

## **ABSTRACT**

Park, Seungki., Ph.D., Purdue University. December 2003, an Analysis of the Impact of Information Technology on the Performance of Construction Contracting Firms. Major Professor: Miroslaw Skibniewski

There have been a number of research efforts to identify the impact of Information Technology (IT) on firm performance since 1980, but there is still no clear evidence of a consistent relationship between IT investment and organizational performance. The impact of IT on firm performance has been widely analyzed in the service and manufacturing sectors, which have experienced significant changes due to IT investment, but the impact of IT investment remains poorly understood with respect to the construction industry. IT investment in construction firms continues to increase annually, but many construction firms have no adequate measures to evaluate their IT investment, as well as its benefits relative to expenditures.

This study is one of the first full-scale research efforts that identifies the impact of IT on performance at the firm level in the construction industry. Seven years of historical data on IT investment and performance were collected from 33 large construction contracting firms in Korea. The main research questions of this study analyze three relationships: the relationship between IT investment and firm performance, the relationship between the type of IT use and firm performance, and the relationship between firm specific resources related to IT and performance.

This research divided IT investment into sub components by using two different general categories for analysis: IT investment in specific contexts and IT investment in

specific business functions of the construction firms. Following the framework established in the Business Scorecard, firm performance was measured in four different aspects of corporate operations: the financial aspects, the internal process enhancement aspects, the aspects of customer satisfaction, and the aspects of innovation and learning. The impact of IT on performance could be affected by the firm's specific internal environment. This study investigated the influence of the firms' two internal factors -- firms' IT effectiveness and contextual factors -- which can affect the relationship between IT investment and performance. The firms' contextual factors were identified by adopting a resource-based approach, which analyzed human, business, and technical resources.

This study produced several meaningful findings. Although IT investment in general is not significantly related to firm performance, through the categorization of IT investment, this study could find several significant specific performance benefits to IT investment. IT investment over previous intervals of time analyzed by context (IT investment for equipment, communication, labor and R&D) was found to be significantly related to some measures of all four aspects of firm performance. This study also found that IT effectiveness and some measures of contextual factors for firms influenced the relationship between IT investment and performance. This study also concluded that the level of IT utilization by firms and the firms' specific IT resources were found to be significantly positively related to firm performance.