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# Performance comparison based on customer relationship management using analytic network process

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ABSTRACT

Customer relationship management (CRM) is a multi-perspective business paradigm which aims maximizing the benefits gained from relationships with customers. The aim of this paper is to compare the CRM performances of e-commerce firms using a multiple criteria decision making (MCDM) approach. Analytical network process (ANP) is a MCDM methodology which can take the inner and outer dependencies among multiple criteria into consideration. As there are dependencies among CRM performance evaluation criteria, ANP is used for comparing the CRM performances of the e-commerce firms under consideration. A sensitivity analysis also provided in order to monitor the robustness of the proposed ANP framework to changes in the weights of evaluation criteria. To the authors' knowledge, this will be the first study which evaluates CRM performance using ANP.

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## 1. Introduction

Customer relationship management is a multi-perspective business paradigm that is composed of people, process and technology (Chen & Popovich, 2003). Keeping its roots in relationship marketing and information technologies, CRM aims at maximizing the benefits gained from relationships with customers. However, no single definition has been accepted in the literature. The researchers has investigated 48 different CRM definitions and concluded with five categories of definitions: strategy, process, philosophy, capability and technology (Zablah, Bellenger, & Johnston, 2004). In this study CRM is defined in a micro view which can be defined as a process that is concerned with managing customer interactions (Plakoyiannaki & Tzokas, 2002; Reinartz, Krafft, & Hoyer, 2004; Srivastava, Shervani, & Fahey, 1999).

As a result of its promises and benefit, CRM term has become popular and companies have been making investments on CRM projects. The most important expected outcomes of CRM can be listed as: improvements in efficiency, cost reduction, improved profitability, increase in sales, enhanced customer value, customer satisfaction and improved customer loyalty (Buttle, 2004; Eid, 2007; Jones, Brown, Zoltners, & Weitz, 2005; Ko, Kim, Kim, & Woo, 2008; Reinartz et al., 2004; Richard, Thirkell, & Huff, 2007a; Roh, Ahn, & Han, 2005; Rust, Zeithaml, & Lemon, 2001; Sheth & Sharma, 2001; Verhoef, 2003). Managing the performance of CRM is especially important because of the low success rates (Brewton, 2003; Krol, 2002; Richards & Jones, 2008). Many companies are still making investments in CRM projects (Richards & Jones, 2008).

Performance measurement can be defined as a part of a management process that is realized periodically in order to determine the success or quality of a particular process or activity (Oztaysi, 2009). Performance measurement is used to evaluate the overall results of the past and identify the future position of the company in the top level management, in the individual level, performance measurement provides information about the shortcomings and motivate for the upcoming activities (Meyer, 2002). PM is a combination of companies' characteristics that are numerically expressed (Folan, Browne, & Jagdev, 2007). In another perspective, performance measurement is process of choosing different attributes (and indicators about them) and generating a combined evaluation based on these attributes. The researchers define performance as a multi attribute decision making problem with the following requirements (Oztaysi & Ucal, 2009): (i) Ability to reflect meaningful numerical results that shows the overall performance of a period. (ii) Ability to reflect the performance of any sub-division or perspective. (iii) Ability to trace the performance improvements by time. (iv) Ability to be flexible to design according to companies preferences. (v) Ability to be dynamic so that firm can change the model when needed. (vi) Ability to give insight about future performance.

Current performance evaluation in CRM literature can be analyzed in four groups. (i) Indirect measures and operational indicators. (ii) Self assessment. (iii) Benchmarking with best practices. (iv) CRM Scorecards. Indirect measures aim at evaluating CRM performance by indicators such as customer equity and brand equity (Kellen, 2002; Richards & Jones, 2008). Operational

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indicators on the other hand identify information about the efficiency of the customer related operations. In the second group, there are tools/scales that are generated by statistical methods (Crosby, Evans, & Cowles, 1990; Dorsch, Swanson, & Kelley, 1998; Dwyer, Schurr, & Oh, 1987; Jain, Jain, & Dhar, 2003; Kumar, Scheer, & Steenkamp, 1995; Lagace, Dahlstrom, & Gassenheimer, 1991; Sin, Tse, & Yim, 2005). These studies aim at measuring relationship quality, behavioral dimensions or holistic CRM. Customer Measurement Assessment Tool (Woodcock, Stone, & Foss, 2003) is the only tool that takes place in the third group. The method has defined nine assessment areas which are; Information technology, people, process, customer management, analysis, proposition customer management, measurement, customer experience and competitors. Differently from others, the method is an assessment tool which is based on comparison of companies' performance with the best practices in the same performance assessment area. The last group is composed of the CRM scorecard studies. There are two studies in the literature that propose CRM scorecard (Kim & Kim, 2009; Kim, Suh, & Hwang, 2003). Also there are some studies that define the most important steps in CRM scorecard applications (Brewton, 2003; Wiedmann & Buxel, 2007) .

There are many studies in the literature which utilize ANP in performance evaluation. Sarkis (1999) proposed a methodological framework for evaluating environmentally conscious manufacturing programs. Yurdakul (2003) measured long-term performance of a manufacturing firm using ANP approach. Leung, Lam, and Cao (2006) used ANP to facilitate the implementation of the Balanced Scorecard (BSC) in order to incorporate a wider set of non-financial attributes into the measurement system of a firm. Sarkis (2003) showed how ANP approach could be used to enhance the manufacturing strategy performance evaluation models. Chen and Lee (2007) constructed a performance evaluation model for project managers on the basis of leadership behaviors that lead to managerial practices. Chen, Huang, and Cheng (2009) proposed an approach of measuring a technology university's knowledge management performance from competitive perspective. Chen and Chen (2010) interviewed Taiwanese higher education experts to integrate critical measurement criteria and develop an ANP based original performance appraisal system to present complex interdependent relationships and to construct a relation structure among measurement criteria for performance appraisal.

The purpose of this study is to compare the CRM performances of e-commerce firms using a multicriteria decision making method. ANP is a decision making methodology which can take the inner and outer dependencies among multiple criteria into account. Since there are dependencies among CRM performance evaluation criteria, ANP is used for comparing the CRM performances of the firms under consideration. To our knowledge, this will be the first study that evaluates CRM performance using ANP.

The rest of the paper is organized as follows. Section 2 includes a literature review about the performance evaluation criteria used in CRM studies. In Section 3, a summary of ANP methodology and the CRM network structure used in this study are briefly given. In Section 4, the proposed ANP framework is applied to a case study in Turkish e-commerce market. In this section, a sensitivity analysis is also provided. Finally, in the fifth section concluding remarks and suggestions for further research are given.

## 2. CRM performance evaluation criteria

Performance is defined as the potential for future success of actions in order to reach the objectives and targets (Lebas, 1995). Wholey (1996) indicate that performance is not an objective reality; it is socially constructed reality and needs to be defined before getting measured. Meyer (2002) denotes that performance refers simultaneously to the action, the result of the action and to success of the result compared to some benchmark. By performance evaluation companies can 'look ahead', 'look back' and 'motivate' and 'compensate' people. While 'look ahead' and 'look back' aim at gauging the economic performance and past accomplishments of the firm as a whole, 'motivate' and 'compensate', at the individual level, motivate and drive the compensation of individual people.

Traditionally, accounting and financial indicators have dominated the performance measurement field. But these traditional systems were not often satisfactory as they are short term biased and do not address operational excellence and intangible assets (Kaplan, 1983; Kaplan & Norton, 1992). Balanced Scorecard (BSC) is a widely used corporate performance management system (Kaplan & Norton, 1992). In BSC, the performance of a company is proposed to be evaluated not only in financial perspective but also other perspectives that effect financial results. These four dimensions are defined as finance, customer, process and learning and development. Researchers propose that the companies should build a strategy map in order to identify the relationship between these dimensions and the criteria under each dimension (Kaplan & Norton, 2004).

In this study, the performance evaluation model is proposed in accordance with Balanced Scorecard and the performance of CRM is analyzed in four related dimensions, the relationships between the dimensions are identified and the criteria under each dimension are defined. The dimensions utilized in CRM performance evaluation can be listed as; outputs dimension, customer dimension, CRM processes, and organizational alignment (Fig. 1). With the considered dimensions, both the outputs and the factors that affect these outputs are taken into account which provides holistic and predictive performance evaluations.

The studies in the literature show that CRM has positive effects both in the companies' managerial ratios and indicators (Buttle, 2004; Ko, Lee, & Woo, 2004; Reinartz et al., 2004; Roh et al., 2005; Sheth & Sharma, 2001) and the customers' attitude towards the company (Eid, 2007; Jones et al., 2005; Mithas, Krishnan, & Fornell, 2005; Richard, Thirkell, & Huff, 2007b; Tanner, Ahrearne, Mason, & Moncrief, 2005). CRM outputs dimension implies the effect of CRM on the company financial and managerial indicators. In other words, CRM outputs are the main expectations of companies from CRM projects. CRM projects aim at reaching the CRM outputs by affecting the customers' perception and attitudes. Customer value, satisfaction and loyalty (Kim & Kim, 2009; Reinartz et al., 2004) are the key terms that CRM aims at improving. In the model, the results of CRM initiatives on customers are handled in the customer dimension.

The structure of CRM has been discussed in the CRM literature (Chen & Popovich, 2003; Reinartz et al., 2004; Roh et al., 2005; Sin et al., 2005; Zablah et al., 2004) and the absence of a single definition of the term has been shown as one of the major difficulty in CRM performance assessment (Richards & Jones, 2008). Zablah et al. (2004) has analyzed 48 CRM definitions and concluded with five different perspectives of CRM, strategy, process, technology, capability and philosophy. The proposed model is in accordance with process perspective and thus the primary dimension defining the structure of CRM is CRM process dimension. This dimension contains the key customer related procedures that are used in the company. The final dimension *organizational alignment* defines the accordance of the firm strategy, organizational culture and the technology with CRM processes. The organizational alignment dimension provides information about the environment and factors that improve the CRM processes.

In the proposed model, each performance dimension is represented by appropriate criteria. The performance dimensions and sample references using the related criteria are listed in Table 1.

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