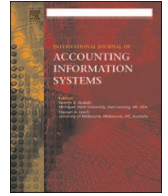




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## Does decentralized decision making increase company performance through its Information Technology infrastructure investment?

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### ABSTRACT

A company's Information Technology (IT) infrastructure is a key factor in its sustainability and ongoing success and profitability. This paper explores the relationship between a company's investment in IT and its performance. Performance is measured, with the help of a Balanced Scorecard (BSC), in four ways; financial, internal business processes, innovation & learning and customer perspective. The relationship between each BSC category serves as indicators of the effect of IT investment on a company's performance. This will help establish the benefits of both financial and non-financial indicators. We focus on the Electrical and Electronic manufacturing performance of companies Malaysia. System Resource Theory (SRT) is used as the background theory to explain the concepts of organizational effectiveness, efficiency, productivity and multidimensional performance measurements and to link the variables used in this study. We conduct an empirical study in order to confirm the moderating effects of decentralized decision making. The results suggest that IT investment produces a significant relationship with all BSC perspectives, but the moderating effect is only significant only from a customer perspective.

### 1. Introduction

Many companies invest heavily in Information Technology, often not receiving the expected return on their investment (Brynjolfsson, 1993; Peppard and Rowland, 1995). These large expenditures have led to managerial concerns over the business value of IT (Lee et al., 2010). The link between IT investment and a firm's performance has been discussed in the scientific literature (Bardhan et al., 2013) and the 'productivity paradox' has been an ongoing debate for a number of years (Barua et al., 1995; Brynjolfsson, 1996; Brynjolfsson and Hitt, 1996; Hitt and Brynjolfsson, 1996; Bharadwaj et al., 1999; Garud and Kumaraswamy, 2005; Thouin et al., 2008; Yuhn and Park, 2010). Managerial proficiency in resource utilization and organizational control is reflected in a firm's productivity and performance (Kohli et al., 2012). These studies provide much of the motivation for this paper.

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## 2. Related work

### 2.1. IT productivity paradox

The benefits of IT investment have received interest among scholars and practitioners. Many studies have investigated the return on IT investment with regard to a company's performance, with conflicting conclusions being reported (Sircar et al., 2000; Barua et al., 1995; Brynjolfsson, 1996; Brynjolfsson and Hitt, 1996; Hitt and Brynjolfsson, 1996; Bharadwaj et al., 1999; Barua and Mukhopadhyay, 2000; Dedrick et al., 2003; Hoadley and Kohli, 2014; Kohli and Devaraj, 2003; Kohli et al., 2012; Barua and Kriebel, 1995; Hitt and Brynjolfsson, 1996). Some noted positive relationships between IT investment and company performance, others did not. Discussions regarding IT productivity and the strategic value IT still continue (Hwang et al., 2015). Despite these uncertainties, companies continue to invest in IT, presumably as they perceive value in doing so, or perceive that they would be at a disadvantage if they did not make these investments.

The term productivity is defined as the output produced for a given input (Brynjolfsson, 2003; Hitt and Brynjolfsson, 1995). While it is simple to define, it is difficult to measure. For example, the measurement used for output will not only include the physical products produced but also the value created for consumers. In today's economy, value depends increasingly on product quality, timeliness, customization, convenience, variety, and other intangibles (Brynjolfsson and Hitt, 1993). Difficulties also exist in measuring the input as there are many factors to be considered, such as capital equipment, materials and other resources consumed (Brynjolfsson and Hitt, 1993). IT is perceived as an enabler to improve productivity, although IT investment comes with no guarantees (Lin and Chuang, 2013). Many companies assume, that by investing in IT, it will create a positive economic returns to them but the inconsistencies reported in the scientific literature have led to the productivity paradox. Within the manufacturing sector, which is the focus of this study, IT-driven productivity growth in the 1990s may have been more pronounced in manufacturing than in the non-manufacturing sector (Stiroh, 2002).

This paradox can be defined as the perception that there is a lack of increase in output, after an investment in IT (Sircar et al., 2000). These findings were later contradicted (Brynjolfsson and Hitt, 1995, 1996; Dewan and Min, 1997; Garud and Kumaraswamy, 2005; Thouin et al., 2008; Yuhn and Park, 2010). One of the most significant gaps in the study of the productivity paradox is too much emphasis on United States (US) firms and the lack of cross-country studies (Melville et al., 2004) and this suggests that further research on this issue is needed outside the US. Some researchers argue that IT investment relates indirectly to a firm's performance through contextual factors (Campbell, 2012), such as country characteristics (Lin and Chiang, 2011). Studying companies from outside the US business environment will provide additional perspectives.

### 2.2. Infrastructure IT investment

IT investment is often a large investment for a firm. On average > 4.2% of revenue is invested in IT (Weill et al., 2002). IT investment also forms a major portion in capital budgets in many organizations (Jeffery and Leliveld, 2004). IT investment is an enormous and significant spending by a firm (Bureau of Economic Analysis, 2007). The average company normally allocates 54% of its IT investment to infrastructure (Weill et al., 2002). IT infrastructure investment is defined as the investment for the purpose of managing shared IT services used by multiple applications such as servers, networks, laptops, customer databases etc. (Weill and Aral, 2003, 2004). A good quality IT infrastructure is a complex fusion of technology, processes and human assets (Barney, 1991). However once in place, it can lead to a competitive advantage because it will take competitors time to emulate it (Weill et al., 2002).

### 2.3. Performance measurement - balanced scorecard

The scientific literature suggests that the use of multiple measures of performance, including both financial and non-financial, are important to capture the non-financial benefits from an investment in IT. Companies are now using performance measurement systems to track non-financial metrics (Banker et al., 2004; Fernandes et al., 2006; Barad and Dror, 2008).

The assessment of organizational performance could be a catalyst for both the present and future success of companies (Kaplan and Norton, 1996). The Balanced Scorecard (Kaplan and Norton, 1992) brings together elements of strategy, financial and non-financial measures. This methodology enables companies to translate their strategic objectives into a coherent set of performance measures (Kaplan and Norton, 1993). The Balance Scorecard links strategy to organizational measurement and is frequently used by managers in their decision making. It is regarded as one of the most significant accounting developments (Tayler, 2010), enabling managers to make decisions that can maximize a company's financial value (Kaplan, 2009).

Technology influences the structure of industries, creates competitive advantage and has the potential to change the rules of competition. Moreover, nearly every function within an organization has technology integrated within it, including production, procurement, distribution, accounting and marketing (Edwards, 2001). Previous studies suggest that IT enables organizational change that leads to productivity gains and it should not only be viewed as a tool for automating current processes (Mithas et al., 2012). The effectiveness of technology, and information processing in particular, are very important to a company's success and it is a misconception to consider IT as just another department within an organization. Furthermore, the application of IT is an integral part of a company's strategy and it affects many parts of the business (Edwards, 2001).

The purpose of the Balanced Scorecard (BSC) is to translate strategy into measures that uniquely communicate vision to the organization (Kaplan and Norton, 1992). BSC was developed to; (1) clarify and translate vision and strategy, (2) communicate and link strategic objectives and measures, (3) plan, set targets and align strategic initiatives and (4) enhance strategic feedback and

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