Neural Network-Based Evaluation of the Effect of the Motivation of Hospital Employees on Patients’ Satisfaction

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ABSTRACT

This article evaluates the effect of the motivation of employees on organizational performance using a neural network. Studies show that employee motivation influences organizational performance, particularly in organizations providing services. Methods based on statistical computations like regression and correlation analysis were used to measure the mutual effects of these factors. As these statistical methods necessitate the fulfillment of certain requirements like normally distributed data and because they are not able to express non-linear relations and hidden complicated patterns, a back propagation neural network has been used. The neural network was trained by using data from 300 questionnaires answered by hospital employees and 1933 patients hospitalized in a private hospital in Tehran over three successive months.

Keywords: Employee Motivation, Hospital Employees, Neural Network, Organizational Performance, Patient Satisfaction

1. INTRODUCTION

The fact that satisfied clients are the key to long term success for businesses is well-documented in the literature (Kristensen et al., 1992; Zeithaml et al., 1996; McColl-Kennedy & Schneider, 2000). Client contentment and faithfulness are one of the sources of competitive advantage, a means of development for a business organization and sometimes, its rescue from crises. If clients have a high level of satisfaction, return on investment (ROI) will increase (Armstrong & Kotler, 2000; Frederick, 1996; Weitz & Jap, 1995). Numerous researchers have confirmed the existence of a positive relation between customer satisfaction and enterprise profitability.

DOI: 10.4018/jhisi.2010100101
According to Herzberg’s two-factor theory, factors affecting motivation have generally been categorized into two sets: intrinsic and extrinsic. Each of these two groups consists of many parameters; as a result, developing an exact mathematical model for the study of these groups is complicated due to the non-linear relations and interdependencies of some of the variables. Owing to the possible existence of such non-linear, complex relations and hidden patterns in the data, neural networks were used in this research for modeling and classifying the two groups of factors and their effect on patient satisfaction. As can be seen in Table 1, the most common methods used to evaluate causal relationships between two variables are multivariable regression and correlation tests. It is usually difficult to employ regression models in HR research as a result of the two main assumptions in such models- the normal distribution of the target variable and a lack of correlation between dependent (input) variables- and also the natural interdependence of human variables. Newer data analysis techniques such as neural networks provide better tools for investigating relations between human variables by removing the presuppositions inherent to statistical methods (Bigus, 1996). In this research, data collection is generally divided into two sections. The first section concerns determining the patients’ satisfaction as the output of the network and the second one deal with the network’s input data.

This article is organized as follows: in Section 2, a background of relevant theories and the applied models will be presented. The second part consists of two subsections: in the first, the opinions of management authorities on motivation are discussed, and in the second, an overview of theories pertaining to employee motivation is offered. In the third part of this article, the model used in this research is described. The research methodology, consisting of the definition of variables, data collection, neural network design and training and model application have been defined in separate subsections in the fourth part. A detailed treatment of the results is given in part 5, and in conclusion
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