

Innovative IT Systems and Firm Performance: Some Empirical Evidence

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Abstract

This study presents findings investigating the benefits of IT investment. The results suggest that IT investments does have the potential to benefit the firm. However, empirical results presented in the literature suggest that the benefits depend on both firm-specific, as well as external factors. Firms having CEOs with IT expertise are more likely to see benefits from IT investment. Likewise, firms in an industry with unanticipated growth are more likely to benefit from a more innovative IT system.

Introduction

With the rapid advances in information technology, many smaller businesses can now afford increasingly sophisticated IT systems. A business owner may question the benefits of making such an investment. Do more sophisticated information technology (IT) systems really benefit the firm? And if yes, how exactly does the firm benefit? This article will present some interesting and relevant findings from the empirical research.

Interestingly, the evidence over the past decades is somewhat mixed. It appears that there are ways that firms can in fact benefit from a more sophisticated IT system. But often, firms do not realize significant benefits from their IT investment. It is important for the business owner to understand what kinds of benefits to realistically expect from investing in IT.

The relationship between IT investment and firm performance has been tested for decades. Some studies have found a positive relation between firm performance and IT expenditures (see Bharadwaj, 2000, for a discussion of these studies). Many of these studies measured performance in terms of firm productivity, such as output. Other studies have used financial measures of performance. However, other studies have failed to find conclusive evidence of benefits from IT investment (Evans & Morton, 2004). Researchers refer to this lack of evidence that IT expenditures benefit the firm as the “productivity paradox” (see for example Carr, 2003). It does appear, therefore, that IT can benefit the firm, but in specific ways and under certain circumstances.

One motivation cited by managers who invest in IT is to provide capabilities to detect and respond to market opportunities or threats (Wade & Hulland, 2004). This can allow the firm to utilize opportunities strategically to gain a competitive advantage. Altschuller, Gelb and Henry (2010) examine the relation between IT investment and firms’ performance during periods of unanticipated industry changes. It would be expected that IT investment would provide a firm with enhanced capabilities to sense changes in its’ environment and to effectively respond to such changes. Thus, firms that have invested in IT *before* a period of unanticipated industry turbulence should demonstrate better financial performance during periods of such unanticipated industry changes than firms with less IT resources.

It is important to note that an industry can be affected by both, periods of unanticipated downturn or industry growth. If investment in IT does in fact enhance a firm's strategic agility, we would expect that firms with greater IT resources prior to each of these types of unanticipated industry change will outperform other firms during these periods of industry turbulence (growth as well as an industry downturn).

This approach also addresses the question of causality. Researchers have pointed out that even if there is evidence of a positive association between IT investment and firm performance, the direction of the causality is unresolved. It may be that IT investment does in fact enhance a firm's competitive advantage and therefore results in superior financial performance. An alternative interpretation can be that more profitable firms are more likely to have the resources available to make such investments. However, by measuring the relation between *prior* IT investment and firms' performance *during* the period of industry turbulence (either downturn or growth), one eliminates the issue of causality.

Using financial accounting and stock return data, Altschuler, Gelb & Henry (2010) identify industries (defined by 2-digit SIC) that experienced significant, unanticipated turbulence. An industry is identified as being economically distressed when the median sales growth (for the firms in that industry) is negative and the median stock return is negative 5% or less. Likewise, an industry growth period is defined as when median sales growth for the industry is positive and the median stock return is at least 5%. The stock return criterion helps ensure that this industry-wide change was in fact unanticipated by investors. The year in which the industry change is identified is the base year. They measure IT investment (defined by data from the InformationWeek 500 issues on firms' IT expenditures) two years prior to the base year. They then measure the association between the prior IT investment and sales growth, stock return, and operating income over the two-year period starting a year before and through a year after the base year. All three performance criteria were measured relative to the 2-digit SIC industry median.

The results are quite interesting and suggest that IT investment can sometimes, but not always, benefit the firm. During periods of unanticipated industry *growth*, firms did in fact benefit from prior IT investment expenditures. On the other hand, prior IT investment did not seem to benefit firms that experienced an unanticipated industry *downturn*. One explanation can be that in a period of industry growth, the firm has greater access to the necessary resources to identify and strategically exploit industry changes, such as expanding markets and new opportunities, relative to its' competitors with more limited IT resources. On the other hand, during an economic downturn, the firm's ability to exploit such opportunities may be more limited.

This result can be a possible explanation for the "productivity paradox" identified in prior research. The relation between IT investment and firm performance appears to depend on industry conditions. As a result, prior research was unable to find a clear and unambiguous relationship between IT and firm performance.

Does IT investment affect the quality of a firm's financial accounting reports? The fact that auditing standards place great emphasis on the role of IT in the financial reporting process suggests that there should be a relation. For example, Statement of Auditing Standards (SAS) 94 mandates that auditors understand the client's IT systems and the potential risks they can impose on the reporting process. IT has assumed an increasingly greater role in firms' accounting systems, and it is therefore important to understand how more innovative IT systems affect the quality of firms' accounting reports.

A greater role for IT can have both positive and negative effects on a firm's accounting system. For example, Clark, Jones & Zmud (2006) cite anecdotal evidence of material misstatements resulting from the complexity of implementing Enterprise Resource Planning systems. On the other hand, Morris (2011) finds that ERPs often take advantage of built-in controls, thereby enhancing internal controls.

In a recent study, Altschuler, Fried and Gelb (2016) examine auditor reported IT material internal control weaknesses. These reports are required for audits of publicly held companies by the Sarbanes-Oxley Act. They find that firms with more innovative IT systems (based on the InformationWeek rankings) are less likely to have such reported internal control weaknesses. (Their results were obtained after controlling for other variables identified in prior research as being associated with internal control weaknesses.) These results suggest that IT innovation is positively correlated with better internal controls, and therefore more reliable financial reports.

The impact of IT on a firm's performance and the reliability of its' financial reports may also depend on the IT expertise of the firm's senior management. Haislip and Richardson (2018) cite prior research that suggests that the effect of IT in a firm is greater when the CEO has experience with IT. They find that firms with CEOs with IT expertise tend to make more accurate financial forecasts and announce earnings on a more timely basis than firms with CEOs that lack IT-expertise. Their results suggest that the benefits of a firm's IT investment will depend on the expertise of senior management.

Conclusion

The empirical findings presented in this paper suggest that the benefits of IT investment to a firm are not automatic. An innovative IT system does have the potential to benefit a firm. However, the benefits depend on the expertise of management. Likewise, the benefits can also depend on the firm's external environment. Firms are more likely to benefit from an innovative IT system during periods of unanticipated industry growth, as opposed to an unanticipated industry downturn. One possible explanation offered is that in an industry growth period, there are more resources available to identify and exploit market opportunities.

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