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Abstract

While a lot of research has been conducted on IT investments, only a few studies have focused on IT capabilities and industry level resources. Past research has shown that both managerial characteristics and industry environment are key elements to understand the impact of IT investments on firm's performance. In this study two aspects of industry level are being considered: IT intensity and growth rate. Therefore, the overall objective of this research is to evaluate the role IT intensity and growth rate play to leverage IT capabilities, which in turns affect firm's performance.

Keywords: IT-capability, IT-intensity, growth rate, firm performance, resource-based theory

Objectives

The role IT plays in the organizational context has been a constant concern for both scholars and practitioners. Thus, studies have been trying to understand on how to use IT to leverage company's performance as well as the relationship between IT and various output organizational variables. However, most of previous research has employed a binary relationship to explain this phenomenon, in which models were always reduced to input and output variables where IT and organizational outcomes have played each role interchangeably. Some studies (Hitt, 1999; Bharadwaj, et al., 1999; March and Sutton, 1997) treated IT as an independent variable while others (Dewan, et al., 1998) as a dependent variable. Such efforts have increased our understanding of such relationship. However, many controversial results have been raised, which have contributed to reinforce arguments under the umbrella of Productivity Paradox. That is, some studies (Loveman, 1988; Strassmann, 1985) have found little or negative impacts of IT on firm productivity, while others (Brynjolfsson and Hitt, 1996; have suggested positive impacts.

Scholars (Brynjolfsson and Hitt, 1998) argue that to move beyond the productivity paradox other measurements should be included in future research. Furthermore, controversial results existed because, in general, researchers have neglected the existence of other contextual variables that might either intermediate or moderate such relationship (Barua, et al., 1995). As a consequence, more recent studies have suggested opening the black box of IT to capture key factors that might affect firm's success. For example, building on previous work, Bharadwaj, et al. (2002) found that Firmwide IT capability, as a multidimensional construct, is a better predictor of such relationship and is positively related to measurements of firm's performance. Nonetheless, they argue that other variables might moderate the impact of IT capability on firm outcomes.

As a result, this research is focused on advancing our understanding of Firmwide IT capability construct. Specifically, this study is motivated by the following research question: *a) what is the impact of Firmwide IT capability on firm's performance across different industry environments?*

The remaining sections are organized as follows. First, we describe the theoretical background. Second, we present our research model and hypotheses. Third, we present the methodology. Finally, we draw expected results for both scholars and practitioners.

Theoretical Background

The argument in favor of opening the black box of IT is strongly supported by the fact that some IT investments have produced different business value across firms. In such a perspective business value is viewed as a result of the interaction between IT and complementary factors such as business strategies, processes, and incentives (Barua and Mukhopadhyay, 2000). For example, Clemons and Row (1991) argue that differences among competitors are a result of the way they access complementary strategic resources to use IT. Interestingly, a recent and exhaustive literature review on IT investment returns concluded *"The strategic use of IT is probably the least developed area that examines the relation between IT and* performance" (Dehning and Richardson, 2001 p. 14).

Following this research stream this research is grounded on resource-based theory (RBT) (Barney, 1991; Mata, et al., 1995). RBT mainly differs from other approaches in that it lies under assumptions that strategic resources are heterogeneously distributed across firms. According to Barney (p. 101), firm's resources can be broadly categorized into three categories: physical capital resources, human capital resources, and organizational capital resources. Such strategic resources encompass several characteristics that represent the uniqueness of an organization within its industry segment. For example, a company managerial capability to leverage its IT resources can be a differential advantage over its competitors, thus differentiating its performance across industries. Such perspective is important in the context of IT because it allows one to focus on managerial capabilities toward manipulation of IT resources that are available both internal and external to the organization.

Recently Bharadwaj (2000) has demonstrated the use of resource-based theory to develop the concept of IT capability in order to verify IT impact on firm performance. In addition, extension of this work is been conducted by Bharadwaj, et al. (2002), in which IT capability is viewed as a holistic and higher-level construct formed by various other constructs such as strategic vision of IT, IT and business process integration, IT and business (internal) partnerships, IT and external partnerships, IT infrastructure development, and IT management. Thus, IT capability can vary according to the variation of the input of each of the other constructs. In summary, different inputs will provide different values to IT investments, which in turn will affect firm's performance.

Similar vein is taken by the work of Richardson and Zmud (2001). They have also used resource-based theory to revisit conversion effectiveness construct, initially proposed by Weill (1992). Their argument is in favor of conceiving and operationalizing it as a holistic construct. Thus, conversion effectiveness is composed of two major elements: complementarities and enterprise IT management. Complementarities are corresponding investments that must be made together with IT such as investments in business strategic planning, in business processes, in incentive structures, and in control systems. Enterprise IT management represents the roles that must be carried out in effectively performing enterprise IT planning.

Finally, Richardson and Zmud (2001) findings suggest that specific dimensions of the conversion effectiveness construct are more appropriate to explain certain type of industries, which can be classified as automation, intermediate, or advanced according to the stage of IT implementation use in the industry.

Research Model

Although variables identified in previous studies express variations on the impact of the IT capability construct, RBT lens also suggest that resources are another critical dimension that can impact profoundly business skills and organization performance. For example, it is argued that the higher the level of resources the more positive is the impact of IT skills on firm's performance. As a result, still many other issues need to be addressed (Bharadwaj, et al., 2002). For example: a) how these sub-constructs interact and evolve over time and what is the resulting impact of interactions among them on IT capability; b) in which ways these different interactions can affect the impact of IT capability on firm's outcomes; and c) how industry level variables (i.e. resources) might moderate the relationship between IT capabilities and firm's performance.

As discussed earlier, Resource-based Theory considers both skills and resources. While skills are represented by IT capability construct, resources can be defined in terms of industry contextual variables. In other terms, characteristics of the environment in which a company is embedded in can affect its operationalization of IT capabilities.

In general, the literature suggests that IT capabilities can be leveraged when an industry belongs to a context that demands higher level of IT use. In other terms, IT capability will have a greater impact on firm's performance when environmental conditions such as IT intensity and growth rate are favorable.

IT capability construct is operationalized in terms of strategic vision of IT (SIT), IT and business process integration (BPI), IT and business (internal) partnerships (IIT), IT and external partnerships (EIT), IT infrastructure development (ITM), and IT management (INF). These measurements are described in Bharadwaj, et al. (2002).

Two dimensions of the industry environment are considered: IT intensity and growth rate. IT intensity represents the level (i.e.: Automate, Informate Up/Down, and Transform) of IT usage by organizations within a specific segment. In the automate level are those industries that employ IT basically to replace human labor. Informate Up/Down is when IT is used as a source of data/information to support management and employees. Finally, industries in the transform category are those that have employed IT to promote changes in the traditional way of doing business by redefining business processes and relationships. Growth rate is the amount of change over a period in some characteristics of a company such as sales revenue or profit. It is normally measured in percentage terms and can be compared to the retail price index. In this study, the growth rate considered will be extracted from COMPUSTAT and will be used at the industry level.

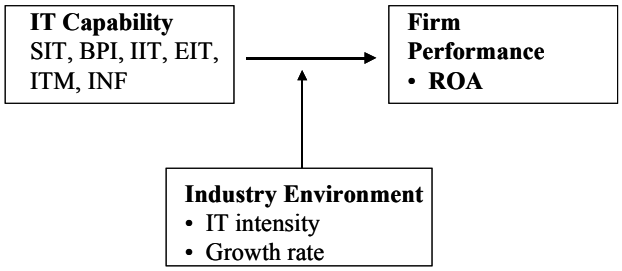

Figure 1. Research Model

Thus, we offer the following two hypotheses: H1: The greater the IT intensity level of the industry environment, the greater will be IT capability impact on firm's performance; H2: The greater the growth rate of the industry environment, the greater will be IT capability impact on firm's performance.

Methodology

The data to be used are derived from a dataset that has been used by in Bharadwaj, et al. (2002) to establish IT competency measures. This dataset was formed from a combination of survey and data taken from COMPUSTAT. It contains data relative to dependent variables and control variables. In addition, it will be collected data from a secondary data source regarding IT intensity and growth rate.

Our objective is to establish cumulative study regarding firmwide IT capability construct, thus providing comparisons across studies. Therefore, control variables and dependent variables are related to Bharadwaj, et al. (2002) study. Control variables include firm size, advertising expenditures to sales, and R&D expenses to sales, whereas firm's performance is expressed in terms of Return on Assets (ROA), which is an objective measure of firm profitability and has already been used by others (Bharadwaj, et al. 2002; Rai, et al., 1997; Hitt and Brynjolfsson, 1996; Weill, 1992) when investigating IT investments and business performance.

Expected Results

Resource-based Theory suggests that firms are viewed as historical and social entities. Thus, their ability to acquire and exploit resources to gain competitive advantage depends upon their place in time and space. Therefore, we expect to provide evidence that IT intensity and growth rate moderate the relationship between IT capability and firm's performance. For researchers we are both providing knowledge on environmental influences on IT capabilities as well as addressing a gap in the literature of IT investments. For practitioners we are offering managerial strategies on how to use organizational environment to leverage company's IT capabilities

At the conference we expect to discuss some of our findings related to statistical analysis that will be conducted this spring and summer.

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