USING RESOURCE-BASED THEORY TO INTERPRET THE SUCCESSFUL ADOPTION AND USE OF INFORMATION SYSTEMS & TECHNOLOGY IN MANUFACTURING SMALL AND MEDIUM SIZED ENTERPRISES

Mário M. Caldeira

ISEG (Portugal), Rua Miguel Lupi 20, 1249-078 Lisboa – Portugal
Tel.: +351 21 3925956
caldeira@iseg.utl.pt

John M. Ward

Cranfield University, School of Management (UK), Cranfield, Bedford, MK43 OAL, UK
Tel.: +44 1234 751122, Fax: +44 1234 751806
j.m.ward@cranfield.ac.uk

ABSTRACT

The purpose of this paper is to consider how resource-based theory can be used to explain success with the adoption and use of information systems and information technology (IS/IT) in manufacturing Small and Medium-sized Enterprises (SMEs). A number of authors have explored the applicability of resource-based theory to the IS/IT domain, mainly at a conceptual level. Overall they infer that the key differentiators for long term successful IS/IT deployment reside within the internal context of an organisation, based on organisational competences. This paper is based on in-depth case study research in twelve Portuguese manufacturing SMEs. With the objective of trying to understand why and how these factors caused the different success levels of IS/IT adoption identified, the findings were analysed from the perspective of resource-based theory. The analysis of the data suggested that certain combinations of factors, also primarily associated with the internal context, were the determinants of the different levels of success in IS/IT adoption and use.

1.   INTRODUCTION

The globalisation of the economy is forcing many enterprises to change in order to survive. To compete in these global markets, many manufacturing SMEs need to develop new business strategies and employ new technologies. However, manufacturing SMEs in traditional industries, usually have poor human and financial resources (Bridge *et al.*, 1998; Welsh and White, 1981) and are therefore likely to be less prepared and less able to change. A better understanding of the ways in which SMEs adopt and implement new technologies, like information technology (IT), is necessary because previous research in the area is limited and mostly out-of-date due to the rapidly changing costs of using IT, and the resulting increased adoption by smaller enterprises.

The Portuguese industry is dominated by small and medium sized enterprises (98% of the total firms in the industrial sector). Because of their lack of bargaining power, scarce resources and low management skills, Portuguese manufacturing SMEs have been deeply affected by the increasing globalisation of the world economy. This research was designed to provide an in-depth understanding and explanation of the relative levels of success in IS/IT adoption and use, in such firms. Through detailed case studies in twelve firms, factors and factor relationships were determined that provided a coherent explanation of the evidence collected. A second objective of the research was to provide further understanding of the causes of the relative levels of adoption and success, by reference to appropriate theory. IS research is often criticised for lacking theoretical foundations or for insufficient reference to theory in explanations of findings. This paper describes how the findings from the study can be understood with reference to resource-based theory.

2. THE PRINCIPLES OF RESOURCE-BASED THEORY

Resource-based theory has been developed to understand how organisations achieve sustainable competitive advantages. The theory focuses on the idea of costly-to-copy attributes of the firm as sources of business returns and the means to achieve superior performance and competitive advantage (Barney, 1986; Conner, 1991; Hamel and Prahalad, 1996). A firm can be understood as a collection of physical capital resources, human capital resources and organisational resources (Barney, 1991). Resources that cannot be easily purchased, that require an extended learning process or a change in the corporate culture, are more likely to be unique to the enterprise and, therefore, more difficult to imitate by competitors. It is argued that performance differentials between firms depend on having a set of unique inputs and capabilities (Conner, 1991). According to resource-based theory, 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).

Barney (1991) argues that in order to provide competitive advantage a resource must fulfil four criteria:

1. Valuable: the resource must have strategic value to the firm (for example, by exploiting opportunities or neutralising threats);

2. Rare: the resource must be unique or rare to find amongst the current and potential competitors of the firm;

3. Imperfect imitability: It must not be possible to perfectly imitate or copy the resource (because it is difficult to acquire; because the link between the capability or the achieved sustained competitive advantage is ambiguous; or because it is socially complex);

4. Non-substitutability: competitors cannot substitute the resource by another alternative resource to achieve the same results.

As Grover et al. (1998) explain, "the essence of a resource-based theory is that given resource heterogeneity and resource immobility and satisfaction of the requirement of value, rareness, imperfect immitability, and non substitutability, firms' resources can be a source of sustained competitive advantage" (p.84). Resource-based theory treats enterprises as potential creators of value-added capabilities. Understanding the development of such capabilities and competences involves viewing the assets and resources of the firm from a knowledge-based perspective (Conner and Prahalad, 1996; Prahalad and Hamel, 1990). Prahalad and Hamel (1990) concentrate their attention on the collective learning processes of the organisation, on the development of skills and technology integration. Their concept of "core competences" is related to mechanisms by which firms learn and accumulate new skills in order to develop business capabilities to out-perform competitors. One of the objectives of the theory is to help managers to appreciate why competences 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. A resource-based view of the firm accepts that attributes related to past experiences, organisational culture and competences are critical for the success of the firm (Campbell and Luchs, 1997; Hamel and Prahalad, 1996). Conner (1991: p.140) suggests that "an in-house team is likely to produce technical knowledge, skill, or routine that fits better with the firm's current activities".

Mata *et al.*(1995) in a conceptual study looking at five attributes of IT (customer switching costs, access to capital, proprietary technology, technical IT skills and managerial IT skills) concluded that managerial IT skills are the only one of these attributes that can provide sustainable advantage. According to these researchers managerial IT skills include:

1. the ability of IT managers to understand and appreciate the business needs of other functional managers, suppliers and customers;

2. the ability to work with these functional managers, suppliers and customers to develop appropriate IT applications;

3. the ability to co-ordinate IT activities in ways that support other functional managers, suppliers, and customers;

4. the ability to anticipate the future IT needs of functional managers, suppliers and customers.

Other literature emphasises the importance of leadership and the relationship between the role of the CEO in relation to IS/IT (Earl and Feeny, 1994; Peppard and Ward, 1999). Feeny and Willcocks (1998a: p.20) state that "core IS capabilities are those necessary and sufficient to ensure that an organisation can exploit changing markets of technological services – to achieve business advantage through IT over time". These researchers identified nine core IS/IT capabilities: IS/IT leadership; business systems thinking; relationship building; architecture planning; making technology work; informed buying; contract facilitation; contract monitoring and vendor development (Feeny and Willcocks, 1998a and 1998b).

3. OVERVIEW OF THE RESEARCH METHOD

Given the objectives of this research it was important to define a legitimate measure of 'success' that could clearly and unambiguously differentiate a number of levels of success in the cases studies. However, it is difficult to evaluate objectively IS/IT success (Ives *et al.*, 1983; Ives and Olson, 1984, Weill and Baroudi, 1990) and two variables are more commonly used as surrogate measures of IS/IT success. Those variables are: level of computer utilisation and user information satisfaction (UIS) (usually CEO's information satisfaction) (Baroudi *et al.*, 1986; DeLone, 1988; DeLone and McLean, 1992; Montazemi, 1988; Melone, 1990; Raymond, 1985). According to DeLone and McLean (1992: p.69), "user satisfaction or user information satisfaction is probably the most widely used single measure of IS success". This is due to the fact that "satisfaction" has a high degree of "face validity", since it may be hard to classify as not successful a system that users say they like. The usefulness of user information satisfaction is higher when compared to the conceptual weaknesses of most other potential measures of IS/IT success.

The criteria used to interpret the data gathered in the fieldwork and cluster the firms according to their relative level of success with IS/IT adoption and use are essentially based on three issues: the level of user information satisfaction expressed by the interviewees; problems and potential solutions identified by the interviewees related to IS/IT adoption and use; and the contribution of IS/IT to the business perceived by the interviewees. Similar criteria to evaluate IS/IT success can be found in the IS/IT literature (Earl, 1990, 1993; McGolpin and Ward, 1997).

User information satisfaction is clearly a subjective concept and may be interpreted differently by the different key actors. In reality there was generally little disagreement amongst interviewees regarding IS/IT success in each firm in this study, across these three issues.

A framework, based on the work of Pettigrew *et al.* (1989), was used to classify factors associated with IS/IT adoption and success from previous research and analyse the data from the fieldwork (see figure 1). The *external context* includes the knowledge available in the market plus the business and technological environment that, although external to the firm, influences IS/IT adoption and use. The *internal context* includes the set of resources, competences, management perspectives and internal politics that are inherent to the organisation. *Content* refers to the type of IS/IT implemented, IS/IT objectives, assumptions, evaluation and time of adoption. *Process* is defined as a set of actions that lead to IS/IT adoption and use in

organisations. It relates to the models, techniques, frameworks and time of IS/IT adoption, along with the stages of IS/IT development in the firm (IS/IT planning and evaluation, IS/IT construction/acquisition, implementation and benefits management).

Based on the review of the results of previous studies, it was clear that in order to understand the successful adoption and use of IS/IT in manufacturing SMEs, it would be necessary to understand relationships amongst factors within and across the dimensions of *internal context*, *external context*, *process* and *content*.
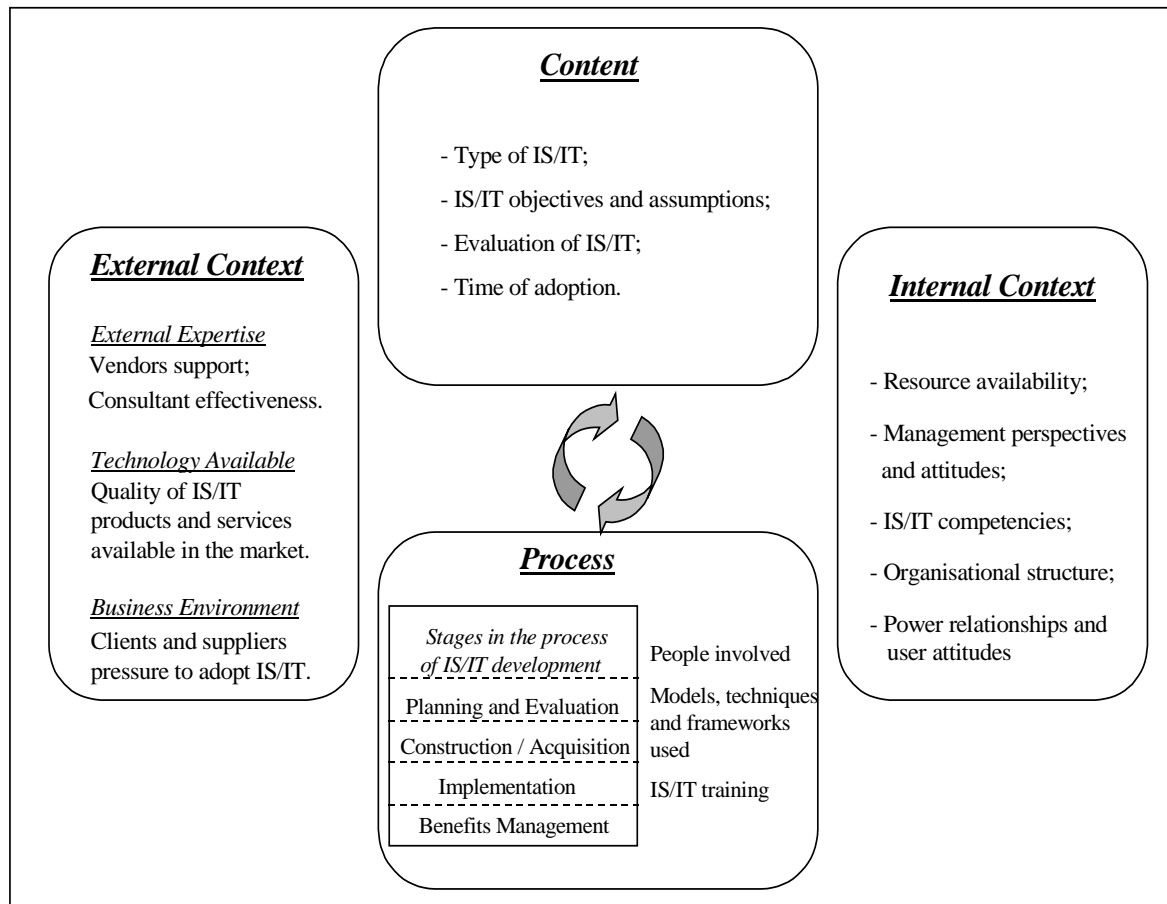

Figure 1: The initial framework for analysis of IS/IT in SMEs.
Source: Compiled by the authors, based on Pettigrew at al. (1989).

Twelve enterprises in several manufacturing industries were selected for in-depth case study research: footwear (2 firms), textiles (2), clothing (3), cement pipes (1), wine producers (2) and mould makers (2). The firms chosen were expected to cover different levels of IS/IT success and adoption. The enterprises studied have between 58 and 450 people and annual turnover between 4 to 20 million pounds. The enterprises involved in the case study research may not represent the general situation of the Portuguese SMEs. The sample was selected on the basis of studying firms that could be deemed successful or unsuccessful with IS/IT adoption and use. The sample does not enable any type of statistical generalisation to be made for Portuguese industry.

Semi-structured interviews with 68 questions/topics based on the framework shown in Figure 1 were the main research method used. Semi-structured interviews are able to generate rich data that allow an understanding of the research topic according to the perspectives of the key actors involved (CEOs, owners, IS/IT managers, senior managers, IS/IT experts, IS/IT vendors, IS/IT consultants). This method of data collection was complemented by an analysis of the documents provided by the firm and a short questionnaire to confirm the level of IS/IT success perceived in the interviews. Between three and five interviews were

conducted in each firm, always including the owner/CEO, senior IT person and one or more operational managers.

The data were coded and analysed by the use of a software package for qualitative data analysis – *NUD*IST*. This software helped to structure the data, according to the dimensions suggested by the research framework. The structure of the framework was introduced in the index system of the software package.

4. SUMMARY OF THE ANALYSIS OF CASE STUDIES IN TERMS OF ADOPTION AND RELATIVE SUCCESS

From the analysis four clusters (named A to D) emerged as clearly distinguishable, based on the combination of levels of management information satisfaction and the extent of IS/IT adoption and use (see Figure 2).
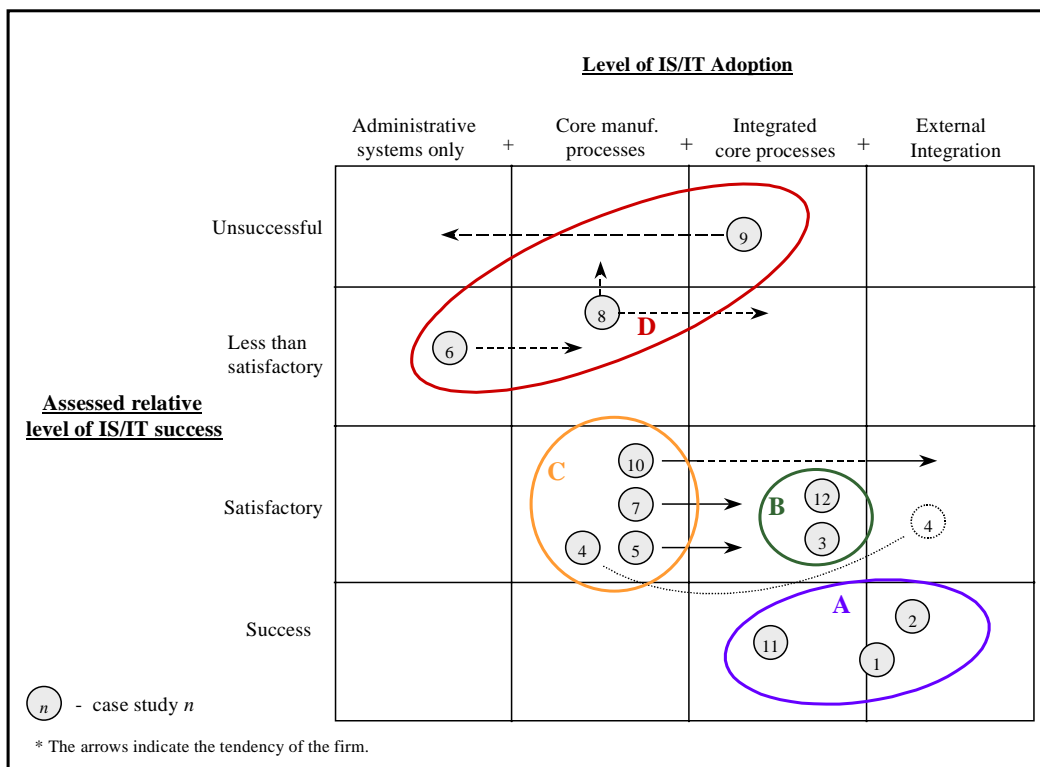

Figure 2: The clusters for analysis
Source: Caldeira (1998)

Three of the firms studied were classified in *cluster A*. In these firms managers interviewed stated that they were highly satisfied with the adoption and use of IS/IT in the enterprise. No actual significant problems were reported nor were better feasible solutions for IS/IT adoption and use identified by the interviewees. The interviewees also stated that significant business benefits were achieved by the use of IS/IT. All the firms in *cluster A* have their core processes integrated by the use of IS/IT and two have interorganisational information systems with their major customers (external integration).

The firms in *cluster B* presented lower levels of management satisfaction with IS/IT adoption and use. Although the interviewees were positively satisfied with IS/IT adoption and use in the firm, some problems still exist or better ways of using IS/IT were identified. The two firms in this cluster have their core processes integrated by the use of IS/IT and interviewees could describe specific business benefits that were achieved by the use of IS/IT.

In the firms in *cluster C* managers have similar levels of satisfaction to the ones in *cluster B* (the level of satisfaction with IS/IT was scored 3 or 4) but their level of IS/IT adoption was lower. The firms in *cluster C* do not have their core administrative and manufacturing processes integrated.

Firms were classified in *cluster D* when all or almost all of the interviewees were not satisfied with the level of information provided by IS/IT or deep problems with IS/IT adoption and use were reported, without identifying any feasible solutions to these problems in the short/medium term. IS/IT was also perceived as making little, if any, contribution to business performance. The level of IS/IT adoption of these firms varies. One enterprise has only administrative systems, one has its core administrative and manufacturing processes computerised and one achieved a stage of integration between core administrative and manufacturing processes.

5.   FINDINGS FROM THE CASE STUDIES

The analysis of the data, using NUD*IST, identified fifteen factors which appeared to influence the levels of IS/IT adoption and success in the cases studied. From these factors two were classified as *determinant factors* (see below). The others were denominated s*econdary factors* since they are important for IS/IT adoption and use but are not critical to achieving IS/IT success.

The *secondary* factors include:

- Availability of financial resources in the firm;

- Users' qualifications;

- Quality of the software available in the market;

- Quality of IS/IT external expertise and services available;

- Type of IS/IT to be implemented;

- Definition of IS/IT objectives;

- The time of IS/IT adoption.

- User attitudes;

- Power relationships between the members of the firm;

- IS/IT vendors' support;

- Business pressure to adopt IS/IT;

- Availability of IS/IT training;

- Profile of the people involved in the process of IS/IT development;For example, user attitudes were only a problem in the firms where top managers were not exerting pressure on employees to use computer systems properly. In the firms where top managers were involved, problems of resistance to change were not an issue.

Determinant factors are those that appear to explain relative IS/IT success. Data collected in the fieldwork provided evidence that these factors actually determine why some firms are more successful than others with IS/IT adoption and use. These are:

- IS/IT competences (IS/IT people and knowledge available);

- Management perspectives and attitudes towards IS/IT adoption and use.

The attributes of these two determinant factors clearly distinguished and explained the relative success of IS/IT adoption in the firms studied. This research provided evidence that the development of internal IS/IT skills combined with top management support towards IS/IT adoption is the base to provide superior levels of satisfaction with IS/IT adoption and use in manufacturing SMEs.

For example, the development of IS/IT skills in-house is limited by the difficulty of hiring qualified IS/IT experts. The firms that were less successful adopting and using IS/IT put more emphasis on the perceived quality of the software systems they were buying, than in the need to develop IS/IT competences in-house. On the contrary, the more successful firms concentrated on acquiring expert help to develop in-house knowledge, in order to be prepared to build, buy, or contract out computer solutions to meet their business requirements.

6. INTERPRETING THE FINDINGS – A RESOURCE-BASED THEORY PERSPECTIVE

Mata *et al*. (1995) explain that IS/IT managerial skills are a source of competitive advantage because these are socially complex, involving friendship, trust, and interpersonal relationships between senior management and IS/IT managers. Because of that, IS/IT managerial skills need long periods of time to develop, through experience and learning. Furthermore, managerial IS/IT skills are heterogeneously distributed across firms, valuable, and because of their social complexity they are not subject to low-cost imitation (Mata *et al*., 1995).

Unlike larger enterprises, in manufacturing SMEs even technical IS/IT skills can be a source of competitive advantage because SMEs usually have scarce financial resources and do not have the same ease of hiring qualified IS/IT experts. Moreover, it may be difficult to bring highly-qualified IS/IT experts to remote areas, far from major towns, (where many Portuguese manufacturing SMEs in traditional industries are located). Therefore, qualified IS/IT expertise is likely to be relatively rare amongst SMEs. Furthermore, since most top managers in traditional manufacturing SMEs do not have much IS/IT expertise they may not be able adequately to evaluate the profile of the IS/IT experts that they need to hire. In the fieldwork, it was found that in some of the firms that were less successful the person responsible for IS/IT (who was not an IS/IT expert) did not seem to realise the professional limitations of the IS/IT people of the firm.

In traditional manufacturing SMEs, the CEO and other top managers are frequently owners and entrepreneurs. Therefore, the CEO has the authority to influence other members of the business and he or she is likely to overcome any resistance to change (Markus, 1983; Thong *et al.*, 1996). Evidence from the study confirms that commitment from the top to the process of IS/IT adoption and use is extremely important for the success of the IS/IT project in SMEs. Where the CEO was not personally involved in IS/IT adoption, another senior manager with power in the organisation and whom the CEO/owners trust (sometimes a relative) was directly involved in leading the adoption process. In some of the most successful cases studied, the CEOs also had a clear vision about the strategic use of IS/IT in the business.

Table 1 provides an example from one of the firms in cluster A of how each of the four criteria for competitive advantage from resources (as per Barney (1991) were met.

In almost all the firms that were in clusters A, B and C, the top managers and the IS/IT managers/experts interviewed declared that they had, or were looking for, customised software systems which matched the core manufacturing processes of the enterprise.

Because these systems are a specific asset, critical for the firm, managers wanted a stable relationship with the IS/IT supplier and to avoid being dependent on an unreliable supplier or one whom they did not trust. The CEO of the mould making firm in table 1, when speaking about its process of software acquisition, illustrates this perspective by saying, "*we believed that when we would do business with a firm, we would be married for life, because of that we had to choose very carefully our partners*".

Resource Based Theory Criteria for Advantage	Evidence from the most successful SMEs – eg. Mould Manufacturer
1. Valuable	IS/IT applied to the core competitive processes of the business – integrated design & manufacture and customer trading activities.
2. Rare	Integration and customisation of a range of IS/IT products plus CEO vision to persuade customers (larger companies) to trade on-line.
3. Imperfect imitability	Personal relationships/partnerships with key IS/IT suppliers for mutual long term benefits. Provision of technology education and training service to the whole industry, in Portugal (inc. competitors), to ensure 'competent image' of industry to international customers, and avoid poaching of key staff!
4. Non-substitutability	Continuous, incremental innovation in partnership with IT suppliers to enhance the product/service offer.

Table 1: *Exemplifying the 4 key attributes of a resource for achieving competitive advantage*

Figure 3 attempts to to explain how, in the more successful SMEs, their distinctive business capability based on IS/IT has developed.
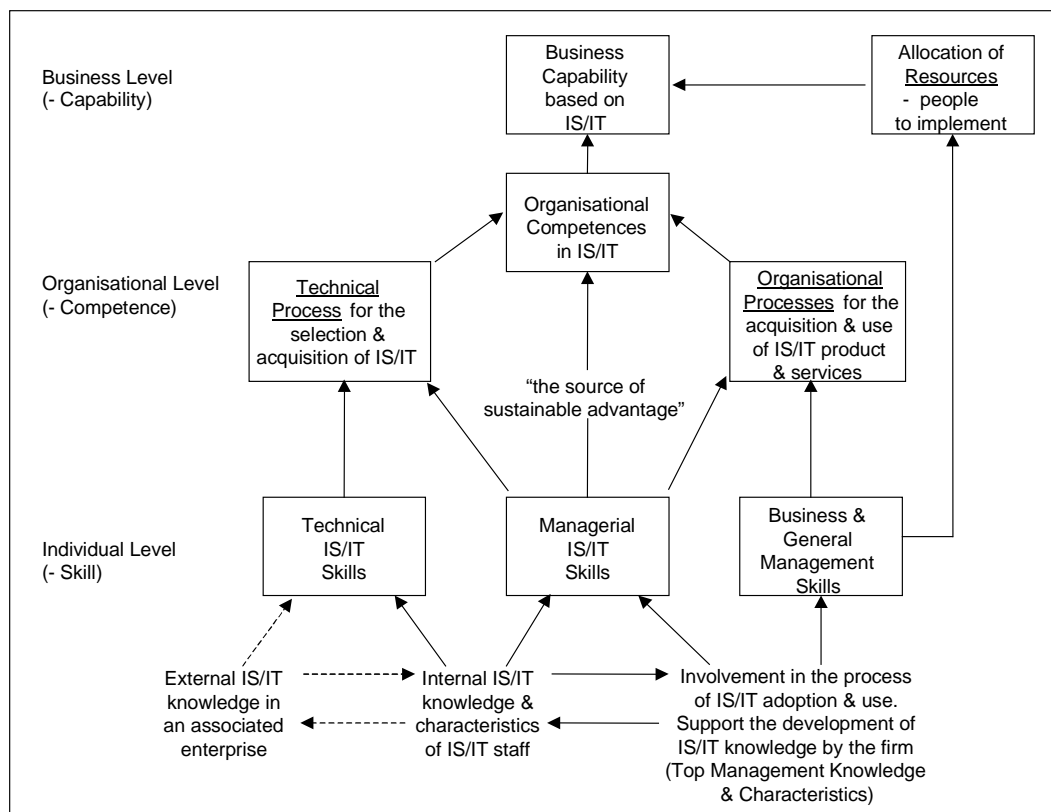

Figure 3: *A resource-based model to understand the successful adoption and use of IS/IT in manufacturing SMEs.(Source: Compiled by the authors.)*

It is the two determinant factors that together sustain the whole model – first, the existence of IS/IT knowledge in the firm or in a closely associated, specialist IS/IT enterprise, and second, a top management that supports the development of IS/IT capabilities, is involved in the process of IS/IT adoption and use, and understands the IS/IT needs of the business.

The technical skills are either developed in-house or insourced appropriately due to the active intervention of the top management, who also contribute their business knowledge and personal abilities to the management of IS/IT. This in turn enables the establishment of, albeit normally informal, 'processes' or ways of working to ensure IS/IT products and services are selected and acquired successfully and economically. At the same time the top management, in their general management role, using the knowledge of the IS/IT experts establish organisational 'processes', which ensure that non IS/IT managers, professionals and staff, use the IS/IT applications to deliver the actual business benefits envisaged. It is the alignment of these processes, sustained by the firm's managerial IS/IT skills that determines the overall organisational competence in IS/IT.

However, these in themselves are not sufficient to build a distinctive business capability from IS/IT investments. The final piece of the jigsaw is the top management's ability to establish the appropriate priority to allocate scarce financial and people resources to the IS/IT investments. This implies knowing how much resource to invest and when, even when this might involve significant financial risk (often personal financial risk), or being the first firm in the industry to invest in 'leading edge' software or hardware. Two of the three most successful firms were very innovative in IS/IT terms, even in comparison to much larger firms.

It must be stressed that the 'processes' described are not formal, they are really 'ways of doing things' based on informal agreement and appropriate behaviour, derived from the personal relationships of the people involved. In the less successful firms, where neither of the determinant factors had appropriate attributes, there was little agreement on what was required or how to do it. These firms were characterised by discord and conflict amongst management and IS/IT experts.

7. CONCLUSIONS

The empirical study involved in-depth case studies in 12 organisations, all manufacturing SMEs in Portugal, but in a variety of industries. They covered the greater part of the possible spectrum of levels of adoption and use as well as success, the latter being defined by a well established surrogate measure. Four distinct clusters emerged against which patterns of factors could be distinguished that appeared to account for the variations in successful adoption in the firms studied. To explain these findings a number of theories were initially considered, but, building on the recent work of others cited above, resource-based theory appeared to offer possible explanations, given that the determinant factors identified were both clearly associated with the internal contexts of the firms. Moreover, resource-based theory argues that sustained advantage results from unique attributes of a firm developed over time – therefore it could explain why some firms had evolved to become more successful than others in this context.

Therefore in order to relate the findings to the core tenets of resource-based theory the focus of the analysis of the case study evidence has been on the three most successful firms, contrasting this where appropriate with the three least successful. A model to relate the key components was devised. From this we believe it has been possible to explain how the determinant factors in combination cause requisite skill sets to be developed, which in turn cause appropriate organisational processes to come into being, which enable effective adoption of technology and its successful exploitation in use. The resulting organisational competence enables IS/IT to provide the basis for distinctive business capability, when resources are allocated for investment.

Research in the topic of IS is often criticised for lacking theoretical foundations or for insufficient reference to theory to explain the findings from empirical studies. This paper is intended to address this criticism. We believe the explanations and models derived here could assist others researching similar topics in other contexts – different industries, countries or even larger organisations.

REFERENCES

Barney, J. (1986). Strategic factor markets: Expectations, luck and business strategy, *Management Science, 32,* 1231-1241.

Barney, J. (1991). Firm resources and sustainable competitive advantage, *Journal of Management*, 17(1), 99-120.

Baroudi, J.*,* Olson, M. and Ives, B. (1986). An empirical study of the impact of user involvement on system usage and information satisfaction, *Communications of the ACM,* 29(3), 232-238.

Bridge, S., O'neill, K. and Cromie, S. (1998). *Understanding Enterprise, Entrepreneurship, and Small Business,* MacMillan, London.

Caldeira, M. (1998). Understanding the adoption and use of IS/IT in SMEs, a study in Portugese industry, *PhD Thesis*, Cranfield University, Cranfield.

Campbell, A. and Luchs, K. (1997). Understanding competencies in Campbell, A. and Luchs, K. (Eds), *Core Competency-based Strategy*, Thomson, London.

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*, 17(1), 121-154.

Conner, K. and Prahalad, C. (1996). A resource-based theory of the firm: Knowledge versus opportunism, *Organization Science*, 7(5), 477-501.

Cragg, P. (1990). *Information Technology and Small Firm Performance*, Unpublished PhD Thesis, Loughborough University of Technology.

Delone, W. (1988). Determinants of success for computer usage in small business, *MIS Quarterly*, 12(1), March, 51-61.

Delone, W. and Mclean, E. (1992). Information systems success: The quest for the dependent variable, *Information Systems Research*, 3(1), 60-95.

Earl, M. (1990). Approaches to strategic information systems planning experience in twenty-one United Kingdom companies, *Proceedings of the 11st International Conference on Information Systems,* Copenhagen, 16-19 December, 271-277.

Earl, M. (1993). Experiences in strategic information systems planning, *MIS Quarterly*, 17(1), 1-24.

Earl, M. and Feeny, D. (1994). Is your CIO adding value?, *Sloan Management Review*, 35(3), 11-20.

Feeny, D. and Willcocks, L. (1998a). Core IS capabilities for exploiting information technology, *Sloan Management Review,* 39(3), 9-12.

Feeny, D. and Willcocks, L. (1998b). Re-design the IS function around core capabilities, *Long Range Planning*, 31(3), 354-367.

Grover, V., Teng, J. and Cheon, M. (1998). Towards a theoretically-based contingency model of information systems outsourcing, in, M. *Strategic Sourcing of Information Systems*, Willcocks, L. and Lacity, M. (Ed), Wiley, Chichester, 79-101.

Hamel, G. and Prahalad, C. (1996). *Competing for the Future*, Harvard Business School Press*,* Paperback edition, Boston (Massachusetts).

Ives, B. and Olson, M. (1984). User involvement in MIS success. A review of research, *Management Science,* 30(5), May, 586-603.

Ives, B., Olson, M. and Baroudi, J. (1983). The measurement of user information satisfaction, *Communications of the ACM*, 26(10), 785-793.

Markus, M. (1983). Power, politics and MIS implementation, *Communications of the ACM*, 26(6), 430-444.

Mata, F., Fuerst, N and Barney, J. (1995*).* Information technology and sustained competitive advantage: A resource-based analysis, *MIS Quarterly*, 19(4), 487-505.

Mcgolpin, P. and Ward, J. (1997). Factors influencing the success of strategic information systems in *Information Systems: An Emerging Discipline?*, Mingers, J. and Stowell, F. (Ed), McGraw-Hill, London, 287-327.

Melone, N. (1990). A theoretical assessment of the use-satisfaction construct in information systems research, *Management Science*, 36(1), 76-91.

Montazemi, A. (1988). Factors affecting information satisfaction in the context of the small business environment, *MIS Quarterly,* 12(2), 239-256.

Peppard, J. and Ward, J. (1999). Mind the gap: Diagnosing the relationship between the IT organisation and the rest of the business, *Journal of Strategic Information Systems* 8(2), 29-60.

Pettigrew, A., Whipp, R. and Rosenfeld, R. (1989). Competitiveness and the management of strategic change processes in *The Competitiveness of the European Industry*, Francis, A. and Tharakan, P. (Eds), Routledge, London, 111-136.

Prahalad, C. and Hamel, G. (1990). The core competence of the corporation, *Harvard Business Review,* May/Jun, 79-91.

Raymond, L. (1985). Organizational characteristics and MIS success in the context of small business, *MIS Quarterly,* 9(1), 37-52.

Thong, J., Yap, C. and Ramen, K.. (1996). Top management support, external expertise and information systems implementations in small businesses, *Information Systems Research*, 7(2), 248-267.

Weill, P. and Baroudi, J. (1990). An empirical investigation of the relationship between firm performance and system success , Working paper nº 15, Graduate School of Management, University of Melbourne

Welsh, J. and White, J. (1981). A small business is not a little big business, *Harvard Business Review*, 59(4), 18-32.