performance and predicts its ranking. Despite a wealth of information being used to reflect performance of CSR (Tsai and Hsu, 2008; Phillips, 2006), there is no universal and exact definition for CSR. Definition of CSR

means different things in different industries. This indicates that concept of CSR is context dependent and its measurement should reflect the environment and the feature of industry investigated. In the case of airline industry, we find that CSR studies involving airlines are rare. A few studies have been conducted on CSR in terms of some key CSR measures. However, these single measures do not reflect the notion of overall CSR of airlines. Airlines CSR should be addressed by considering all critical performance measures from the viewpoint of airline's stakeholders. Stakeholder theory offers a theoretically and practically useful framework for evaluating CSR (Onkila, 2011). Therefore, this paper focuses on identifying the various measures that need to reflect the performance of airlines CSR.

Furthermore, our literature review over the past decades shows that some methodologies have been applied for evaluating CSR. However, no single technique is sufficient for a complete analysis on airlines CSR. Meanwhile, the extant studies evaluate CSR in a single dimension (Liu and Anbumozhi, 2009). Stakeholder theory defines CSR activities as being to satisfy the demands of various stakeholders. Thus, different dimensions of CSR targets different stakeholder groups. In other words, the aim of CSR is to manage and satisfy the interests of various stakeholders (Ferrary, 2009). CSR is measured using multidimensional method. Multi-criteria decision making (MCDM) approach has played an important role in solving multidimensional and complicated problems arising from business.

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In a word, we find that CSR evaluation is a MCDM process which involves many factors.

Grey relation was developed by Deng (1982) based upon the concept that information is incomplete or unknown. Basically, grey relation analysis model is able to handle both incomplete and imprecise information, especially in situations where there is not enough data and the sample distribution pattern is unknown (Zhang et al., 2005). Therefore, grey relation analysis is an effective means for solving MCDM problems with limited information. Due to the complexity and diversity of dimensions of CSR, dimensions of CSR are limited, and data of CSR is incomplete. Meanwhile, because of limited source, CSR information available is usually imprecise, subjective or even inconsistent, and distribution of sample is unknown. Therefore, CSR evaluation system is a classic grey system. To overcome these shortcomings, we also employ grey relation analysis to evaluate CSR.

Meanwhile, we have found that most of these researches utilize the experts' subjective opinions as the relative weights and combine them with grey relation analysis to evaluate. Identifying the relative weights of the evaluation criteria is a very important part of evaluation problem. Weight identification methods can be divided into subjective and objective approaches (Ma et al., 1999; Xu, 2004). The subjective method always needs to collect the subjective preferences of the decision makers. It usually depends on their wisdom, experience, professional knowledge and information that are difficult to define or describe exactly. So, this approach cannot guarantee the more accurate result. However, the objective method can overcome these shortcomings, and reflect the importance of the evaluation objects. Hence, as a well-known objective method, entropy could be used in evaluation of airlines CSR.

In this paper, a new concept is introduced to analyze CSR performance of airlines. Then, relative weights are identified by entropy, which deals with the input data of real values of CSR index of the eight airlines in the period of 2007–2012, because it cannot lose any information of CSR. Finally, grey relation analysis is combined with the objective weights to find the performance and CSR ranking of the eight airlines discussed in this study. On the basis of findings, we develop strategies to help each airline to improve CSR.

2. CSR in airline industry

At the present, the airline industry is an important part of tourism system which deserves further study regarding CSR (Inoue and Lee, 2011). Hence, the airline industry is receiving notable attention. Along with the fast development of global economy, the number of annual airline passenger traffic is growing rapidly. This means that airline industry quickly becomes a major transport service sector (Low and Lee, 2014). Specially, in today's competitive environment of airline industry, CSR behaviors can help airlines improve competitive advantage and acquire customer loyalty (McGehee et al., 2009; Chen et al., 2012). Therefore, more and more airlines are attempting to enhance their public images through CSR activities. Meanwhile, operation of airlines can create job opportunities and economic benefits (Chan and Mak, 2005), but can generate some negative impacts, which include climate change, air pollution, and so on (Hooper and Greenall, 2005; Lynes and Dredge, 2006). Therefore, airlines are required to implement CSR to reduce their negative impacts while maintaining or increasing their positive effects (Lynes and Dredge, 2006).

CSR literature involving airline industry are still limited (Tsai and Hsu, 2008), and mainly focus on the relationship between CSR and firm performance. Lee et al. (2013) built a new CSR dimension regarding its operation-relatedness. This study mainly examined the effects of operation-related and non-operation-

related CSR dimensions on U.S. airlines' performances, finding the positive effect of operation-related CSR on firm performance. Inoue and Lee (2011) disaggregated CSR into five dimensions based on corporate voluntary activities for five primary stakeholder issues and examined how each dimension would affect financial performance in airline industry. They found that each dimension has a differential effect on both short-term and future profitability. Kang et al. (2010) investigated separate effects of positive and negative CSR activities on accounting-based and market-based performances in airline industry. They found that undertaking CSR activities can add extra costs to airlines. Lee and Park (2010) partially supported this view, finding that there is no significant relationship between CSR and accounting-based performance in the airline industry. But, they also found the positive effect of CSR on market-based performance. In a word, we find that the existing studies have no agreement on the relationship between CSR and firm performance. The main reason is the lack of effective and objective standardized CSR measurements (Gebel, 2004; Mak and Chan, 2006). Therefore, we need the development of a universal framework that would allow for the measurement of CSR performance among different airlines.

3. Dimensions and performance measures of Chinese airlines CSR

The multidimensionality of CSR is an important area in the CSR literature. Previous research often measured CSR using a single dimension that aggregates CSR activities (Lichtenstein et al., 2004; Podnar and Golob, 2007), however several scholars had found that CSR consists of multiple dimensions, each of which is represented by a group of different activities (Clarkson, 1995; Godfrey and Hatch, 2007; Waddock and Graves, 1997). The best known multidimensionality of CSR is Carroll's framework. Carroll (1999) suggested that CSR activities can be divided into four dimensions: economic, legal, ethical, and philanthropic responsibilities. Hence, some multidimensional approaches are applied to evaluate CSR, according to the four-dimensional framework (Igalens and Gond, 2005; Wood, 1991). But its application is limited because of the ambiguous boundary among the four dimensions (Schwartz and Carroll, 2003). More specifically, the word 'social' in CSR is vague and lacking in specific direction as to whom the firm is responsible (Carroll, 1991).

Meanwhile, Clarkson (1995) specified that corporate responsibility is in stakeholder groups instead of society as a whole, and further demonstrated that the multidimensionality of CSR can be better assessed by a stakeholder framework. Maignan et al. (2005) made it clear that firm can be deemed responsible only towards stakeholders. Hence, it is suggested that different stakeholders of firm represent different dimensions of CSR (Clarkson, 1995; Peloza and Papania, 2008). Based on the stakeholder framework, subsequent studies often measured CSR by using the Kinder, Lydenburg, Domini (KLD) data that reflects corporate attention to different stakeholder issues (Berman et al., 1999; Kacperczyk, 2009). KLD data commonly is divided into five aspects: (1) employee relations, (2) product quality, (3) community relations, (4) environmental issues, and (5) diversity issues. Some empirical studies treated each of the five categories as an independent dimension of CSR (Backhaus et al., 2002; Kacperczyk, 2009). However, KLD data also has some limitations. First, it cannot contain CSR activities for shareholders and suppliers. Second, these indicators from the KLD data only reflect firms' voluntary activities (McWilliams and Siegel, 2001). Third, inaccurate weight problem still exists in this methodology. These limit its effectiveness and versatility.