THE COMPETITIVE ADVANTAGE OF IT IN EGYPTIAN FIRMS: A RESOURCE BASED PERSPECTIVE

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Abstract

Management has been challenged to achieve competitive advantages using Information Technology (IT). However, how to utilize IT still remains ill-defined. Accordingly, the study at hand intends to assess the effect of Information System resources and capabilities on companies' performance. The theoretical framework has been adopted from the widely used Resource Based theory in order to examine the relationships between the identified constructs. A quantitative method was employed where a structured questionnaire was devised to survey a large number of senior managers and the data collected was analyzed statistically using the Partial Least Squares multivariate technique. A positive relationship was recognized between IS Resources and IS Capabilities. Similarly, but rather hypothetically, the relationships between IS Capabilities and IT support for Core Competencies; and consecutively company performance, were positive as well. Conclusions were derived and a structural model is proposed to suit the Egyptian context.

Keywords: Competitive Advantages, IS Resources, IS Capabilities, Information Technology.

1 INTRODUCTION

Information Technology continues to play a vital role in business organizations. In this essence, the revolution in information technology has altered the sources of competitive advantage for businesses, in addition in greatly influencing how information, services and products are handled and exchanged (Peslak, 2012). There are various theories which attempted to analyze the role of a company’s available resources and capabilities as a source of profit (Roxas and Chadee, 2011). These ideas would fuse into a general analytical model known as the resource-based view (RBV) of the firm (Barney, 1991). The expanded use of RBV as a cornerstone for firm strategy is the result of two developments. First, as the global market for many industries has become volatile, a focus on internal resources and capabilities rather than unpredictable external market forces has been viewed as a more secure basis for the development of strategy. Second, it has become clear that having and maintaining a competitive advantage is the primary source of profitability for a firm rather than the attractiveness of its industry (Mahoney and Pandian, 1992).

Management has been challenged to understand how firms gain and maintain competitive advantages. Still, how best to utilize IT in order to achieve a competitive advantage remains ill-defined. This brings a calling need for having a full structural model which accurately depicts production relationships and demand drivers in order to relate IT investments to organization changes and measure economic performance. Accordingly, the research at hand aims to provide a road map for...
Egyptian business managers by measuring and analyzing the extent to which organizational investments influence the value of IT investments and whether the benefits of IT investments are disproportionately difficult to measure or not.

2 ACHIEVING COMPETITIVE ADVANTAGE
The challenges facing companies differ based on the development of countries (Porter, 2001). Resources and capabilities interact in a dynamic process to enable firms to establish core competencies. The shaping of strategy to achieve competitive advantage is an ongoing process (Rothaermel, 2008) (Laudon and Laudon, 2012). Therefore, firms must strategically position themselves so that product or service mimicry by competitors is difficult. The complex interactions between a company’s various processes explains why competitors often find it difficult to imitate each other (Rothaermal, 2008). Porter (1998) also suggests that a differentiation strategy focuses on some advantage inherent in the product, such as higher quality even at premium prices. Competitors will find it difficult to mimic the product, and differentiation strategies can be undertaken through a variety of means.

IT – Organization Performance: Although IT investment has a significant role and has an undeniable impact on companies' performance, it has not been the focus of wide interest in Arabic literature and it did not attract many Arab studies. A review of literature shows that studies have either investigated the impact of investment in IT on the overall performance of the company or the impact of investment in IT on the financial performance of the company (Laudon and Laudon, 2012).

In a study by Sriram and Stump (2004), the role of IT in strategic communication, developing internal relations among companies, and improving the purchasing process has been studied and analyzed. The two researchers developed a model consisting of the previous variables to show the incentive of investing in IT. The sample of the study consisted of 530 companies. The study showed that IT investment affects performance and specially the purchasing process. They also concluded that it reflects the common understanding in the IT literature that IT is the engine that develops and improves productivity and performance in companies. In addition to that, they stated that IT investment can lead to development and improvement of internal relations among different companies, which reflects on improving overall performance. Not to mention all the other intangible effects for IT investment on companies either direct or indirect.

Ren and Dewan (2006), conducted a study about IT and its relation to risk and return in American companies. The study aimed at exploring the role of IT and its effect on company risks. It was conducted on a sample of 243 companies. The researchers stated that IT has an impact on risks; technology helps in decreasing the risk rates in companies that have high levels of IT systems. They also found that IT helps in increasing the return rates of the sample companies. Later in 2007, Huang’s study about the effect of investment in IT on the performance of companies manufacturing rubber, an indirect relation between investment in IT and the performance of the employees in terms of the ease of work, and time saving and energy saving was found.

Richardson and Zmud (2001) studied the impact of advertising the investment in IT on the return on stocks and their market value. The study was conducted on a sample of 97 companies, and the two researchers concluded that on average there is no extra ordinary return caused by advertising the investment in IT, meaning that there is no reaction from investors or appreciation to the investment in IT, particularly if this investment is characterized by being not effective or necessary.

In an article by (Chan et al., 2012), the association between the strength of information technology controls over management information systems and the subsequent forecasting ability of the information produced by those systems is investigated. It examined three dimensions of information technology material weaknesses: data processing integrity, system access and security, and system structure and usage. Results support the contention that information technology controls, as a part of the management information system, affect the quality of the information produced by the system.
Resource Based Theory: A large portion of the IT-business literature has used the Resource-Based View (RBV) (Roxas and Chadee, 2011) as a framework over the last two decades. RBV has been used in numerous fields such as Human Resource Management, Knowledge Management and Strategic Management in order to explain how a given resource affects company performance and interacts with other resources. This study evaluates IT under the rubric of RBV in order to better understand the relationship between IT capabilities, other resources, and ultimately company performance.

RBV suggests that a firm is a collection of resources, tangible and intangible, human and non-human, collected together in an administrative framework. Proponents of the theory have used RBV to analyze the heterogeneity of resources and their effects on company performance (Baradwaj, 2000). Baradwaj further defined the properties of resources which provide competitive advantage. These properties are a resource’s value, rarity, inimitability and non-substitutability.

Information System Resources: This section will build upon the premise that resources are the bedrock of an organization’s capabilities. Ravichandran and Lertwongsatien (2005) suggested three broad classifications of IT resources. The first classification is that of Human Resources (HR). In this study, HR refers to the skill and proficiency of staff to perform IT related functions. The expertise of a company in relation to IT is determined by its HR, which is often influenced by factors such as the tenure of staff and company specific training and knowledge. The second classification is IT infrastructure sophistication. This classification refers to the capability of IT infrastructure to respond to strategic changes and meet business needs. IT infrastructure must be flexible, enabling a business to take advantage of opportunities and quickly adjust its strategy, and it must deliver accurate, relevant information. The third classification is IT Partnership Quality. This classification includes both internal and external partnerships. Internal alignment between IT and the other resources of a business is essential so that IT providers may understand the relationships between the resources and objectives of the organization (Schryen, 2013). Relationships with external vendors can aid in establishing skills in areas which IT staff have not yet mastered. External vendors can therefore help improve internal IT functions and increase performance.

IS Capabilities: Resources have been described as either tangible (such as IT infrastructure) or intangible (such as Partnership Quality). Capabilities refer to an organization’s coordinated use of such resources which correlate with business objectives and provide results (Jarvenpaa and Leidner, 1998). As capabilities are coordinated, they are also “shared.” Schreyogg and Kliesch-Eberl (2007) suggest that capabilities are to be found throughout a company. They also identified three general areas of capabilities: problem solving and complexity, practicing and success, and reliability and time.

Core Competencies: A core competency is an aggregation of competencies that is cross-organizational. As an aggregation of competencies, a core competency is a source of diversification strategies which help reduce risk and transfer knowledge. The relevant literature describes three classifications of core competencies: market-based access competencies, integrity-related competencies, and functionality-related competencies. Ravichandran and Lertwongsatien (2005) describe market-based access competencies as those which engender the understanding of the prevailing customer base, as well as the recognition of opportunities in new markets. Integrity-related competencies are those which enable a company to produce dependable products and services that are of superior quality. Functionality-related competencies are those that guarantee the delivery of value-driven products and services to customers.

3 RESEARCH METHODOLOGY

The goal of this study is to carry out an empirical analysis of the effect of IT within the Egyptian economy. A quantitative study focuses more on numbers and measurement of variables, which makes it more suitable when dealing with a large number of research objects. Structured questionnaires were designed and distributed. The questionnaire results were statistically analyzed. The existence and
relative strengths of the relationships between the variables were analyzed using the Partial Least Squares (PLS) technique (Maitra and Yan, 2008) (Abd El-Aziz, 2012). PLS is useful as an analytical tool due to its capability to measure relatively small sample sizes (Pirouz, 2006). In addition, PLS is also a components based modeling tool which can simultaneously measure structural paths as well the measurement model.

3.1 Questionnaire

The questionnaire was sent out to senior IT managers and CEO within the survey population via mail and as well as interview. Respondents had the opportunity to assess company performance over the last three years based on operating performance four-item scale and market based performance three-item scale.

In measuring IT support for market-access and IT support for integrity-related competencies, a five-item scale was utilized for each of them. In order to measure IT support for functionality-related competencies, a seven-item scale was utilized. IS capabilities, including planning, systems development, support, and operations, were all measured along a six-item scale.

IS Human Capital, defined as the skill of the personnel, was measured on a four-item scale. IS Human Resource Specialization was measured along a six-item scale. The flexibility of IT infrastructure, composed of the sophistication of network and planning, was measured by a six-item scale. Data and core applications were measured along a four-item scale. IS partnership quality, defined by both the internal and external qualities of the partnerships, was measured using a six-item scale. Information intensity was measured using a three-item scale.

3.2 Population and Sampling

The population sampled within this study includes manufacturing and services, telecommunication, insurance, retails, utilities, services, and banks. As well as, other companies listed on the Egyptian Stock Exchange have also participated. The questionnaire was tailored for the senior management of IT departments and CEOs at the respective firms.

The survey questions were mailed to senior executives and management working in IT department within Egyptian companies. 79935 listed companies in Egypt were selected the companies due to the ease of access to information (The General Authority for Investment, jan-2012). There is no specific sector in Egyptian Market was selected. Four hundred questionnaires were sent out and three hundred forty nine responses were received, resulting in an 87% response rate. Although a high response rate was achieved, the number of respondents in this study was considerably bigger than that achieved by Ravichandran and Lertwongsatien (2005).

Sixty three percent of the companies that responded to the survey belong to the Manufacturing and services group within the Egyptian market. The remaining thirty seven percent was made up of the groups such as Services seven Percent, Telecommunication three percent, Insurance three percent, Retails twelve percent, Utilities seven percent, Others four percent and Bank one percent. These companies had staff numbers ranging between 100 and more than 1000 employees. All of the responding companies had the head office located in Egypt.

4 RESEARCH FINDINGS

PLS is interpreted in two stages. The first step evaluates the measurement model and the second step in the analysis examines the structural model as a whole. “The measurement model subsumes the composition of the latent variables while the structural model depicts how the latent variables are interrelated” (Allen and Rao, 2000).
All of the factor loadings are highly positive. This represents the first step of the PLS analysis, indicating whether these measures should be included in the model. The factor loadings indicate how the individual indicators contribute to the construct, whereas the path coefficients (discussed in section 4.5) indicate how they contribute to the overall relationships between the constructs. P-value is the chance that the relationship you are observing is observed by pure chance. So if you obtain a p-value of 0.01, it means that there is a 1% chance that the relationship between the independent variable(s) and the dependent variable that your model established doesn't actually exist.

IS Human Resource Capital is also well measured by SKILLS_2, SKILLS _3, SKILLS _4, SKILLS _5, SKILLS _6, SKILLS _8, SKILLS _9 with all factor loads highly positive at 0.48, 0.45, 0.48, 0.45, 0.41, 0.28, 0.06 respectively and significant at the 90% significant level in contrast with their small standard errors.

Estimated factor loadings for IT Infrastructure Flexibility are highly positive for ITFlex_4, ITFlex _5 and ITFlex _7, at 0.54, 0.67 and 0.34 respectively and significant at P < 0.1 (90% significance level).

IS Partnership Quality construct is also well measured by ISQ_4 with a factor loading at 0.34, ISQ_5 with a factor loading at 0.38,ISQ_6 with a factor loading at 0.54, with ISQ _10 and ISQ _11 following as measures with a factor loading at 0.21 and 0.24 respectively.

IS Capabilities is well measured by ISCAP_7, ISCAP_21 with factor loads highly positive at 0.54, 0.54 respectively and significant at 90% significant level in contrast with their small standard errors.

IT Support for core competencies is also well measured by ISSUP_6, ISSUP _7, ISSUP_8, ISSUP _9, ISSUP _10, ISSUP _11 with all factor loads highly positive at 0.64, 0.63, 0.66, 0.57, 0.44, 0.38 respectively and significant at the 90% significant level in contrast with their small standard errors.

Firm Performance construct is also well measured by PERF_2 with a factor loading at 0.52, PERF _3 with a factor loading at 0.52, PERF _4 with a factor loading at 0.70, with PERF _5 and PERF _6 following as measures with a factor loading at 0.76 and 0.61 respectively.

Information Intensity is also well measured by with INT_1, INT _2, INT _3 all factor loads highly positive at 0.27, 0.50, 0.32 respectively and significant at the 90% significant level in contrast with their small standard errors.

The P-values for all variables are less than 0.1. The R2 or variances explained for endogenous variables are all greater than .10 with the exception of SKILLS_9, ISQA_10 and ISQA _11. Given the tenability of the measurement model reflected in section 4.4, the structural model can be assessed to focus on the structural causal relationships among IT Infrastructure Flexibility, IS Partnership Quality, IT Support for Core Competencies and Business Performance.

4.1 Research Hypotheses

The test to determine whether the structural model was consistent with the observed data was done with the use of the software LISREL. Allen and Rao (2000) indicated the importance of noting the fact that the causal model is never explicitly proven. On the other hand, the relationships structural model can be tested to check consistency with what was reflected in the data. The path coefficient in the causal analysis reflects the values of the direct contribution of a given variable on another variable, given the effects of the other variables are also taken into account.

**Hypothesis 1:** Structural Equation: IS_Capability = 1.995 + 0.171 IT_Flexibility + 0.291 IS Quality

The path coefficient between IS Human Capital and IS Capability is positive at 0.17. The p-value is less than 0.1 therefore significant at the 90% level. The structural equation model therefore provides support for Hypothesis 1 which stated that there is a positive relationship between IS Human Capital and IS Functional Capabilities.
Hypothesis 2: Structural Equation: IS_Capability = 1.995 + 0.171 IT_Flexibility + 0.291 IS Quality
The path coefficient between IT Infrastructure Flexibility and IS Capability is positive at 0.19. The p-value is less than 0.1 therefore significant at the 90% level. The structural equation model therefore provides support for Hypothesis 2 which stated that there is a positive relationship between IT Infrastructure Flexibility and IS Functional Capabilities.

Hypothesis 3: Structural Equation: IS_Capability = 1.995 + 0.171 IT_Flexibility + 0.291 IS Quality
The path coefficient between IS Partnership Quality and IS Functional Capability is positive at 0.27. The p-value is less than 0.1 therefore significant at the 90% level. The structural equation model therefore provides support for Hypothesis 3 which stated that there is a positive relationship between IS Partnership Quality and IS Functional Capabilities.

Hypothesis 4: Structural Equation: IT Support for Core Competencies = 3.167 + 0.163 IS_Capability
The path coefficient between IS Functional Capability and IT Support for Core Competencies is positive at 0.17. The p-value is less than 0.1 therefore significant at the 90% level. The structural equation model therefore provides support for Hypothesis 4 which stated that there is a positive relationship between IS Functional Capability and IT Support for Core Competencies.

Hypothesis 5: Structural Equation: Firm Performance = 2.716 + 0.210 IT Support for Core Competencies
The path coefficient between IT Support for Core Competencies and Firm Performance is positive at 0.21. However, the p-value is less than 0.1 therefore significant at the 90% level. The structural equation model therefore provides support for Hypothesis 5 which stated that there is a positive relationship between IT Support for Core Competencies and Company Performance.

A positive and significant path coefficient was witnessed between the latent constructs. IS Human Capital, IT Infrastructure Flexibility and IT Partnership Quality both have a strong positive path coefficient to IT Capabilities. However, the path coefficient between IT Capabilities and IT Support for Core Competencies is strong. Finally, IT Support for Core Competencies presents a positive path coefficient with Firm Performance.

5 CONCLUSION
This study extended the research conducted by Ravichandran and Lertwongsatien (2005) by using Resource Based theory to explain how company performance can in component be explained by IS resources and capabilities. The research model presented in this study supported in particular for the positive influence that a flexible IT infrastructure and partnerships at the right level, deliver to the business. After the data were collected and analyzed, significant positive relationships were found:

- IS Human Capital and Information System Functional Capability.
- IT Infrastructure Flexibility and Information System Functional Capabilities.
- IS Partnership Quality and Information System Functional Capabilities.
- IS Functional Capabilities and Information Technology Support for Core competencies.
- IT Support for Core Competencies and Company Performance.

Industries are now elevating the Information Technology (IT) function from the operational to the strategic level. IT has become an essential function and tool used by modern management; from the development of new products to the support of sales and service, from providing market intelligence to supplying tools for decision analysis. Multi-national companies have the ability to acquire information from multiple systems and make it broadly accessible to managers and employees; this has become a critical function. This coupled with the increased opportunities for using IT to achieve strategic competitiveness has made it essential for CEOs to reexamine their IT knowledge in order to manage it effectively.

Technology has become integrated with almost every aspect of the business of many companies. At one time, they had started using technology to run core applications, or to process key business information. Today, technology plays a role in almost everything businesses do, from every aspect of customer service to customizing their store formats or matching their merchandising strategies to
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individual markets in order to meet varied customer preferences. Naturally as technology has become pervasive in the business, it has changed the way they work now. CEOs increasingly recognize the impact that technology decisions have on their business and their corporate culture. As a result, most of them are becoming less comfortable delegating technology decisions to others.

References