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The impact of IT investment on firm performance in China: An empirical investigation of the Chinese electronics industry

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ABSTRACT

Over the past three decades, the impact of information technology (IT) investments on firm performance has been the subject of active research. Although many studies have shown positive and significant benefits derived from IT investment, the findings of almost all these studies are based on data collected in developed countries. Few studies have been conducted to validate these results and to determine whether or not they are still applicable in developing countries. This study tries to investigate the effects of IT investment on firm financial performance in the electronics industry of China, still classified as a developing country, and compare it with the United States. Findings show that IT investment has a positive impact on firm performance in China. Moreover, the impact in China is not different from what occurred in the United States in terms of direction and the size against the assertion of previous studies and expectations.

1. Introduction

Investing in information technology (IT) is widely regarded as having enormous potential for reducing costs and gaining competitive advantage [1–4]. With the continuous increase in IT investment, executives and government policymakers have been concerned about the productivity and profitability of IT investment. The more attention executives give to the tangible benefits of IT investments, the more researchers are becoming interested in measuring the effects of IT investment. Although there has been considerable long-running debate about whether or not IT investment actually results in higher productivity, the majority of researchers come to believe in the positive effects of IT investment on firm performance, with accumulation of IT business value research in IT literature.

Some researchers, however, have doubts about the generalization of the findings, because the findings of existing studies that have shown the positive impact of IT on firm performance are mainly based on data collected from developed countries, particularly the United States [5]. It is unclear whether the findings of previous firm-level studies in developed countries are applicable to other developing countries because there are differences among countries in terms of productivity and economic growth [6,7]. Furthermore, macro-characteristics such as labor costs, competition, IT resources, culture, and education, can affect the mechanism of IT value creation [8]. A few studies (e.g., [9]) were conducted on some developing countries, but it is still difficult to discover firm-level empirical studies showing consistent results on the relationship between IT investment and firm performance (Table 1). Since both excessive emphases on U.S. firms and lack of comparative studies among countries have inhibited knowledge accumulation concerning the IT business value, research regarding the effect of IT investment on firm performance in developing countries can be one of the important topics for future studies [5].

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Table 1
Research result of IT investment and firm performance by the sample.

	Sample		
Result	Developed countries	Developing countries	Developed countries vs. developing countries
No effect or negative effect	● Dasgupta, Sarkis, and Talluri [14] ● Loveman [15] ● Menon and Lee [13] ● Strassmann [11,12]		
Positive effect	● Bharadwaj [16] ● Bharadwaj, Bharadwaj, and Konsynski [17] ● Brynjolfsson and Hitt [1,18] ● Kudyba and Vitaliano [19] ● Li and Ye [20] ● Mitra [21] ● Rai, Patnayakuni, and Patnayakuni [22] ● Shu and Strassmann [23] ● Sriram and Krishnan [24]		● Zhu, Kraemer, Xu, and Dedrick [25]
Mixed result	● Devaraj and Kohli [27] ● Hitt and Brynjolfsson [47] ● Lee and Kim [29] ● Lee and Menon [30] ● Mahmood and Mann [31] ● Osei-Bryson and Ko [32] ● Prattipati and Mensah [33] ● Sriram and Stump [34] ● Weill [43] ● Zhu and Kraemer [35]	● Huang, Ou, Chen, and Lin [38] ● Tam [9] ● Teo and Wong [41]	

This study investigates the effects of IT investment on firm performance in China, which is one of these developing countries. Furthermore, the size of the effect in China will be compared to one in the United States, because differences in country characteristics can affect value creation of IT investment. Consequently, based on data from China, the current study attempts to compare the findings of previous research concerning the impact of IT investment on firm performance in developed countries, to that in developing countries, which is indicated as an important context extension of the research [10].

The structure of this paper is as follows: Section 2 offers a review of previous studies to demonstrate the importance of this study and hypotheses to discover new aspects. In the Method section, the research model, variables and constructs, and data sources are described. Section 4 presents the results of the research with analysis. Then, the contribution and implications of the findings are discussed in Section 5. Finally, in the Conclusions and limitations section, the results are summarized, limitations of the research are identified, and concluding remarks and future studies are provided.

2. Literature review and hypothesis development

For many years, numerous empirical studies have been conducted regarding the relationship between investments in IT and associated effects on firm performance (See Table 1). However, research findings suggest that there is inconsistent evidence that IT investments lead to a significant increase in productivity. Research on the relationship between IT investment and firm performance can be classified into three categories: First, several researchers have asserted that there is no connection between IT investments and firm performance [11,12]. Rather, it is argued that IT investment could have a negative impact on the productivity of an organization because of inefficient allocation of management resources. Elasticity of other management activities (e.g., marketing, research and development (R&D), advertising) and other capital on firm performance are greater than the elasticity of IT capital [1,13]. In the worst case, as firms invest more in IT, there is a greater need for coordination between different activities and information systems across functional areas of the organization after installation of new information systems [14,15]. This so-called IT productivity paradox stimulated researchers to seek the reason for this phenomenon.

The second research group has asserted that a significant positive relationship between IT investment and firm performance exists. As firms invest more in IT, their performance correspondingly increases [16–25]. Various techniques and sample data were used to explain the positive relationship between IT investment and firm performance.

The third research group has reported partial or mixed results, and explained possible reasons for the results [9,26–35]. It was reported that there is a positive relationship between IT investment and a range of firm performance variables; while in some performance variables, there is a negative relationship or effect.

To overcome this perplexing situation, many IT scholars have used more rigorous and scientific research frameworks: i) large-sample data sets [17,36], ii) inclusion of additional factors such as a time lag [18,29], the information-intensity of the industry [4,24,29,30,37], iii) new methodology (e.g., structural equation modeling (SEM)) [25], and iv) new theories, such as a Resource-Based View (RBV) [4,16,38]. These studies have revealed the positive effects, or at least mixed effects, of IT investment on firm performance.

The debate concerning the effects of IT investment on cost and efficiency-related performance has decreased according to the accumulated knowledge stock [29,39]. However, because these previous studies were based on the data from developed countries,