Applying Multiple Linear Regression and Neural Network to Predict Business Performance Using the Reliability of Accounting Information System

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ABSTRACT

This article aims to predict business performance using multiple linear regression and neural network. It compares the accuracy power of ANN and multiple linear regression (MLR) using the reliability of accounting information system as independent variables, and business performance as a dependent variable. It is based on primary data collected through a structured questionnaire from 162 out 202 of public listed companies in financial service sector in Jordan. The data were analysed using ANN and MLR. Testing results of the two methods ANN and MLR confirmed that the business performance indicators (financial, non-financial and combined) were significantly could be predicted by the reliability of AIS and they also revealed that in terms of predictive accuracy test, the ANN has a higher accuracy than regression analysis.

KEYWORDS

Business Performance, Financial, Non-Financial, Reliability of AIS

1. INTRODUCTION

For the purpose of improving their business performance, both financial non-financial measures, business companies employ accounting information systems, techniques and tools. The use of such information systems (IS) becomes essential and justified by the need to enhance and bring efficiency into being; a fact evidenced by most researchers. (Al-Dmour et al., 2018) At the increase of importance, the performance of accounting information systems is prioritized highly and this is mainly led by increased competition and revolution of business environment at various levels, especially on the level of decision making, since such systems are adopted in such a way that is designed for aiding in decision making and enhancing an organization’s competitive position. Furthermore, information technology in business is essential as long as it is reliable and secure. System reliability in administration primarily assures the validity of data and accounting framework. However, an unreliable system can show a number of side effects, as mentioned by Boritz et al. (1999) and McPhie (2000) such as regular system disappointments and accidents that deny inner and outside clients’ access to key

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system administrations; failure to prevent unauthorized access to the system, making it vulnerable to viruses, hackers and loss of data confidentiality; loss of data integrity, including defiled, inadequate and invented information, and genuine support issues bringing about unintended negative reactions from system changes, such as loss of access to system administrations, loss of information privacy or loss of information trustworthiness, and unreliable system. Thus, the American Institute of Certified Public Accountants (AICPA) and the Canadian Institute of Chartered Accountants (CICA) developed a new assurance service called SysTrust, whereby a public accountant can write about the adequacy of controls over the reliability of a system (AICPA, 2006).

Accounting information systems (AIS) researchers can and should employ their knowledge of both technology and business to examine these issues. Furthermore, there is no clear empirical evidence on the extent of the relationship between the reliability of AIS and business performance. Therefore, this paper aims to compare and test the accuracy power of ANN and MLR model in making prediction. It is expected that, the ANN can be used as adequate model due to its ability in self-learning which impacts to providing a better prediction. According to the authors’ knowledge, this paper might be considered to be the first one has attempted to compare ANN and MLR model for performing business performance prediction using reliability of AIS as independent variables. Furthermore, the study aims to overcome the limitations of the previous studies, and to improve understanding of the importance of the reliability of the AIS process in the environmental context of Jordanian organizational culture as a developing country (Masa'deh et al., 2015).

2. LITERATURE REVIEW

Accounting Information System (AIS) has been recognised as one of the most important tools for measuring and reporting the activities and the profitability of the business organizations (Mansour, 2016). The real importance of adopting and use of information technology in the structure of AIS comes from the fact that it redesigned the internal AIS financial control in the direction of promising larger operational efficiency, it aligned the company’s functions to meet the needs of e-business, as well as it resulted in an objective and trustful performance. However, this heavy reliance of today’s businesses on the use of information technology makes the reliability of their AIS very critical.

According to the AICPA (2013), The reliable system is defined as: “...a system that operates without material error, fault or failure in system availability, privacy, integrity, and maintainability during a specified time in a specified environment…” (Saitho, 2012). The core importance of a reliable computing system is specifically identified by the developers of the SysTrust project: The computing system – are running business, producing products and services and dealing with consumers and business partners… As business dependencies on information technology increases, tolerance decreases for systems that are unsecured, unavoidable when needed, and unable to produce accurate information on an instant basis. Like the weak link in a fence, the unreliable system can cause a chain of events that negatively affect the company and its customers, suppliers and business partners (ACICPA/CICA, 2013). SysTrust is an assurance service that independently tests and verifies a system’s reliability. The AICPA succinctly describes the overall purpose of SysTrust in the following way: developments in information technology provide far greater power to companies at far lower costs. As business dependence on information technology increases, tolerance decreases for systems that are not secure, and these systems become unavailable when needed and unable to produce accurate information on a consistent basis. An unreliable system can cause a chain of events that negatively affect a company and its customers, suppliers, and business partners (Al-Dmour, et al., 2018; Hunton, 2002).

In recent years, firm performance has received considerable attention as a substantial academic subject for investigating in the financial and management literature. Researchers and academicians have chosen different approaches for the exploration of this issue. In the previous studies, the effects of using AIS have analyzed on business performance by financially and non-financially. Researchers

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