Chapter 5

Business Value of Information Technology: Measuring Performance and Sources of Profitability

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ABSTRACT
This chapter begins with a discussion of the business value of information technology and then goes on to discuss productivity paradox studies and the different types of benefits of information technology, including operational, tactical, and strategic. It also discusses when to intensify competition or leverage advantages in a timely manner.

1. INTRODUCTION
The debate of the value of information technology (IT) has been under discussion for decades (Lin, 2009; Clemons and Row, 1991; Carr, 2003) and there are still contradictory conclusions about whether or not firms gain competitive advantage from IT (Lin, 2009; Masli, Richardson, Sanchez, and Smith, 2011).

Previous literature has examined information technology’s impact on organizational performance in two important ways: annual spending on IT and acquisition of a particular type of IT.

The group of studies that has measured IT by its annual spending (e.g., Bharadwaj, 2000; Brynjolfsson, Hitt; and Yang, 2002) has two common characteristics. First, the spending on different types of IT is aggregated; therefore, the impact of different IT applications may be confounded (e.g. Barua, Kriebel, and Mukhopadhyay, 1995).
Second, the duration between the spending, the IT implementation, and the emergence of IT impact was assumed to be one year or less.

Another group of studies on IT impact and organizational performance has focused on the acquisition of a particular type of IT by organizations (e.g. ERP, CRM, and e-commerce). In this approach, the researchers noted the date of the announcement of an IT acquisition and then analyzed the long-term trend in organizational performance. These two research approaches complement each other in attempting to define the complexities of determining the value of IT.

However, even with the extensive research on IT, business strategy, and firm performance, results are still mixed (Oh and Pinsonneault, 2007). Mixed results may have been due to the heterogeneous data used in previous studies, limitations of data, different types of methodologies used to measure business value, or assumptions made in the calculations (Lee, 2001). For instance, in examining one type of IT, ERP, previous studies may have limitations because their data was based on public announcements that were voluntarily disclosed, therefore their samples may only include those firms that chose to disclose their ERP implementation information (e.g. Hunton, Lippincott, and Reck, 2003; Nicolau, 2004; Nicolau, 2006).

2. IT INVESTMENTS AND FIRM PERFORMANCE

Mata, Fuerst, and Barney (1995) suggested that using IT to gain sustained competitive advantage was not likely to be easy for firms. If it were relatively simple for firms to copy and use IT in this way, then IT would not be a source of sustained competitive advantage. But when IT is used in an innovative and strategic way, then it will be difficult to imitate by competitors (Clemons and Row, 1991). The fact that it is often difficult and time consuming to develop IT managerial skills, implies that other firms will have a difficult time imitating these IT skills, and therefore they can be a source of sustained competitive advantage.

Early studies of the business value of IT failed to find positive effects associated with investments in IT (Roach 1991). Brynjolfsson (1993) noted that there was a productivity paradox when many firms were making large investments in IT but productivity improvements were not observed. Oliner and Sichel (1994) argued that computers had not made a major contribution to economic growth, and that no one should suggest that there was any doubt about the apparent failure of computers to create acceleration in output and productivity growth. Using data from the Bureau of Labor Statistics, they examined if computing equipment contributed to economic growth since 1970. More recent studies have also concluded that investments in IT do not have a positive effect on business value. Lin (2009), using country level data and stochastic production frontiers, analyzed IT contributions. He concluded that IT does not improve technical efficiency and that the productivity paradox still exists at the country level. Ramirez, Melville, and Lawler (2010) also confirmed that the productivity paradox still exists in business process redesign.

However, Barua, Kriebel, and Mukhopadhyay (1995) argued that the answer to whether the expected benefits of IT have been realized depended on the ability to calculate the economic impacts of IT investments, and that various measurement problems had contributed to mixed results reported in the literature. In contrast to the productivity paradox, there are several studies that have linked IT to greater productivity, firm value and firm performance. Some of these studies indicate that IT does make a difference because firms that invest more in IT apparently perform better than other firms (Mukhopadhyay, Kekre, and Kalathur, 1995; Kelley, 1994; Brynjolfsson and Hitt, 1995; Brynjolfsson and Hitt, 1996; Brynjolfsson and Hitt, 2000; Brynjolfsson, Hitt, and Yang, 2002; Bharadwaj 2000).