

# Impact of IS/IT Investments on Firm Performance: Does Stakeholder Orientation Matter?

António Guerreiro

University of Évora, Évora, Portugal and CEFAGE

[ahmg@uevora.pt](mailto:ahmg@uevora.pt)

**Abstract:** This research project addresses a central question in the IS business value field: Does IS/IT investments impact positively on firm financial performance? IS/IT investments are seen as having an enormous potential impact on the competitive position of the firm, on its performance, and demand an active and motivated participation of several stakeholder groups. Actual research conducted in the Information Systems field, relating IS/IT investments with firm performance use transactions costs economics and resource-based view of the firm to try to explain and understand that relationship. However, it lacks to stress the importance of stakeholder management, as a moderator variable in that relationship. Stakeholder theory sees the firm as the hub centric to the spokes representing various stakeholders who were in essence equidistant to the firm, and survival and continuing profitability of the corporation depend upon its ability to fulfil its economic and social purpose, which is to create and distribute wealth or value sufficient to ensure that each primary stakeholder group continues as part of the corporation's stakeholder system. Stakeholder theory in its instrumental version, argues that if a firm pays attention to the stakes of all stakeholder groups (and not just shareholders), it will obtain higher levels of financial performance. With this premise in mind, the aim of this paper is to discuss and test the use of stakeholder theory in the IS business value stream of research, in order to achieve a better understanding of the impact of IS/IT investments on firm performance (moderated by stakeholder management). To achieve the expected impact from an IS/IT investment, it is argued that firms need a strong commitment from those stakeholder groups, which lead us to the need of a corporate "stakeholder orientation". When firm financial performance is measured by returns on assets (ROA), returns on investments (ROI) and returns on sales (ROS), the results show that "stakeholder orientation" impact positively in the relation between IS/IT and firm performance, using a sample of Portuguese large companies.

**Keywords:** IS/IT investments, impacts, financial performance, stakeholder orientation, return on investments, IS business value

---

## 1. Introduction

The introduction of IS/IT in organizations is likely to have a significant impact within the organization. IS/IT can be used in restructuring organizational activity, in strengthening the competitive position of the firm (Ward & Peppard, 2002), and to transform entire business processes (Al-Mudimigh et al 2001; Brynjolfsson & Hitt, 1998).

In the 1980s IS/IT was herald as a key to competitive advantage (McFarlan, 1984; Porter & Millar, 1985). Porter and Millar (1985) concluded that IS/IT has affected competition in three ways: it has led to changes in industry structure and competition, it was used to support the creation of new business, and companies using IT outperformed their competition. Earl (1989) suggests that IS/IT has the potential to be a strategic weapon.

Despite increasing expenditure on IS/IT (Ballantine & Stray, 1999; Ryan & Gates 2004, Willcocks & Lester 1999) and the belief that IT has a significant impact on organizational performance (Osey-Bryson & Ko, 2004), the effect of such investments on firm productivity has been unclear (Dasgupta et al., 1999; Farbey et al. 1999) and has given rise to a 'productivity paradox' (Love & Irani, 2004). Many organizations find themselves in a "Catch 22" (See Joseph Heller's 1961 novel) for competitive reasons they cannot afford not to invest in IS/IT, but economically they cannot find sufficient justification for it (Willcocks 1992).

During the past four decades a great deal of attention has focused on the impact of IT investment. However studies have frequently generated controversial or inconsistent results (Kivijärvi & Saarinen, 1995).

After revising the literature in the IS business value field, where the weak use of theory is pointed as a major gap in the field, namely in the first years in which the phenomena as been studied, Transaction Cost Theory (TCT) and Resource Based Theory (RBT) are presented and their use in the IS business field is reported.

However those theories say nothing on the relation with several stakeholder groups who interact daily with the firm, and from which the success of the IS/IT depends. Stakeholder theory is introduced in the next part as

a possible good theory candidate to moderate and help to shed light on the relation between IS/IT investments and firm performance. The paper ends with the presentation of the empirical model, results and conclusions.

## **2. Impact of IS/IT on firm performance**

### **2.1 IS/IT investments, firm performance and the 'productivity paradox'**

A growing body of research into the firm performance effects of IT investment has emerged and is sometimes referred to as *IT business value research*. The problem researchers face is to identify robust methods to gain insight into how IT business value is created (Kauffman & Weill 1989). Executives are intensely aware that IT systems have the potential to enable a firm to radically transform the way in which it does business and IT expenditures have increased accordingly. The crux of the problem is whether IT investment really makes a difference in firm performance. Prior researchers have reached contradictory conclusions when studying the relationship between IT investment and firm performance. The search concerning the impacts of IT investments has been conducted at several levels: (1) the economy as a whole, (2) the industry within an economy, (3) the firm within an industry, (4) a work group or division within a firm, (5) the individual or information system (Bakos 1987; Brynjolfsson & Yang, 1996).

The shortfall of evidence concerning the productivity of IT became known as the 'productivity paradox'. As Robert Solow, the Nobel laureate economist state "we see computers everywhere except in the productivity statistics (Solow 1987).

The early studies tended to address the question of computer use (Lucas 1975) and the relationship between performance and computerization intensity (Cron & Sobol 1983). The studies by PIMS (1984) and Bender (1986) measured the proportion of expenses dedicated to IT in firms, while Breshniham (1986) and Roach (1987) measured amounts of resources dedicated to IT in a sector.

Early work in the field is based on some notion of productivity drawn from accounting (which basically ignore the process by which inputs are converted into outputs) or on methodologies from economics. In this case the process that links inputs to outputs is modelled, but very simply using computed ratios of input to output transformation (Crowston & Treacy, 1986).

The difficulty of identifying interesting, consistent results is further compounded by the use of inconsistent definitions of key input and output variables. "IT expenditures" is a good example: some studies adopted a narrow definition of just IS expenses; others broadened the definition to include communications, software and hardware-related employees, and managers.

Simply empirical studies, without a strong theory-base, difficultly will reveal the heart of the IT pay-off question. In the view of Crowston & Treacy (1986) we must look for a strong theory about the process in organizations to guide our choice of variables and to generate testable hypothesis about them.

Once a theory and methodology have been chosen and the unit of analysis has been decided upon to measure IT impact and its locus, the next logical step in the progression is to select a set of performance measures (Kauffman & Weill 1989). With respect to performance measures, at firm level, we can find two sets of measures: accounting based measures (ROA, ROE, ROI, ROS) and market measures (as Tobin's q).

Transaction Cost Theory (TCT) and Resource Based Theory (RBT) are two widely used theories of the firm, that have started to be used in the IS field in general, and are also defended and used to study the impacts of IT on business. Next we will briefly describe both theories and their fundamental assumptions.

## **2.2 The transaction cost theory and the resource based theory**

### *2.2.1 The transaction cost theory*

Coase (1937) refuted the idea from the economic theory of price-mechanism as the key to resource allocation within the firm, and call to a new theory of the firm, actually known as the TCT. As he states, "Outside the firm,

price movements direct production, which is coordinated through a series of exchange transactions on the market. Within a firm, these market transactions are eliminated and in place of complicated market structure with exchange transactions is substituted the entrepreneur-co-ordinator, who directs production” (Coase 1937, p.388). In his view the main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism in the market place (information costs, market regulation costs, negotiating costs, contract costs, costs of monitoring the contracts). According Coase (1937) a firm becomes larger as additional transactions are organized by the entrepreneur (inside the firm) and becomes smaller as he abandons the organization of such transactions (and goes to the market). The firm is seen as a nexus of contracts (Demsetz 1988) or as a governance structure (Rindfleisch & Heide, 1997).

Over the past four decades, Williamson (1975, 1979, 1985, 1996) has added considerable precision to Coase’s general argument by identifying the types of exchanges that are more appropriately conducted within the firm boundaries than within the market. Opportunism and bounded rationality are presented as the key behavioural assumptions on which transaction cost economics relies. He argues that opportunism is a central concept in the study of transaction costs and focuses his attention on the exchanges in which opportunistic potential is relevant. Opportunism is defined as “self-interest seeking with guile” (Williamson 1985, p.47). In his view, opportunistic potential exists when three necessary conditions occur: (1) asset specificity, (2) small number of potential transactors, and (3) imperfect information.

According to Williamson (1975) firms exist when the opportunistic potential is significant. When asset specificity, small number of contractors and imperfect information are not significant the market will dominate and transactions between contractors will occur. In Rindfleisch & Heide (1997) view, transactions costs may result from direct costs or opportunity costs and these costs are related to three types of variables: (1) asset specificity, (2) environment uncertainty and (3) behavioural uncertainty.

Several criticisms have been levelled at transaction cost theory. Simon (1991) argues that the theory is divorced from reality and Granovetter (1985) states that it ignores the social context of human actions. Furthermore, these researchers argue that Williamson turns the concept of opportunism (a relatively unexplained phenomena) into a behavioural assumption. The concept of opportunism is based on the assumption that decision makers may unscrupulously seek to serve their self interests and that it is impossible to know who is trustworthy and who is not. Rindfleisch & Heide (1997) argue that the limited research on TCA’s performance implications makes it difficult to access fully its theoretical value as well as its empirical validity.

In the IS field, the interest in TCT increased with the rising interest in studying the options of insourcing or outsourcing the IS/IT function (Grover et al., 1998; Willcocks & Lacity, 1998).

TCT is proposed as a relevant theory in the IS business value field. Crowston & Treacy (1986) state that Williamson’s studies of markets and hierarchies can help to explain the enterprise and industry level impact of IT by explaining changes in production and transaction costs. He points out that the boundaries between industries arise at those points where a market’s advantage of production efficiencies outweigh the transaction cost superiority of internal organization. Simply put, separate and specialized industries exist because at some points it is cheaper to buy a product or service in the market than to make it. IT has the potential to radically alter cost structures and transform the structure of industry boundaries. In some cases, functions that were once integrated into the firm may be eliminated and alternatives may be purchased in a market. In other cases, products and services that were once purchased now may be created within the firm. IT can have this impact on industry structure by altering the relative production efficiencies and transaction costs of market and organization mechanisms, and the specificity of assets that create products.

Kauffman & Weill (1989) argue that the use of strong theory bases will improve the likelihood of achieving meaningful IT impact analysis results, future IS research should tap a broad range of applicable theories and methods, TCT is one of them.

Nonetheless TCT looks to firm as a ‘nexus’ of contracts and assumes ‘opportunism’ as a central issue, and lacks to address the importance of stakeholders (and their cooperative relations) to the prosperity and sustainability of the company.

### *2.2.2 The resource based theory*

The resource-based view argues that firms possess resources, a subset of which enables them to achieve competitive advantage. This theory focus on the idea of costly-to-copy attributes of the firm as sources of business returns and hence an essential way to achieve superior performance and competitive advantage (Barney 1991, Conner 1991, Conner & Prahalad, 1996; Prahalad & Hamel, 1990). According the RBT, the firm looks for unique attributes that may provide superior performance. The firm is seen as a collection of productive resources. These resources can be classified into three categories: (1) physical capital resources, (2) human capital resources, and (3) organizational resources (Barney 1991). It is argued that performance differentials between firms depend on having a set of unique inputs and capabilities (Conner 1991).

According the RBT, competitive advantage occurs only when there is a situation of resource heterogeneity (different resources across firms) and resource immobility (the inability of competing firms to obtain resources from other firms) (Barney 1991). The RBT treats companies as potential creators of value added capabilities. The development of such capabilities and competencies involves a knowledge-based perspective (Conner & Prahalad, 1996; Prahalad & Hamel, 1990).

One of the objectives of the theory is to help managers to appreciate why competencies can be perceived as a firms' most valuable asset and, at the same time, to understand how those assets can be used to improve business performance. Barney (1991) argue that a resource, to provide competitive advantage, must fulfil four criteria: (1) valuable, (2) rare, (3) imperfect immutability and (4) non-substitutability. In the view of Grover et al. (1998), the essence of a resource-based theory is that given resource heterogeneity and resource immobility and satisfaction of the requirement of value, rareness, imperfect immutability, and non-substitutability firms' resources, can be a source of sustained competitive advantage.

Unlike TCT, a resource-based view of the firm does not depend on opportunistic behaviour. It focuses on developing internal knowledge and competencies to enable the firm to improve its competitiveness. It accepts that attributes related to past experiences, organizational culture and competencies are critical for the success of the firm (Hamel and Prahalad, 1996).

RBT has been widely used in the IS field (Mata et al., 1995; Caldeira 1998; Grover et al., 1998; Caldeira & Ward, 2003). Mata et al. (1995) argue that managerial IT skills were an attribute of IT that can provide sustainable advantage (they are usually developed over long periods of time, through learning and experience). In the view of Grover et al. (1998), and according to resource-based theory, outsourcing is a strategic decision which can be used with the purpose of filling the gap between the desired IS/IT capabilities of the firm and the actual ones. Caldeira (1998) and Caldeira & Ward (2003) defend a resource-based approach to the understanding of IS/IT adoption and use in manufacturing SMEs.

The RBV has been proposed to investigate the impact of IT investments on firm performance (Santhanam & Hartono, 2003). Researchers have shown that a firm's ability to effectively leverage its IT investments by developing a strong capability can result in improved firm performance. For instance, Bharadwaj (2000) provided evidence that firms with IT capability tend to outperform a control sample of firms on a variety of profit and cost-based performance measures. Santhanam & Hartono (2003) indicate that firms with superior IT capability exhibit superior current and sustained firm performance when compared to average industry performance, even after adjusting for effects of prior firm performance.

RBT recognizes the importance of manage stakeholders, but puts it as one of the competences to transform the firm resources into capabilities, in order to achieve a competitive advantage.

### **3. Stakeholder theory and IS/IT investments**

The idea that corporations have stakeholders has become commonplace in the management literature, both academic and professional (Donaldson & Preston 1995). The ruling paradigm of corporate governance holds that those who invest their capital into whatever kind of business, and, by that token, those who risk losing their investment in parts or in total, have an entitlement (and an obligation) to govern the business they have invested into. Capital investors (principals) either govern the business themselves, or they do so with support of agents (managers) who they may appoint. The observation that principals and agents may have conflicting interests even among themselves has led to the development of agency theory (Jones, 1995).Freeman's (1984)

landmark work provided a solid and lasting foundation for many continuing efforts to define and to build stakeholder models, frameworks, and theories. According to his work, strategic management of private sector firms could become much more effective and efficient, if managerial efforts regard various stakeholders' concerns. In other words, shareholders benefit long-term if other legitimate interests in the firm do not fall by the wayside.

Stakeholder theory establishes a framework for examining the connections, if any, between the practice of stakeholder management and the achievement of various corporate performance goals (Donaldson & Preston 1995). The principal focus of interest here has been the proposition that corporations practicing stakeholder management will, other things being equal, be relatively successful in conventional performance terms (profitability, stability, growth). Instrumental uses of stakeholder theory make a connection between stakeholder approaches and commonly desired objectives such as profitability. Stakeholder management requires, as its key attribute, simultaneous attention to the legitimate interests of all appropriate stakeholders, both in the establishment of organizational structures and general policies and in case-by-case decision making.

In the information systems field, there is an extensive work about a wide range of issues such as IS/IT evaluation, design, implementation and management of IS/IT investments, using stakeholder theory.

However, the main focus is about the use of the "stakeholder" concept and with their identification. This research also stresses the importance of including stakeholders on several tasks such as evaluation and IS/IT design in order to achieve the expected levels of performance.

Today the benefit of exploiting IS/IT not only relates to making business processes and tasks more efficient. Instead, IS/IT also enables the creation of products, services, distribution channels, and links with customers, suppliers, and other stakeholders. Remenyi (1999) defends that IT has no direct value in its own right. IT investment has a potential for derived value. More than any other factor of success or failure of the IT investment is a function of the skill and commitment of the information systems principal stakeholders. Only when IT is coupled with other resources, and especially the principal stakeholders, can any benefits or value be perceived. Any organization ultimately makes investments in IS/IT to create value for its stakeholders, whether they are shareholders, customers, employees or others with a vested interest in sharing in its success (Ward & Peppard, 2002). The literature cites many examples of IS/IT projects in which multiple stakeholder groups are involved, with substantial influence. Farbey et al. (1999) found that external stakeholders could play a decisive and crucial role in many IS/IT investments.

Mixed empirical results are always an invitation to seek better theory. A productive approach would be to move from the question of whether IT creates value to how, when and why benefits occur or fail to do so (Soh & Markus, 1995).

To achieve the expected impact from an IT investment, we argue that firms need a strong commitment from these stakeholder groups, which lead us to the need of a *stakeholder orientation*.

According to ST main proposition, it is possible to put the following research questions:

- Does the IS/IT investment of firms practicing stakeholder management will, other things being equal, be relatively successful in terms of firm performance?
- Is there a relation between a firm's corporate social responsibility (CSR) and the impact of IS/IT investments on firm performance?

The proposed conceptual model put a new construct, '*stakeholder vs shareholder orientation*', as a moderating variable in the relationship between IS/IT investments and firm performance (figure 1).



Figure 1: IT investments and firm performance: A stakeholder approach

*Stakeholder Orientation* has been assessed by stakeholder theorists in the strategic management field using KLD index (a corporate social performance index), which relies on public records of notable socially responsible activities (Berman et al., 1999), Dow Jones Sustainability Index (DJSI) in USA, or the Footsie for Good Index (FTSE4Good) in the UK. When it is not possible to use those indexes (for example to use firm level data of other countries), researchers should develop efforts to identify firms with good practices of corporate social responsibility (CSR), and create a ‘dummy’ variable (1 for firms with a ‘stakeholder orientation’; 0 for the others) as a good proxy of stakeholder management practices.

Firm performance should be assessed by accounting measures, such as return on assets (ROA), return on equity (ROE), return on investments (ROI), or return on sales (ROS), the world famous “language” of business and management, particularly when data sets include firms that are not present in the stock markets.

#### 4. Data description and empirical model

##### 4.1 Data description

This section provides a brief description of the data used in this paper. The Portuguese National Institute of Statistics (INE) runs annually two surveys to Portuguese companies, the Harmonized Firm Survey (IEH) which collects accounting data, and the Survey on the Use of Information and Communication Technologies (IUTIC) where we can find information about IT expenditure.

Both surveys are exhaustive for firms with more than 250 employees (all population of Portuguese firms is inquired), so we have requested data on those companies, for the years of 2004 and 2005 (2004 was the first time in which the question “how much your company spent in IT” appeared in the IUTIC survey).

The sample is constituted by large firms with more than 250 employees mainly from the private sector and has a total of 1186 observations (581 firms inquired in 2004 and 605 in 2005) from the sectors of extracting and manufacturing industry (sector C/D), electricity (sector E), construction (sector F), wholesale and retail trading and repair (sector G), Hotels and Restaurants (sector H) transport and communications (sector I), real estate and business service activities (sector K) and other collective, social and personal activities (sector O).

Those firms employ 742 persons in average, spent 1.726.702 euros in advertising, 905.895 euros with IS/IT and communications, and 547.643 euros with human resources dedicated exclusively to IS/IT and communications.

Some companies (26) didn’t give information on the amount spent on advertising. Others (71) did not provide enough accounting information to allow us to compute some financial performance indicators, or presented a negative value for equity, so we have 1115 valid observations.

##### 4.2 Variables and model

The **dependent variable**, financial performance will be accessed by the most common financial indicators: return on equity (ROE), calculated by taking the net result over shareholders’ equity for each specific year; Return on Assets (ROA), calculated by taking the EBIT over total (net) assets for each specific year; Return on Investment (ROI), calculated by taking the EBIT over total investments for each specific year; and at last Return on Sales (ROS), calculated by taking the net result (or EBIT) over total sales for each specific year.

ROE represents what return the company is making on the shareholders’ funds invested in the company. ROE assesses leadership ability to get the job done. A business that has a high return on equity is said to be one that is capable of generating cash internally (Ross et al, 2002). ROE is one of the most common indicators used

by IS researchers to study the impact of IS/IT investments on firm performance (Rai et All., 1997; Stratopoulos & Dehning 1999, 2000; Shin, 2001; Aral & Brynjolfsson, 2006), particularly when data sets include firms that are not present in the financial markets (publicly traded), or when the last ones are not efficient (it is not possible to use market measures).

According Brown et. al., 1995, ROE, ROA and ROI are all closely related and are widely accepted as profitability measures.

Return on Assets (ROA) measures the company's ability to generate profits from its assets, ignoring how they were financed (Stickney, 1990). Return on investment (ROI) measures the company's ability to realize value from their investments. Return on sales (ROA) measures the net margin of the company on the turnover.

These profitability indicators are quite common being used by researchers in the field of information systems, to study of the impacts of investments in IS/IT on business performance (Kivijärvi & Saarinen, 1995; Rai et al., 1997; Li &Ye, 1999; Stratopoulos & Dehning 1999, 2000; Bharadwaj, 2000; Shin, 2001; Hitt et al.,2002; Lee & Boose, 2002; Byrd & Davidson, 2003; Santhanam & Hartono, 2003;Dimovsky & Skerlavaj, 2004; Zhu, 2004; Tanriverdi, 2005; Ravichandran & Lertwongsatien, 2005; Aral et al., 2006; Aral & Weill, 2007; Guerreiro & Serrano, 2007a, 2007b; Altinkemer et al., 2007; Dehning et al., 2007; Lee, 2008; Stoel & Muhanna, 2009; Ravichandran et al., 2009).

As **independent variable**, we used IS/IT investment. The IS/IT investment concept is operationalized in many different ways by different researchers. In this paper we use the concept of IS/IT investment which is asked to Portuguese companies in the IUTIC survey. This concept is closed to the concept defined by the MIT researchers Aral & Weill (2006: 23): “total expenditures on IT (all computers, software, data communications, and people dedicated to providing IT services), including both internal and outsourced expenditures”.

The Portuguese IUTIC survey provides us that data into two separate variables:

- **IT<sub>Assets</sub>**= All expenses in computers, software, and data communications dedicated to providing IT services;
- **IT<sub>HR</sub>**= Human Resources expenditure related to computers, software, and data communications dedicated to providing IT services;

The IS/IT investment variable will be the sum of both items.

In the model we divided these variables by total sales, in line with Aral & Weill (2006), with the aim of control for the relative production size of firms.

To assess the contribution of “stakeholder orientation” of the firm, a **moderate variable** (dummy) was introduced in the model. Field research was conducted to identify corporate strategy practices of companies to evaluate their stakeholder orientation, using Business Council for Sustainable Development Portugal (BCSD Portugal), Corporate Social Responsibility Portugal (RSE Portugal) and GRACE Portugal (Group of Reflection and Support to Corporate Citizenship) member lists. All those non-profit organizations’ mission is to develop CSR among Portuguese companies. Firms listed in these public lists were considered as having stakeholder orientation.

As **control variables**, two firm level variables were introduced to control for their effects on performance, advertising expenditures and firm size (Aral & Weill, 2006). According Montgomery & Wernerfelt (1988), advertising expenditures are positively related to firm performance. Firm size will be controlled by the natural logarithm (ln) of the n<sup>o</sup> of employees and advertising expenditures will be operationalized as ratio that expenses to sales, to control for the relative production size of firms (Aral & Weill, 2006). Also we will introduce p-1 control variables for the different sectors present in the sample (p=number of sectors).

At last, the model is introduced as follows (in line with Aral & Weill (2007) :

$$FP_i = \beta_0 + \beta_1 \left( \frac{Total\ IT}{Sales}_i \right) + \beta_2 STO_i + \beta_3 STO_i \left( \frac{Total\ IT}{Sales}_i \right) + \beta_4 \ln(NPS_i) \quad (1)$$

$$+ \beta_5 \left( \frac{Advertising}{Sales}_i \right) + \beta_{ij} Sector_{ij} + \varepsilon_i,$$

where :

*FP* – financial performance (ROA, ROE, ROI, ROS)

*ROA* – return on assets

*ROE* – return on equity

*ROI* – return on investment

*ROS* – return on sales

*Total<sub>IT</sub>* - total IS/IT investments (euros)

*Sales* – turnover (euros)

*STO* – dummy variable "stakeholder orientation"

*NPS* – workforce (number of employees)

*Advertising* - Advertising expenses (euros).

The signal of the coefficient  $\beta_1$  will reveal us if IT impact (directly) on financial performance. The coefficient  $\beta_3$  aims to measure the impact of the moderating effect of 'stakeholder orientation' on the relationship between spending on IS / IT and business performance.

According Aral & Weill (2007) the variable Total IT can be divided into two distinct components, namely  $TI_{Assets}$  and  $TI_{HumRes}$ :

$$FP_i = \beta_0 + \beta_1 \left( \frac{TI_{Assets}}{Sales}_i \right) + \beta_2 \left( \frac{TI_{HumRes}}{Sales}_i \right) + \beta_3 STO_i + \beta_4 \left( \frac{TI_{Assets}}{VN}_i \right) STO_i \quad (2)$$

$$+ \beta_5 \left( \frac{TI_{HumRes}}{Sales}_i \right) STO_i + \beta_6 \ln(NPS_i) + \beta_7 \left( \frac{Advertising}{Sales}_i \right) + \beta_{ij} Sector_{ij} + \varepsilon_i,$$

where :

*FP* – financial performance (ROA, ROE, ROI, ROS)

*ROA* – return on assets

*ROE* – return on equity

*ROI* – return on investment

*ROS* – return on sales

*TI<sub>Assets</sub>* - total IS/IT assets expenditure (euros)

*TI<sub>HumRes</sub>* - total IS/IT human resources expenditure (euros)

*Sales* – turnover (euros)

*STO* – dummy variable "stakeholder orientation"

*NPS* – workforce (number of employees)

*Advertising* - Advertising expenses (euros).

The  $\beta_4$  and  $\beta_5$  coefficients are intended to assess the impact of the moderator effect of 'stakeholder orientation' in the relationship between IS / IT expenditure and business performance. If the signal of those parameters is positive it means that stakeholder orientation does impact positively on firm performance.

The models presented were estimated by the method of the ordinary least squares (OLS). The Gauss-Markov base assumptions of this research methodology were subject to analysis. The following assumptions were analysed:

- absence of autocorrelation of the residuals, analysis carried out by the Ljung-Box test;
- homogeneous variance analysis through the White and ARCH tests;
- the normality of the residuals analysed by Jarque-Bera test.

Multicollinearity was also the subject of study by analysing the correlation map between variables.

## 5. Results and discussion

In a global manner all presented results are related to models that have statistical significance, the Gauss-Markov assumptions were mostly respected. Cumulatively, and given the sample size, the central limit theorem ensures the validity of the assumption concerning the normality of the distribution of residuals.

The equations (1) and (2) were estimated, the first of which uses as an independent variable the total spending amount in IS/IT, and the second allocating these expenses between "IS/IT assets" and expenditures associated human resources to IS/IT.

For each equation were run 5 multiple regressions by the method of least squares, as many as the variables that are used to measure the financial performance of the company (ROE, ROA, ROI, net ROS and operational ROS).

Total spending on IS/IT revealed a negative impact on financial performance, when measured by return on assets (ROA) and return on sales (ROS). When it breaks down spending on IS/IT, it appears that spending on IS/IT assets continue to have a negative relationship with the ROA and ROS, however the impact on the return on investment (ROI) is positive.

We also noted that the variable stakeholder orientation' (STO) moderates the relationship between IS/IT investment and performance, and in the case of ROA and ROS, the working hypothesis is validated, *i.e.*, business strategies oriented to the satisfaction of all stakeholders of the company have a positive impact on the relationship between investments in IS/IT and financial performance.

**Table 1:** Impact of IS/IT and the 'stakeholder orientation' on firm financial performance

Equation	Variables	ROE	ROA	ROI		ROS (Net)	ROS (Oper.)
(1)	Total IT	Model NS	(-0,406769) ***	Model NS		(-2,778275) ***	(-2,887860) ***
	'STO'		(+2,291474) *			NS	NS
	IT*'STO'		NS			NS	NS
(2)	IT <sub>Assets</sub>	Model NS	(-2,334092) ***	(+17,50720) ***		(-10,74144) ***	(-14,13466) ***
	IT <sub>HumRes</sub>		NS	NS		NS	NS
	'STO'		NS	NS		NS	NS
	IT <sub>Assets</sub> *'STO'		(+1,565496) ***	(-20,41318) ***		(+4,430268) *	(+11,01206) ***
	IT <sub>HumRes</sub> *'STO'		NS	NS		NS	(-3,098337) ***

\*\*\* (99%); \*\* (95%); \* (90%); Model NS: Model without statistical significance; NS: The variable is not statistically significant.

Finally, we introduced a one year lag in the equations according IS literature (for. ex. Brynjolfsson 1992) in order to obtain more robust results.

$$FP_{(n+1)i} = \beta_0 + \beta_1 \left( \frac{Total\ IT_{(n)}}{Sales_i} \right) + \beta_2 STO_i + \beta_3 STO_i \left( \frac{Total\ IT_{(n)}}{Sales_i} \right) + \beta_4 \ln(NPS_i) + \beta_5 \left( \frac{Advertising_{(n)}}{Sales_i} \right) + \beta_6 FP_{(n)i} + \beta_{ij} Sector_{ij} + \epsilon_i, \tag{3}$$

$$PF_{(n+1)i} = \beta_0 + \beta_1 \left( \frac{IT_{Assets(n)}}{Sales_i} \right) + \beta_2 \left( \frac{IT_{HumRes(n)}}{Sales_i} \right) + \beta_3 STO_i + \beta_4 \left( \frac{IT_{Assets(n)}}{VN_i} \right) STO_i + \beta_5 \left( \frac{IT_{HumRes(n)}}{Sales_i} \right) STO_i + \beta_6 \ln(NPS_i) + \beta_7 \left( \frac{Advertising}{Sales_i} \right) + \beta_8 FP_{(n)i} + \beta_{ij} Sector_{ij} + \epsilon_i, \tag{4}$$

The equations (3) and (4) were estimated, the first of which uses as an independent variable the total spending amount in IS/IT, and the second allocating these expenses between "IS/IT assets" and expenditures associated human resources to IS/IT.

For each equation were run 5 multiple regression by the method of least squares, as many as the variables that are used to measure the financial performance of the company (ROE, ROA, ROI, net ROS and operational ROS).

In fact, the model that incorporates a "lag" of one year presents more robust results, which corroborates the thesis that there is an organizational learning process to obtain the benefits from this type of investment, that the IS/IT must be properly used, or that IS/IT expenditure must be converted into assets to generate value.

Total spending on IS/IT showed a negative impact on financial performance, when it is measured by return on assets (ROA) and return on sales (ROS).

When spending on IS/IT is divided, it appears that spending on IS/IT assets continue to have a negative relationship with ROA and ROS, and on the return on investment (ROI).

We also noted that the variable 'stakeholder orientation' (STO) moderates the relationship between IS/IT investment, and in the case of ROA, ROI, and ROS, the working hypothesis is validated, *i.e.*, the corporate governance model proposed by 'Stakeholder Theory' reveals a positive impact on the relationship between investments in IS/IT and financial performance.

**Table 2:** Impact of IS/IT and the 'stakeholder orientation' on firm financial performance (one year lag model)

Equation	Variables	ROE	ROA	ROI	ROS (Net)	ROS (Oper.)
(3)	Total IT	NS	(-0,432530) ***	NS	(-2,286900) ***	(-1,390535) ***
	'STO'	NS	NS	NS	NS	NS
	IT*'STO'	(-13,59512)***	NS	NS	(+1,728581) ***	(+1,774911)***
(4)	IT <sub>Assets</sub>	NS	(-1,738030) ***	(-17,60251)***	(-12,46772) ***	(-5.342395) ***
	IT <sub>HumRes</sub>	NS	NS	NS	NS	(-0.797944)***
	'STO'	NS	NS	NS	NS	NS
	IT <sub>Assets</sub> *'STO'	(-38,05000)***	(+1,271225) *	(+14,06506) *	(+10,41254) ***	(+5.807227)***
	IT <sub>HumRes</sub> *'STO'	NS	NS	NS	NS	NS

\*\*\* (99%); \*\* (95%); \* (90%); Model NS: Model without statistical significance; NS: The variable is not statistically significant.

## 6. Conclusions

The impact of information systems/information technologies (IS/IT) investments on firm financial performance continues to be a source of heated discussion and debate.

This paper aims to discuss and test the use of stakeholder theory in the IS business value stream of research, in order to achieve a better understanding of the impact of IS/IT investments on firm performance (moderated by stakeholder management).

We found a negative direct relation between IT expenditure and financial performance.

Our results are consistent with the conclusions researched by others IS business value researchers, namely those who rise the problem of the "productivity paradox".

It can also be true that the stock of IS/IT capital of the Portuguese companies is not enough to produce positive impacts, they may be in the learning adjustment process.

Also Portuguese managers could not be investing in complementary organizational investments to get better results from there IS/IT investments.

To achieve the expected impact from an IS/IT investment, it is argued that firms need a strong commitment from these stakeholder groups, which lead us to the need of a “stakeholder orientation”.

When firm financial performance is measured by returns on assets (ROA), returns on investments (ROI) and returns on sales (ROS), the results show that “stakeholder orientation” impact positively in the relation between IS/IT and firm performance, using a sample of Portuguese large companies.

Our main research questions were (1) to find out if IS/IT investments impacts on business performance were most successful in the group of firms with corporate strategies with a recognized “stakeholder orientation”, and (2) if there is a link between the firm’s corporate social responsibility (CSR) and the impact of IS/IT on firm performance.

Our results show that, for that sample of companies, “stakeholder orientation” and CSR indeed makes the difference. We believe and demonstrate that Stakeholder Theory is a good one to better understand the phenomena under study.

One of the major limitations of this work is related with the chosen model (a linear one) albeit this is a common method used in the literature.

In future work we aim to test the adequacy of non-linear models in the study of IS/IT impacts on firm performance.

The concept of “stakeholder orientation” needs also further elaboration. Based on the Global Reporting Initiative (GRI) guidelines to firm sustainable reporting and borrowing research methodologies from accounting it will be possible to move from an dichotomic variable (dummy) to another one that better express the commitment of corporate strategies to stakeholders.

## References

- Al-Mudimigh A, Zairi M, and Al-Mashari M. (2001) “ERP software implementation: an integrative framework”. *European Journal of Information Systems*, Vol 10, pp 216-226.
- Bakos, J. (1987) “Dependent variables for the study of firm and industry-level impacts of information technology”, In *Proceedings of the 8<sup>th</sup> International Conference on Information Systems*, Pittsburgh.
- Ballantine J and Stray S. (1999) “Information systems and other capital investments: evaluation practices compared”, *Logistics Information Management*, Vol 12, No.1, pp 78-93.
- Barney, J. (1991) “Firm resources and sustainable competitive advantage”, *Journal of Management*, Vol 17, No.1, pp 99-120.
- Bender, D. (1986) “Financial Impact of Information Processing”, *Journal of Management Information Systems*, Vol 3 No.2.
- Berman, S.; Kotha, S. and Jones, T. (1999) “Does Stakeholder Orientation Matter? The Relationship between Stakeholder Management Models and Firm Financial Performance”, *Academy of Management Journal*, Vol 42, No.5, pp 488-506.
- Bharadwaj, A. (2000) “A resource-based perspective on information technology capability and firm performance: An empirical investigation”, *MIS Quarterly*, Vol 24, No.1, pp 169-196.
- Breshnihan, T. (1986) “Measuring Spillovers from Technical Advance: Mainframe Computers in Financial Services”, *American Economic Review*, Vol 76, No.4, pp 742-755.
- Brown R, Gatian A and Hicks J. (1995) “Strategic information systems and financial performance”, *Journal of Management Information Systems*, Vol 11, No.4, pp 215-249.
- Brynjolfsson, E. (1992) “The Productivity Paradox of Information Technology: Review and Assessment”, MIT Sloan School of Management Working Paper.
- Brynjolfsson E and Hitt L (1998), “Beyond the productivity paradox”, *Communications of the ACM*, Vol 41, No.8, pp 49-55.
- Brynjolfsson, E. and Yang, S. (1996) “Information Technology and Productivity: A Review of the Literature”, [online], MIT, <http://ccs.mit.edu/papers/CCSWP202.html>.
- Caldeira, M. (1998) “Understanding the adoption and use of information systems / information technology in small and medium-sized manufacturing enterprises: a study in Portuguese industry”, unpublished PhD. thesis, Cranfield University.
- Caldeira, M. and Ward, J. (2003) “Using resource-based theory to interpret the successful adoption and use of information systems and technology in manufacturing small and medium-sized enterprises”, *European Journal of Information Systems*, Vol 12, pp 127-141.
- Coase, R. (1937) “The nature of the firm”, *Economica*, Vol. 4, No.16, pp386-405.
- Conner, K. (1991) “A historical comparison of resource-based theory and five schools of thought within industrial organization economics: do we have a new theory of the firm?”, *Journal of Management*, Vol 17, No.1, pp 121-154.

- Conner, K. and Prahalad (1996) "A resource-based theory of the firm: Knowledge versus opportunism", *Organization Science*, Vol. 7, No.5, pp 477-501.
- Cron, W. and Sobol, M. (1983) "The Relationship between Computerization and Performance: A Strategy for Maximizing the Economic Benefits of Computerization", *Information & Management*, Vol 6, No.3, pp171-181.
- Crowston, K. and Treacy, M. (1986) "Assessing the Impact of Information Technology on Enterprise Level Performance", Sloan School of Management Working Paper N.1835.
- Dasgupta S, Sarkis J. and Talluri S. (1999). "Influence of information technology investment on firm productivity: a cross-sectional study", *Logistics Information Management*, Vol 12, No.1, pp 120-129.
- Demsetz, H. (1988) "The theory of the firm revisited", *Journal of Law, Economics, and Organization*, Vol 4, No.1, pp 141-161.
- Donaldson T and Preston L. (1995) "The stakeholder theory of the corporation: Evidence and implications", *The Academy of Management Review*, Vol 20, No.1, pp 65-91.
- Earl M. 1989 "Management Strategies for Information technology". Prentice-Hall, Englewood Cliffs, New Jersey.
- Farbey B, Land F and Targett D. (1999) "Moving IS evaluation forward: learning themes and research issues", *Journal of Strategic Information Systems*, Vol 8, pp 189-207.
- Francalanci C and Galal H. (1998) "Aligning IT investments and workforce composition: the impact of diversification in life insurance companies", *European Journal of information Systems*, Vol 7, pp 175-184.
- Freeman R. (1984) "Strategic management: A stakeholder approach", Pitman/Ballinger, Boston.
- Grover, V.; Teng, J. and Cheon, M. (1998) "Towards a theoretically-based contingency model of information systems outsourcing", in *Strategic Sourcing of Information Systems*, L. Willcocks and M. Lacity (Eds), Wiley, Chichester, pp 79-101.
- Harris S E and Katz J L. (1989) "Predicting organizational performance using information technology managerial control ratios", In *Proceedings of the Twenty-Second Annual Hawaii International Conference on System Sciences*, Computer Society Press, Los Alamitas, CA: 197.
- Hitt L, Wu D and Zhou X. (2002) "Investment in Enterprise resource Planning: Business impact and productivity measures", *Journal of Management Information Systems*, Vol 19 (1), pp 71-98.
- Jones T. (1995), "Instrumental stakeholder theory: A synthesis of ethics and economics", *The Academy of Management Review*, Vol 20, No.2, pp 404-437.
- Kauffman R and Weill P. (1989) "An evaluative framework for research on the performance effects of information technology investment", In *Proceedings of the 10<sup>th</sup> International Conference on Information Systems*, J. I. DeGross, J. C. Henderson, and B. R. Konsynski (Eds), Boston, pp 377-388.
- Kivijärvi H and Saarinen T. (1995) "Investment in information systems and the financial performance of the firm", *Information & Management*, Vol 28, pp 143-163.
- Lee J and Bose U. (2002) "Operational linkage between diverse dimensions of information technology investments and multifaceted aspects of a firm's economic performance", *Journal of Information Technology*, Vol 17, pp 119-131.
- Love P.E.D and Irani Z. (2004) "An exploratory study of information technology evaluation and benefits management practices of SMEs in the construction industry", *Information & Management*, Vol 42, pp 227-242.
- Lucas, H. (1975) "The use of an accounting information system, action and organizational performance", *The Accounting Review*, October, pp 735-746.
- Mata, F.; Fuerst, W. and Barney, J. (1995) "Information technology and sustained competitive advantage: A resource-based analysis", *MIS Quarterly*, Vol 19, No.4, pp 487-505.
- McFarlan F.W. (1984) "Information technology changes the way you compete", *Harvard Business Review*, Vol 62, No.3, pp 98-103.
- Osey-Bryson K and Ko M. (2004) "Exploring the relationship between information technology investments and firm performance using regression splines analysis", *Information & Management*, Vol 42, pp 1-13.
- PIMS Program (1984) "management productivity and information technology", The Strategic Planning Institute, Cambridge, Massachusetts.
- Porter M and Millar V.E. (1985) "How information gives you competitive advantage", *Harvard Business Review*, Vol 63, No.4, pp 149-160.
- Prahalad, C. and Hamel, G. (1990) "The core competence of the corporation", *Harvard Business Review*, May-June, pp 79-91.
- Remenyi D. (1999) "The elusive nature of delivering benefits from IT", *Electronic Journal of Information Systems Evaluation*, Vol 3, No.1.
- Rindfleisch, A. and Heide, J. (1997) "Transaction cost analysis: Past, present and future applications", *Journal of Marketing*, Vol 61, No.4, pp 30-54.
- Roach, S. (1987) "Technology and the Services Sector: America's Hidden Competitive Challenge", *Economic Perspectives*, Morgan Stanley.
- Ryan S and Gates M. (2004), "Inclusion of Social Subsystem Issues in IT investment decisions: An empirical assessment", *Information Resources Management Journal*, Vol 17, No.1.
- Santhanam, R. and Hartono, E. (2003) "Issues in Linking Information Technology capability to firm performance", *MIS Quarterly*, Vol 27, No.1, pp 125-153.
- Shin N. (2001) "The impact of information technology on financial performance: the importance of strategic choice", *European Journal of Information Systems*, Vol 10, pp 227-236.

- Simon, H. (1991) "Organizations and markets", *Journal of Economic Perspectives*, Vol 5, No.2, pp25-44.
- Solow, R. (1987), "We'd Better Watch Out," *New York Times Book Review*, 12 July.
- Stickney, C. (1990): "Financial Statement Analysis: A Strategic Perspective", Harcourt Brace Jovanovich, São Diego, USA.
- Strassman P. (1997), "The squandered computer". Information Economics Press, New Canaan.
- Ward J and Peppard J. (2002), "Strategic Planning for Information Systems". 3rd Edition, John Willey & Sons, Chichester.
- Willcocks L. (1992), "IT Evaluation: Managing the Catch 22", *European Management Journal*, Vol 10, No.2, pp 220-229.
- Willcocks, L. and Lacity, M. (1998) "The sourcing and outsourcing of IS: Shock of the new?", in *Strategic Sourcing of Information Systems*, L. Willcocks and M. Lacity (Eds), Wiley, Chichester, pp 1-41.
- Willcocks L and Lester S. (1999), "Beyond The IT Productivity Paradox", *Wiley Series on Information Systems*, Wiley, Chichester.
- Williamson, O. (1975) "Markets and hierarchies: Analysis and antitrust implications", *The Free Press*, New York.
- Williamson, O. (1979) "Transaction-cost economics: The governance of contractual relations", *The Journal of Law and Economics*, Vol 22, pp 233-261.
- Williamson, O. (1985) "The economic institutions of capitalism: Firms, markets, relational contracting", *The Free Press*, New York.
- Williamson, O. (1996) "The mechanisms of Governance", *Oxford University Press*, New York.