A Review of Technological Investment and Its Effects on Firm’s Performance

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Abstract - This paper reviews an extensive body of literatures to investigate technological investment and firm’s performance. It provides a comprehensive viewpoint on issues related to technological investment and how it affects firm’s performance. Despite the fact that many researchers studied technological investment, but there are inadequate investigation focusing on technological investment and firm’s performance particularly in Malaysia. The majority of published studies in recognizing databases carried out their researches with primary data sets and mainly focused on information technology (IT) investment. Another important issue that has not been properly investigated is what constitutes technological investment and its relationship with firm performance in Malaysia. Finally, this paper develops a framework that explains the relationship between technological investment and firm performance. Technological investment is viewed in terms of operational and administrative technology investment while firm’s performance is viewed in terms of return on investment and return on assets.

Keywords: firm’s performance; information technology investment; technological investment.

I. Introduction

Researchers have acknowledged that, among the major factors impacting economic progress in today’s global business atmosphere is the transmission and application of latest technologies in organizations [1, 2]. Technological investments signify the major money expenditure items on several firms and possess a significant effect on performance. However, scientific investigation and advancement of latest technologies alone will not guarantee complete technological improvement, because technological innovation without applying and employing them may not grant expected higher firm performance [3]. The importance of technological investment can be seen as implementing of latest technological equipment or innovative processes which lead to achieve higher profit, higher productivity, greater activity outcomes, reduced costs, improved quality, gaining competitive advantage, market share and improve firm performance at the same time [1, 2].

As a result several firms persist to invest a significant amount of money, primarily because of the belief that technological investment provides a significant effect on firm performance [4, 5]. Organizations make considerable technology investments each year to boost their managerial decision making, assist their business operations, and enable their strategic goals. As a result of enormous expenditures on technology by today’s firms, researchers and professionals are trying to acknowledge a better connection between technology investment and firm’s performances by means of research [2]. Even though, for more than ten years, many researchers have been trying to investigate the effects of technology investments on firm’s performance, but the findings of the studies are not consistent [6].

The issues of what constitute technological investment and its relationship with firm performance in Malaysia is an area of study that has not been properly investigated. There are inadequate investigation focusing on technological investment and firm’s performance particularly in Malaysia. The majority of published studies in recognizing databases dwells mainly on information technology (IT) investment and firm’s performance [2, 4, 5], advanced manufacturing technology investment and firms' performance [7] and investment in human resources management and firm performance [8]. Which lead to lack of empirical studies focusing on technological investment and firm’s performance.

Furthermore, Zehir [2] used primary data and test it with the factor analysis, regression analysis, and correlation analysis. Javier [5] used cross sectional survey and tests the data with exploratory factor analysis, confirmatory factor analysis and multiple
regression analysis. Thouin [6] used regression analysis of archival survey data contain 914 integrated health care delivery system. Bagheri [9] employed a survey method approach to analyze the data they collected, both mediated regression and hierarchical linear regression models were utilized. Hence, this paper attempts to look into the connection between technological investment and firm’s performance in the developmental economics. While much of the argument in the literature in terms of factors contributing to performance, this paper looks at one of the factors i.e. technological investment. Firm performance is a common issue in any organizations in Malaysia especially in the new era of globalization, where competitiveness and innovativeness are norms that go with performance.

This literature-based paper begins by defining the concepts of technological investment and firm performance. It then explores the connection between technological investment and firm performance. In the final section we develop the research framework and conclude the significance of the technological investment as a pillar in future analysis of firm performance.

II. Definition of Technological investment and Firm Performance

Wright [10] defined technology as the knowledge and processes which individuals utilize in order to satisfy individual needs and wants. Also wie [11] define technology as the assortment of physical processes which transform inputs to outputs by using procedural processes and organizational preparations to carry out the transformation. While investment could be seen as the creation or purchase of properties and assets with the aim of earning benefits in the near future [12]. Technological investment within the firm can be classified to as information technology investment, operational technology investment, administrative technology investment, advanced manufacturing technology investment in the case of manufacturing firms, or investment in any form of technology.

Information technology (IT) can be defined as the use of electronic machines and programs for the processing, storage, transfer and presentation of information [2]. Administrative technology refers to technology used to give administrative support to the firm and integrate its operations with the rest of the organization [7]. Whereas, within the operational framework, technology is described as a technical expertise and may as well be connected to be equipment’s, an electric powered or mechanical element and software code, as chemical process, a patent, an approach, or a person [13]. Advanced manufacturing technology refers to the application of the latest scientific or engineering discoveries to the design of operations and production processes [7]. While there are several definitions of firm performance in the literary works but the simplest definition is to measure productivity [5]. Vorhies and Morgan [14] defined firm performance as a three dimensional construct that comprises the dimensions of customer satisfaction, market efficiency and corporate profitability. Furthermore, the performance measurements and its indicators were variously described by different scholars. Tze and Boon [15] said performance measurement is a periodic measurement of improvement towards a long and short period goals and revealing of the outcomes to the decision makers so as to enhance program performance. Heshmati and Loof [4] stated that a measure of firm performances consists of financial and operational performance. Likewise Idris [7] measure firm performance with the return on investment and cost reduction in a study of the relationship between technology investment and firm performance.

III. The Relationship between technological investment and Firm Performance

Earlier researches has been unable to find a significant positive relationship between technology investment and performance, Roach [16] in a study of information workers from 1970 to 1986 found that the computers had limited effect on the productivity of workers. Yet, more recent studies have found that technological investment has a significant positive effect on firm performance.

Firms, in order to improve performance, attempt to improve their infrastructure investment in capital in new technology and acquiring new machinery and equipment [17]. Investment in physical capital, and specific plant and machinery, information technology (IT) are associated with the adoption and diffusion of the latest technologies key to improving performance. A study by [17] proposes a new conceptual framework for examining the reasons that manufacturing firms decide to invest in the acquisition of new machinery and equipment in order to improve their performance.

Therefore research on the link between technological investment and firm performance can be classified into three groups. Firstly numerous investigators have revealed that there is no connection between technological investments and firm performance [16]. Secondly, the research group has asserted that a tremendous positive connection between
technological investment and firm performance prevails. As firms devote more in technology their performance will correspondingly improve [9]. Different methods and sample data were used to describe the positive connection between technology investment and firm performance.

Idris [7] by using correlation analysis and an ANOVA test whether there is difference of means and correlation between investment in production technology, planning technology, design technology and administrative technology and company performances. He found strong positive correlations between investments in advanced technology with return on investment (ROI). A study by [4] provides robust empirical analysis of the possible two-way causal relationship between investment and performance at the firm level. Results show evidence of some two-way causal relationships, which are mainly transitory in character. Significant heterogeneity is observed in the firms’ investment and performance behavior by their size. Likewise [5] studies the relationship between IT investments and performance within the purchasing function. The paper proposes that the effect of IT investments on purchasing performance depends, at least partially, on the capacity of the purchasing function to use the technologies to implement and develop advanced purchasing and supply practices. The analyses support the idea that IT investments exert a positive effect on purchasing operational performance.

Thirdly, the research group has revealed partial or combined results, and explained possible reasons for the results [18, 6]. It was documented that there is a positive connection between technology investment and a variety of firm performance variables. While in several performance variables, there is a negative connection or impact. Thouin [6] used return on investment and profitability to examine the relationship between IT investment and firm performance and revealed that IT budgetary expenditures and the number of IT services outsourced are associated with increases in the profitability of Integrated Healthcare Delivery Systems, whereas increases in IT personnel are not significantly associated with increased profitability. John, [18] determines if IT investment significantly impacts firm performance and find out that, the level of physical assets (computers) that a firm utilized possesses a strong and optimistic impact on company performance. However, the more human capital (Programmers) a company uses to develop software, the worse the performance of the company.

All these researches have exposed the positive impact, or at least combined impact of technological investment on the firm's performance. The literature showed that in order to have a fruitful result from technological investment, a framework that facilitates operational and administration technology investment is needed. This important prompted us to develop a framework. The proposed framework can be used as a guideline for managers and investors in improving technological investment performance.

**Proposed Conceptual Framework**

![Proposed Conceptual Framework](image)

**Fig 1.1: Research framework**

This figure is the operational definition of the constructs in this study. This study decide that the operation technology investment including plants and equipment investment and administrative technology including information technology IT for human resources and purchasing department can be the operational definition of technological investment which lead to the firm's performance.

**IV. Conclusion**

This study is a firm-level empirical investigation of the relationship between technological investment and firm performance in Malaysian public listed companies (PLC’s). This study represents one of the first research to empirically investigate the effect of technological investment on firm performance in this sense this study contributes to technological investment business value literature. The paper should be important to managers and practitioners beside technological investment researchers; because
technological investments have a vital role in today’s organizations. If the firms manage the investments correctly and carefully, it can lead to an improvement in firms’ performance. Maximize the benefits of technological investment are very important for performance and success of the organizations in the future. As such a better connection between technology investment and firm’s performances can be achieve by means of measuring firm performance with return on investment and return on asset.

References


