

Chapter 13

Quantification of Corporate Performance Using Fuzzy Analytic Network Process: The Case of E-Commerce

Başar Öztayşi

Istanbul Technical University, Turkey

Cengiz Kahraman

Istanbul Technical University, Turkey

ABSTRACT

Performance Measurement (PM) is a combination of a company's characteristics that can be numerically expressed. The aim of the PM is to provide feedback about the success of current activities and give insight about future performance. Performance of a company depends on its vision and goals so the definition of performance can vary with time. While PM literature provides various models for PM, the most accepted model is Balanced ScoreCard (BSC). BSC supplies four inter-related perspectives that the companies can identify as indicators for performance. These perspectives are: financial, internal business processes, customer, and learning and growth perspectives. In this study, PM is formulated as a Multi Attribute Decision Making (MADM) problem and a Fuzzy Analytical Network Process (FANP) based performance measurement model is proposed. The performance measurement criteria are built based on four perspectives of BSC. The proposed model utilizes FANP in order to determine the relative importance of perspectives and indicators. The performance scores for each indicator are determined based on the predefined goals and these scores are aggregated to reach an overall performance score.

DOI: 10.4018/978-1-4666-4450-2.ch013

INTRODUCTION

Performance term entails an execution of an action, accomplishment of a goal and the quality of realization a process, an operation or an action. In other words performance is related to a goal, accomplishment of an activity and quality of the activity. In the corporate performance measurement literature, performance term is determined as a socially constructed concept rather than an objective reality that stands for measurement. Thus in order to evaluate the corporate performance, the expectations should be defined and a consensus should be maintained about the borders of the concept (Wholey, 1996). Performance is a combination of goals which are determined by the conditions, and relational models that enable the company to accomplish these goals on time. Since it is affected by goals and conditions, the definition of company performance may vary depending on the time and the place (Lebas, 1995). Meyer (2002) defines that performance should be related both to the action and the consequence of that action. Both the action and the consequences should be benchmarked to a standard in order to make a reference to a degree of achievement.

Electronic commerce is the process of buying, selling, transferring, or exchanging products, services, and/or information via computer networks (Turban et al., 2012). It can be proposed that the start of e-commerce applications goes back to 1970s with the emergence of electronic fund transfer applications. As the popularity of internet grew, the e-commerce applications also started to flourish and span to new media and business models. The performance management of e-commerce applications is a vital issue because a significant amount of e-commerce applications have failed. Thus the literature provides studies about critical success factors and performance evaluation models (Ramanathan, 2012; Huang et al., 2009; Gunawan et al., 2008; Lee et al., 2007; Sung, 2006).

Folan et al. (2007) defines three key concepts about performance measurement. These are relation, goal and characteristics. Relation emphasizes the relation of the company with its environment. Basically, the performance of a company should be measured by its effect on the related environment, such as its share in the markets that it operates. The second concept “goal” defines that the performance of a company is about what it wants to achieve. The performance should not be measured according to the goals of other firms or associations. The last concept, characteristics determines that the performance measurement should be composed of summarized, related characteristics of a company, such as cost, quality and flexibility. It is also stated that, in order to measure the performance; the mentioned characteristics should be numerically expressed and measured by performance indicators. As a consequence of these statements it can be mentioned that the performance measurement is a combination of different numerical performance indicators. In another perspective, performance measurement is a multi attribute evaluation or decision making process.

Meyer (2002) defines seven purposes of Performance Measurement (PM) that exist within the different levels of the companies. “Looking back” and “looking ahead” are the purposes of PM in the top management levels. PM enables companies to look back and evaluate the past activities and look ahead and prepare for the forthcoming performance. Motivate and compensate, on the other hand are the purposes for the lower levels of the company. Each individual can evaluate personal performance and compensate. At the same time the performance measurement can motivate the individuals for the future. In larger and more complicated firms, performance measures are also expected to roll up from the bottom to the top of the organization, to cascade down from top to bottom, and to facilitate performance comparisons across business and functional units.

27 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/quantification-of-corporate-performance-using-fuzzy-analytic-network-process/82699

Related Content

Handling Optimization Under Uncertainty Using Intuitionistic Fuzzy-Logic-Based Expected Value Model

Nagajyothi Virivintiand Kishalay Mitra (2018). *Handbook of Research on Emergent Applications of Optimization Algorithms* (pp. 750-776).

www.irma-international.org/chapter/handling-optimization-under-uncertainty-using-intuitionistic-fuzzy-logic-based-expected-value-model/190184

An Improved Particle Swarm Optimization for Optimal Power Flow

Dieu Ngoc Voand Peter Schegner (2013). *Meta-Heuristics Optimization Algorithms in Engineering, Business, Economics, and Finance* (pp. 1-40).

www.irma-international.org/chapter/improved-particle-swarm-optimization-optimal/69880

Comparative Performance Evaluation of Fractional Order PID Controller for Heat Flow System Using Evolutionary Algorithms

Rosy Pradhanand Bibhuti Bhusan Pati (2019). *International Journal of Applied Metaheuristic Computing* (pp. 68-90).

www.irma-international.org/article/comparative-performance-evaluation-of-fractional-order-pid-controller-for-heat-flow-system-using-evolutionary-algorithms/234688

Movement Strategies for Multi-Objective Particle Swarm Optimization

S. Nguyenand V. Kachitvichyanukul (2012). *Modeling, Analysis, and Applications in Metaheuristic Computing: Advancements and Trends* (pp. 109-130).

www.irma-international.org/chapter/movement-strategies-multi-objective-particle/63808

A Study of Tabu Search for Coloring Random 3-Colorable Graphs Around the Phase Transition

Jean-Philippe Hamiez, Jin-Kao Haoand Fred W. Glover (2010). *International Journal of Applied Metaheuristic Computing* (pp. 1-24).

www.irma-international.org/article/study-tabu-search-coloring-random/51675