

The Influence of IT Investment on Business Performance: A Comparative Study of Regression Analysis and Artificial Neural Networks

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ABSTRACT

Due to the considerable advances and tangible benefits of information technology (IT), almost all top-tier firms invest heavily in IT applications. However, the phenomenon of the “IT productivity paradox” prevents firms from investing in IT freely. Despite the number of studies exploring the relationship between IT investment and business performance, the value of IT investment remains difficult to justify. Specifically, evidence of a payoff from massive IT investments is still very limited. According to previous studies, the reasons behind the IT productivity paradox may be a shortage of accurate and timely data, a failure of considering the time-lag effect, and the application of inappropriate data analysis techniques. To address the aforementioned symptoms, this study developed a system to examine the influence of IT investment on business performance. Specifically, we collected actual enterprise operating data, applied two different data analysis techniques (i.e. regression analysis and artificial neural networks), and conducted analysis using data over a period of four years. The results indicate that: (1) the higher the ratio of maintenance costs is, the poorer business performance will be; (2) the higher the ratio of IT investment is, the better the business performance and the lower the operating cost will be; (3) we also found that the time lag effects of IT investment on business performance for a period of two to three years; (4) regarding the estimation of the influence of IT investment on business performance, artificial neural networks are superior to regression analysis for their explanatory power.

Keywords: IT investment; Business performance; Artificial neural networks; Regression analysis.