Global Information Technology Management and Organizational Analysis: Research Issues

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ABSTRACT

There are numerous studies in the management literature that analyze specific aspects of the implementation of information technology (IT) in organizations. Meanwhile, the global IT management area has emerged as a dynamic field of investigation of IT impact in a global environment. However, after reviewing the management /international business literature and the global IT literature, we detect the need to integrate the theoretical frameworks of both streams in order to advance in this field. As a result, we connect the areas of advance in IT general management with the main lines of research in global IT management. The synthesis of both fields allows us to suggest new areas of research that we discuss in the final section.

KEY WORDS

Theoretical Review, Organizational Analysis, Global Information Technology, Management Theories.

INTRODUCTION

Information technology (IT) has been a catalyst for social and economic change in the last decades. At the same time, organizations have not only played a part in social and economic change but have constituted the principal agent of modernization and progress in society in general. Various researchers, mainly in the areas of management and information systems have spent considerable time and resources to studying the effects of IT on organizations. This has led to an unprecedented growth in the volume of work in this exciting area.

Areas of study span from the effects of IT on organizational structure (Orlikowski and Robey, 1991), the links between investment in IT and business performance (Brynjolfsson *et al.*, 1994), and the inter-relationships between the human element and IT (e.g. Ross, Beath and Goodhue, 1996). From a global perspective of business, the IT implementation and diffusion with emphasis in different cultures and countries (e.g. Palvia, 1998) has been analyzed. The role played by the different national cultures on information systems (IS) management has been one of the most important

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topics in global IT. Davison and Jordan (1998) have studied the impact of culture on group support systems; Kwon and Chidambaran (1998) have focused on the impact of culture on communication technology acceptance and Shore and Venkatachalam (1995) analyzed cultural differences in the analysis and design of information systems.

From a global point of view, other questions emerge, such as the case of the political and regulatory impact on several IT dimensions. The political environment can affect different IT related areas, e.g. transborder data flow restrictions, government technology initiatives, privatization trends, the enactment and enforcement of standards, trade and customs regulations, etc. (Palvia, Palvia and Whitworth, 2002). Finally, the level of economic development of each country cannot be ignored since it involves different levels of IT development and therefore different levels of research concerns.

However, and despite the variety of work done in the IT organizational impact area and in the Global IT area, there has been little effort of integration of these research fields. The objective of this study is thus to analyze the effect of global factors on the role of IT in organizations, using the main theoretical perspectives as a basis for the analysis.

To accomplish this objective we have structured the work into a first introductory part in which we revisit the concept of global IT and we briefly review the literature in global information technology. Next, we analyze the literature in management, pointing out the different theoretical perspectives from which the effects of IT on businesses have been studied. Fourthly, we analyze the IT organizational impact in relation to key global issues with the aim of defining several research areas, most of them unexplored. We end this paper with an examination of the proposed research lines and the ramifications within each area. Some final conclusions from our analysis are also presented.

GLOBAL INFORMATION TECHNOLOGY MANAGEMENT

The relative novelty of the global information technology management concept has meant that the research in this area is at an early stage. However, a considerable amount of work has been done since the beginnings of the early nineties. Palvia (1998) suggests that there are three main components of global IT research, and therefore three main lines of investigation in global information technology: (1) information systems and technologies that are global in scope; (2) IT products and services that are developed in one country and used in another and (3) developing, using and managing information systems and technologies in different cultures and countries.

Although numerous studies have been carried out in the first two areas, perhaps the most dynamic section in global information technology management relates to the key issues and challenges faced by executives in managing IT in different parts of the

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world (third component of global IT research). To examine this question, Palvia, Palvia and Whitworth (2002) elaborate a model that can be useful in analyzing key global issues, some of them proposed previously by Niederman, Brancheau and Wetherbe (1991). This model consists of a series of factors that affect the key IT issues in global management (see Table 1). As key issues, the model includes seven categories which are IT business relationships, human resources and IT management, IS quality and reliability issues, internal effectiveness measure, end-user computing, technology infrastructure and systems development.

Table 1. A Model for Global IT Issues Analysis

Variables that may influence the IT issues	
COUNTRY-SPECIFIC VARIABLES:	**KEY IT MANAGEMENT ISSUES:**
Level of economic development of the country.	Business relationship: Includes IT issues that contribute to the business objectives of the firm and deals with IT architecture, IT alignment and data resource issues.
Political/regulatory factors	Human resources: Shortage of qualified IS personnel is an important question in this area.
Cultural variables	Quality and reliability: Management of software and hardware in different parts of the world.
	Internal effectiveness: Includes IS human resources, software development, applications portfolio and IS effectiveness measurement.
FIRM-SPECIFIC VARIABLES:	
Type of firm and industry	End user computing: Management and organizational strategies to face problems use of computers by end users.
Global strategies	Technology infrastructure: Development of telecommunications, electronic data interchange, IT infrastructure, imaging technology and distributed systems.
Global business and IT strategy	Systems development: Development of applications, specially concerning to better project management and software development productivity.

Source: Adapted from Palvia, Palvia and Whitworth (2002) and Niederman, Brancheau and Wetherbe. (1991).

The above key issues in IT management can be influenced by two types of contextual/global factors. The first group of factors can be defined as environmental factors and are country-specific factors. It includes three main variables: the level of economic development of the country, the political/regulatory framework and cultural issues affecting IT management. The country-specific factors are, in fact, difficult to control, but nevertheless may influence the IT management priorities in a country.

The second group can be defined as firm-specific global factors and it comprises the type of firm and industry, the global strategies implemented by the firm and the global strategies implemented by the firm in the IT management field.

The global IT management field emerges from the combined analysis of the key IT issues considering the above-mentioned contextual factors as moderating variables.

The ways in which country-specific or firm-specific factors affect IT management questions will constitute the main areas of research in global information technology management. Below we discuss the main implications of the country-specific and firm-specific factors in the study of Global Information Technology Management.

The Impact of Country-Specific Factors

Focusing the analysis on the impact of the country-specific factors it is possible to study individually the role of economic development, the political/regulatory framework and the cultural variables. Firstly, the level of economic development of the country will be presumably connected to a higher interest in strategic issues in IT management. Among the strategic issues in IT we can mention IT based business process redesign, planning and managing telecommunications networks, the alignment of the IS organization within the enterprise, improving IS strategic planning, etc. (Brancheau, Janz and Wetherbe, 1996). On the other hand, issues such as the shortage of qualified human resources and obsolescence of computing equipment are still of a great importance in under-developed countries (Palvia, Palvia and Zigli, 1992).

Political and regulatory factors in different countries also have an effect on key IT management issues. Chepaitis (1996) emphasizes the problems caused by the impact of a political system that includes control and pressure by the authorities, poor public data stores and a lack of competitive market experience. The political and governance philosophy (socialism, capitalism, communism, democracy and dictatorship) affects therefore the conditions in which IT is managed and developed (Palvia, Palvia and Whitworth, 2002).

Differences in national cultures also play an important role in the IT area. The study of Hofstede (1980) has provided the basis for analyzing the cultural impact on key IT issues. Hofstede (1980) defined four dimensions of national culture: individualism-collectivism, power distance, uncertainty avoidance, and masculinity-femininity. There are important precedents in the study of the effect of national culture on IT management: Nelson and Clark (1994) proposed a research agenda of the cross-cultural impact on IS management; Shore and Venkachalam (1995) analyzed differences in systems analysis and design related to culture. In other cases, the relationship between culture and technology acceptance (Kwon and Chidambaran, 1998) and between culture and group support systems adoption (Davison and Jordan, 1998) has been the object of analysis. This question is still a very open line of investigation, because other studies do not find a direct relationship between different national cultures and IS management issues.

The Impact of the Firm-Specific Variables

The firm specific variables can also impinge upon key IT management issues. Firstly the type of firm or industry can be considered an independent variable in MIS research (Palvia, Palvia and Whitworth, 2002). The level of development, the

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composition and the objective of the IT portfolio can differ depending on the type of industry. Niederman, Brancheau and Wetherbe (1991) studied the differences in IS management in manufacturing, service and non-profit organizations. Service and manufacturing firms seem to manage in a different manner some IS issues as has been suggested by Deans *et al.* (1991). They found that computer integrated manufacturing, local cultural constraints and vendor support in foreign subsidiaries were more important for manufacturing companies. On the other hand, data security, data utilization, currency restrictions and exchange rate volatility were more important for service firms (Palvia, Palvia and Whitworth, 2002).

Global strategies is the second firm specific element included in the study of Palvia, Palvia and Whitworth (2002) Based on the model of Bartlett and Ghoshal (1989), it is possible to analyze the relationship between the four basic strategies of internationalization (multinational, global, international and transnational) and IT architecture. As Palvia, Palvia and Whitworth (2002) point out, most previous work suggests that the IT architectures of global firms should be aligned with each type of global business strategies.

Global business and IT strategy is the fourth firm specific factor that can affect key IT issues. Several IT management issues may have an important impact on the firm strategy definition and implementation. The utilization of IT as a driver of the firm's strategy has been a topic in business management since the early eighties (Parsons, 1983; Porter and Millar, 1985) that has been revisited in the nineties (e.g. Henderson and Venkatraman, 1993). Given that IT can delimit the firm strategy, the global strategy of the firm can also be shaped by IT issues. The means of introduction and expansion in new markets or the defense strategies against external competitive pressures can be interrelated to IT utilization and development choices. As a example, some multinational firms use new logistics and commercialization electronic devices to quickly cut costs and therefore to oust national, non technological competitors, from the markets in which they enter/participate.

Country-specific variables and firm-specific variables will be used in the next sections to explain the relationship between global issues and the main theoretical frameworks developed in IT general management.

IT AND GENERAL MANAGEMENT

IT has long ceased to be a specialist area restricted to qualified professionals of strictly technical backgrounds. Even as early as the 1960's a number of studies appeared that attempted to analyze – although in a very speculative manner – the importance that IT might have in the future in aspects such as inter-organizational communications or the generic impact of IT in human communication and business (e.g. Licklider, 1960). Research began at that point which, from the point of view of Management, tried to explain the behavior of the new technologies in the business system and the effect it might have on the different characteristics of the company, such as size, structure, processes and performance. Specifically, the literature has been

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concerned with studying three questions related to the presence of IT in the company. We analyze these three sections below.

Explorative Focus on IT in the Company

First, there was the need to resolve questions arising from the introduction of the new technologies into the companies, from a purely descriptive point of view, based on pioneer companies and normally on the direct experience of the author. The question being answered was *what does this type of technology do, or what can it do*, in the company, paying attention to the different functions it carries out, its features, and how it develops within the company (e.g. Licklider, 1960). They are highly explorative studies, whose principal objective is to instruct and inform the management about the business possibilities of the new tools, and they rarely use elaborate theoretical models that allow conclusive outcomes. We call this group of studies the *Explorative Focus* on IT in the company. We can distinguish two areas of study: description of successful cases and the use of the concept of the life-cycle to explain the evolution of IT in the company.

Structural Focus

Second there is the branch of study concerned with the impact that IT has on firm structure. These are studies that analyze the forces, which upon application of technological solutions, modify or alter the conditions in which companies organize internally. This research draws on studies with a long tradition in fields related to the structure of organizations, such as organizational design, the management of change, workgroups and intra-organizational communication, analyzing the effect that IT has on the various structural issues. We shall call this area of research *Structural Focus*. This is one of the subjects most frequently related to IT, that is, the study of the relationship between specific types of technologies and the structure of the organization (e.g. Nault, 1998), how investment in IT is related to variables measuring a company's form, such as size, diversification, vertical integration and options of growth or the impact of IT on jobs.

IT creates new options for organizational design, and the new organizational forms in turn provide new opportunities for the design of technology (Fulk and DeSanctis, 1995). Yates and Benjamin (1991) point out that IT has repeatedly played a role in the evolution of organizational structures and assert that *innovations in IT have made new organizational forms possible, and vice versa*. Besides, other authors consider that IT can lead to the marketplace becoming more efficient than the hierarchy in the market-hierarchy relation for the coordination and taking of economic decisions. In the field of international IT management, IT can be the trigger for the eventual emergence of transnationals in the form of a network structure of companies. This idea has been previously considered in the concept of the transition of organizations in the Bartlett and Ghoshal (1989) typology.

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Despite the limited level of consensus that exists in the field (Nault, 1998), it is interesting to review the different structural aspects, which could be modified by the implantation and deployment of IT. Among these we could find the following effects, which we set out as areas of research within this approach: (1) reduction in the number of hierarchical levels and flattening out of business structures; (2) the disappearance of routine jobs; (3) integration of departments; (4) formation of workgroups; (5) change in flow of information throughout the organization; (6) the possible implantation of telecommuting and (7) relationship between IT architecture and organizational structure

Strategic Focus

Third, we will refer to work attempting to analyze the impact of IT on strategic management in the company, especially to the relation between the implementation of IT, strategy and performance. There are distinct approaches which respond to the different objectives of analysis: industrial organization (Porter, 1980), organizational economics (Williamson, 1975; Jensen and Meckling, 1976), resource based view (RBV) (Wernerfelt, 1984), knowledge based view (institutional theory (Selznick, 1957), and strategic networks perspective (Freeman, 1979). We shall also considered other more recent and less developed theoretical perspectives that could prove useful in explaining certain IT strategic management issues. Among these we highlight the knowledge based view (Kogut and Zander, 1992), upper echelon focus (Hambrick and Mason, 1984), the dynamic capabilities framework (Teece, Pisano and Shuen, 1997) and the perspective of the stakeholders (Coff, 1999). We shall use the generic term *Strategic Focus* to refer to the work done in this area.

INFORMATION TECHNOLOGY, MANAGEMENT THEORIES AND GLOBAL ISSUES

Bearing in mind the above considerations, we aim to identify in this section some research lines. In order to do this, in Figure 1 we have integrated the theoretical approaches that may prove significant in explaining the organizational impact of IT in a global context. Each theoretical approach can be used to address a specific research question in the field of global IT management. In the interest of providing a more orderly vision of the problem, we have placed the issues of future research in each of the approaches analyzed into the study. These approaches have been classified according to two criteria. In the left part of the graph, we point out the origin of each approach, whether it is economic theory or organizational and social theories. In the right part of the graph each approach is analyzed in relation to its implications, whether strategic, structural or of explorative character. Additionally, we have differentiated that research which has more to do with global issues using the model of Palvia, Palvia and Whitworth (2002) as a basis for comparison. Finally, and as result of the discussion of the theoretical frameworks that we have undertaken in this work, we propose 18 areas of research in global IT management.

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Population Ecology, IT Impact and Global Issues

Population Ecology (Hannan and Freeman, 1977) may provide progress in explaining the impact of the processes of technological discontinuity on organizational survival, or the substitution of some technologies for others over a period of time. According to the precepts of ecological theory, the introduction of new IT may favor the survival of some organizations in a sector as opposed to other technologies, especially in cases where the management of information has a significant effect on the value chain.

In the area of global IT management (see line 1 in Figure 1), population ecology could constitute a valid theoretical framework to analyze the moderating effect of country-specific variables. The eventual relationship between IT utilization and firm survival ratios in populations of firms can be moderated by country-specific factors: the level of economic development, the political/regulatory context and even some cultural issues. All the proposed lines of action are not well explored at the moment, so we encourage researchers to adopt new initiatives in this area. On the other hand, the firm-specific elements proposed by Palvia, Palvia and Whitworht (2002) can have a more limited impact on the relationship between IT utilization and firm survival ratios. Among them (type of firm and industry, global strategy and global business and IT strategy), only the size of the organizations that use information technology in different countries could provide new explanations for the survival ratio of new IT projects. In other words, the likelihood of survival of new IT projects or technological firms in foreign countries may be explained by the size of the multinational firm or by the size of the new technological branch.

On the other hand, global strategy and global business and IT strategy will not have a relevant role under the population ecology perspective due to the fact that population ecology does not accept the strategic choices of the firm as determinant variables in explaining the survival/failure ratio (Hannan and Freeman, 1977).

Resource Dependence Theory, IT Impact and Global Issues

From the perspective of the Resource Dependence Theory (Pfeffer and Salancick, 1978) it is possible to analyze the function of specific kinds of IT as a scarce resource and its influence on the strategic pre-eminence of some organizations against others. Resource dependence theory (RDT) claims that the possession or control of certain key resources by an organization can result in the dependence of the rest of the organizations on the first organization. Additionally RDT asserts that there are three critical factors in determining the dependence of one organization on another, and therefore its relative power (Medcof, 2001): (1) the importance of the resource, such that the more relevant the factor is, the stronger will be the dependency relationships of the organizations that lack it; (2) existence of alternatives, such that the power of the company that possesses the key resource decreases with an increase in the possibility of choice that dependent organizations enjoy and (3) unlimited ability to take decisions that affect the resource, such that the company with greater capability for decision will enjoy a privileged position.
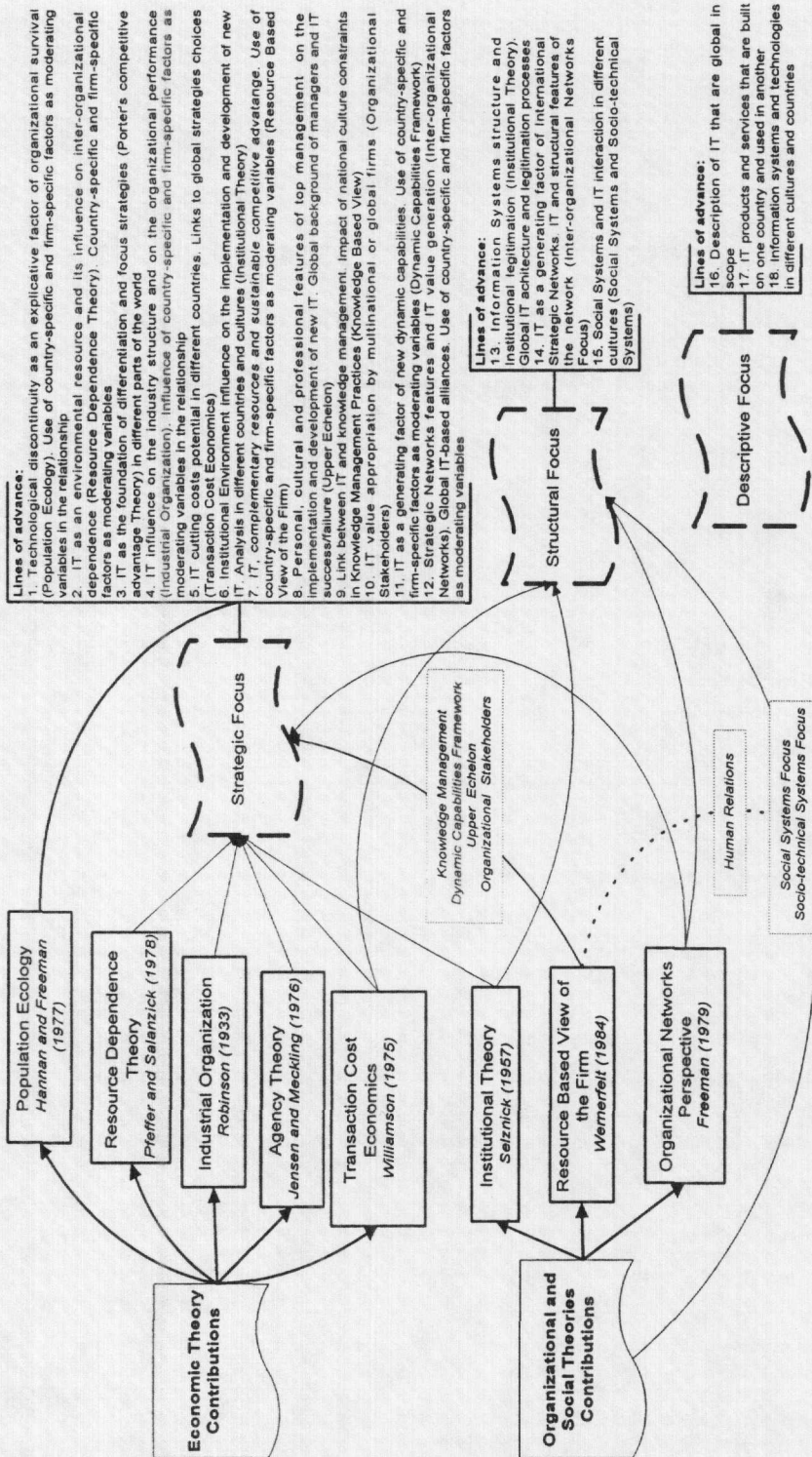
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Lines of advance:

1. Technological discontinuity as an explicative factor of organizational survival (Population Ecology). Use of country-specific and firm-specific factors as moderating variables in the relationship
2. IT as an environmental resource and its influence on inter-organizational dependence (Resource Dependence Theory). Country-specific and firm-specific factors as moderating variables
3. IT as the foundation of differentiation and focus strategies (Porter's competitive advantage Theory) in different parts of the world
4. IT influence on the industry structure and on the organizational performance (Industrial Organization). Influence of country-specific and firm-specific factors as moderating variables in the relationship
5. IT cutting costs potential in different countries. Links to global strategies choices (Transaction Cost Economics)
6. Institutional Environment influence on the implementation and development of new IT. Analysis in different countries and cultures (Institutional Theory)
7. IT, complementary resources and sustainable competitive advantage. Use of country-specific and firm-specific factors as moderating variables (Resource Based View of the Firm)
8. Personal, cultural and professional features of top management on the implementation and development of new IT. Global background of managers and IT success/failure (Upper Echelon)
9. Link between IT and knowledge management in Knowledge Management Practices (Knowledge Based View)
10. IT value appropriation by multinational or global firms (Organizational Stakeholders)
11. IT as a generating factor of new dynamic capabilities. Use of country-specific and firm-specific factors as moderating variables (Dynamic Capabilities Framework)
12. Strategic Networks features and IT value generation (inter-organizational Networks). Global IT-based alliances. Use of country-specific and firm-specific factors as moderating variables

Lines of advance:

13. Information Systems structure and institutional legitimation (Institutional Theory). Global IT architecture and legitimation processes
14. IT as a generating factor of international Strategic Networks. IT and structural features of the network (Inter-organizational Networks Focus)
15. Social Systems and IT interaction in different cultures (Social Systems and Socio-technical Systems)

Lines of advance:

16. Description of IT that are global in scope
17. IT products and services that are built on one country and used in another
18. Information systems and technologies in different cultures and countries

Strategic Focus

Structural Focus

Descriptive Focus

Knowledge Management
Dynamic Capabilities Framework
Upper Echelon
Organizational Stakeholders

Human Relations

Social Systems Focus
Socio-technical Systems Focus

Population Ecology
Hannan and Freeman (1977)

Resource Dependence Theory
Pfeffer and Salanzick (1978)

Industrial Organization
Robinson (1933)

Agency Theory
Jensen and Meckling (1976)

Transaction Cost Economics
Williamson (1975)

Institutional Theory
Selznick (1957)

Resource Based View of the Firm
Wernerfelt (1984)

Organizational Networks Perspective
Freeman (1979)

Economic Theory Contributions

Organizational and Social Theories Contributions

Figure 1. IT and Global Management. Perspectives integration and new research lines

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According to resource dependence theory, IT can constitute a key resource under the above conditions (scarcity, value adding capacity, etc). The firms that obtain and maintain the key resource (IT) will be in a privileged position. From a global point of view (see line 2 in Figure 1), it is possible to suggest that country-specific factors and firm-specific factors can moderate the relative success of the firms that posses the IT key resource. Firstly, research is needed to address whether the economic development of the country favors (or not) the conditions under which IT can become a key resource. Secondly, the use of political/regulatory and national culture as moderating variables can also be of interest for future research. The analysis of firm-specific implications on global IT impact, using the resource dependence framework, can provide interesting research options. The firm size and the IT strategic choices of the firm in a global context could be considered as moderating variables in the use of IT as a key resource. It could be interesting to test if big multinational firms are in a privileged position in less developed countries because they have access to valuable and scarce types of IT.

Industrial Organization, IT Impact and Global Issues

Porter's Competitive Strategy and Industrial Organization (Porter, 1980) has been one of the theoretical options that has had most impact in the IT area. In the IT field, industrial organization can be useful to explain the influence that variables of the industry external to the company might have on the implantation, deployment and competitive performance of IT. In this sense, it would be interesting to find out if factors like number of competitors, the intensity of competitive rivalry, the level of innovation or the fluidity in the circulation of information within the industry, determine the competitive capability of IT.

From a global perspective (see lines 3 and 4 in Figure 1), the Industrial Organization might constitute an appropriate framework to analyze the impact of the economic development of the country on the IT organizational impact. The economic development could be related to the structure of industrial sectors and therefore to the number of competitors, the intensity of competitive rivalry and the level of innovation. On the other hand, firm-specific elements such as global strategies (multinational, international and global) can be explained through Porter's theory of strategy. As an example, a global firm enjoying a cost-cutting information technology could choose an aggressive strategy of quick introduction and development in emerging markets (global strategy) using a standardized IT-based operations system. Meanwhile, a multinational firm might build strong local presence through sensitivity and responsiveness to national differences based on autonomous IS. Finally, international firms may use their standard IT and IS to exploit parent company knowledge and capabilities through worldwide diffusion and adaptation.

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Agency Theory, IT Impact and Global Issues

Agency theory (Jensen and Meckling, 1976) has been very little used up till now in research relating to IT, so that it is necessary to learn more about the organizational behavior of IT that may be explained thanks to this theoretical paradigm. It would be possible to analyze the relationships existing between the level of commitment of the owner towards the company management, the use of IT and the firm performance (Karake, 1995). Studies could also be done on the relationship between the level of commitment of the executives towards the company – shown in their investment of capital in the company stock – and the use of IT, especially those tools that have most impact on performance. It would be likely in this case that those executives most committed to the company would show more explicit support for the introduction and development of IT and telecommunications tools, in an attempt to achieve two aims: increase control over the management team, on the one hand and increase the profitability of the processes that involve intensive use of IT, on the other. Also, from the perspective of agency theory it would be possible to study the influence of the composition of the Board of Directors on the level of IT implementation in the company and on its technological performance. From the agency perspective, the boards can be used as tools of control by the owners, which might affect the technology policy of the company, increasing, for example, the computing systems for management control. An empirical justification for the proposition requires, however, more study, because the few studies that have been carried out have not found definitive results (Karake, 1995).

From a global point of view, agency theory could be used to explain IT use as a control and coordination device in different cultural environments. Firstly, cultures with a lack of orientation towards trust-based, durable and solid business relationships could develop more intensely control-oriented information technology such as web-based Information Systems for shareholders, or more sophisticated Internet-based channels of information with partners. Secondly, it may be of interest to analyze (in different countries) the relationship between the level of individualism, the emergence of opportunistic behaviors among managers and the use of control-oriented IT. Thirdly, another question of interest might be the influence of the composition of the board of directors on the degree of international expansion of technological firms. A board of directors mainly composed of owners may be more conservative in its decision-making and therefore more reticent to adopt strategies of international expansion in countries with a dissimilar IT background. As an example, countries with a lack of an IT-skilled labor force may be less attractive to multinational firms directly managed by owners than to firms not managed by owners.

Transaction Costs Economics, IT Impact and Global Issues

As we pointed out before, work has been done that is concerned with the savings in transactions resulting from the introduction of IT in the value chain in the company. The theoretical framework of transaction costs economics (Williamson, 1975) can be especially effective in predicting the success of IT systems aiming to reduce costs in

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the value chain (Powell and Dent-Micallef, 1997) by creating economies of time or economies of resources in the links that are intensive in information. The systems of Computer-Aided Design and Computer-Aided Manufacturing – CAD and CAM – are clear examples of the increase in efficiency in production processes by using IT. But IT can also reduce transaction costs with clients because it may reduce uncertainty in taking a commercial decision, the complexity of such a decision, the asymmetry of information that the client sometimes faces, and the disadvantages motivated by the loss of bargaining power in a situation of "small numbers" (Williamson, 1975). IT may also reduce the indirect costs of transaction, such as the cost of adverse selection or of moral risk (Amit and Zott, 2001).

In the field of relationships between companies, Clemons and Row (1991) undertook an analysis of the circumstances in which IT could reduce transaction costs. Inter-company collaboration may be one of the principal means by which IT reduces transaction costs between companies, especially after the introduction of TCP/IP technology (Amit and Zott, 2001). It would also be of interest to study how transaction costs behave in the long term, bearing in mind that it has been shown that certain IT tools only lead to benefits in the medium to long term (Brynjolfsson and Hitt, 2001). Although various authors have suggested the importance of studying the creation of value by IT by means of a reduction in transaction costs (Powell and Dent-Micallef, 1997), empirical evidence for this is still scarce, and the area of research is still open.

From a global perspective (see line 5 in Figure 1), the level of economic development (country-specific variable) can strengthen the reduction in transaction costs due to IT implementation. The intensity of economic development might probably be linked to the existence of more intensive information processes. Firms using IT in developed countries could therefore find it easier to cut costs in the value chain than firms from less-developed countries that manage simpler value-chains. On the other hand, the globalization strategy of a firm that uses IT could be modified depending on the differences in the capacity of IT to cut transaction costs in different parts of the world.

Institutional Theory, IT Impact and Global Issues

We analyze, in the second group, the approaches originating in the organizational theory, among which we will study institutional theory, resource based view and its most recent derivations, and the inter-organizational networks framework (see Figure 1). First, according to the institutional approach (Selznick, 1957), companies act in a social environment that imposes norms, values and behavior patterns that indicate what is acceptable and what is not from the point of view of social behavior. Thus the reasons for human behavior, and therefore for that of organizations, go beyond the limits optimal from an economic point of view, can be explained in some cases in terms of social justification. The process by which companies adopt standard behaviors, ignoring the question of whether it is economically optimal, is known as *legitimation* (Scott, 1987) and can give rise to decisions that are ill thought out, the result of the determinism of the environment. This theoretical framework may have

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strong research implications concerning IT, since in our opinion, it may explain the phenomena of the automatic adoption by a company of certain new technologies whose potential to create value is doubtful (it could be an explanation for the technology bubble of the late nineties). This approach would be useful to throw light on some recent problems like the massive introduction, and lack of success, of a large number of business models based on the Internet. The institutional approach can also provide a complementary explanation in the cases where, as we shall detail later, the resource-based view proves to be inadequate in explaining the success or relative failure of the technological modernization of a company.

From a global point of view (lines 6 and 13 in Figure 1), it might be of interest to analyze the differences in the intensity of the legitimation processes in different countries and/or cultures. The level of economic development, the political/regulatory framework and cultural restrictions might accelerate, or mitigate, the legitimation initiatives in which IT is involved. Among these questions, it could be interesting to study whether the firms of countries with a high risk-avoidance culture follow legitimation processes in IT adoption more frequently than firms in countries with a high culture of risk. The political/regulatory framework can also legitimate certain strategic choices to adopt or to reject the use of IT. According to the firm-specific factors in the model of Palvia, Palvia and Whitworth (2002) it is interesting to explain if technological firms choose a specific globalization strategy following exclusively legitimating reasons.

Resource Based View, IT Impact and Global Issues

The Resource Based View (RBV) (Wernerfelt, 1984) has been the dominant view in the development of the strategic approach in recent times (Hoskisson *et al.* 1999). According to the RBV, a firm that possesses a valuable, rare and difficult to imitate or to substitute resource will achieve a sustainable competitive advantage. As we have already pointed out in this work, a large number of studies have related the creation of value by means of IT with the gaining and maintenance of competitive advantage (e.g. Powell and Dent-Micallef, 1997; Bharadwaj, 2000). The options for further study in this area consist of the identification of new resources complementary to IT, and the description of the conditions under which IT behaves as a valuable resource. Additionally, it would be useful to supplement the RBV with other approaches, such as the above-mentioned institutional theory (Selznick, 1957), or that of the appropriation of value by stakeholders (Coff, 1999). Despite this weakness, the RBV, complemented with the dynamic capabilities framework (Teece, Pisano and Shuen, 1997) can serve as a basis from which to explain the competitive impact of IT over a time period, an area with little empirical evidence so far.

The RBV has a number of points in common with other theoretical frameworks, like the upper echelon (Hambrick and Mason, 1984), knowledge management (Kogut and Zander, 1992; Nonaka, 1994) or the organizational stakeholders approach (Coff, 1999). Apart from the knowledge management view, which has already added significantly to the study of IT, the upper echelon and the stakeholders approach can

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be further developed in the future. The first (Pinsonneault and Kraemer, 1997; Pinsonneault and Rivard, 1998) may be able to explain the interrelation between the characteristics of management (age, previous experience, technological knowledge, international experience) and the effective introduction of the new technologies. It should be noted that there is a strong parallel between this approach and the RBV because the personal and career characteristics of the executives can be resources that are valuable, scarce and difficult to imitate, and in combination with IT they may have a positive and lasting effect on competitive position. The second may be able to explain the situations in which IT generates value although the organization cannot take advantage of it in the form of income, benefits, or in general, increase in competitive advantage. In these cases there are certain powerful groups in the organization (stakeholders) that might absorb the resource's capacity for creation of value.

From a global perspective (see lines 7-11 in Figure 1), the Resource Based View and related approaches could be useful to explain the IT impact on different countries and when firms with a global scope use IT. Using a country-specific approach, new research is needed to investigate if the national culture or the national political/regulatory framework can constitute a source for creating competitive advantage via the use of IT. Firms in a more innovative culture could make use of the IT in a more effective manner than firms in a conservative environment. Also, it would be useful to know if complementary elements to IT such as fluid internal communication, absence of conflict and managers support to the introduction of new information technology have the same effects on IT effectiveness in different countries. Using the RBV it would also be interesting to analyze if the implementation of a specific global strategy (transnational, international, multinational, global) can become a value-generating resource for a technological company.

Other research question arises if we consider approaches related to RBV, such as the knowledge management view (KBV) and the stakeholders view. Firstly, more research is needed to fully understand the relationship between IT utilization and competitive advantage using knowledge management practices by the same firm in different parts of the world. As an example, firms that try to compete in new markets could find difficulties implementing knowledge sharing practices in countries with a high individualistic orientation. Secondly, the Stakeholder approach can be used to explain specific situations in which branches of multinational firms that introduce a valuable IT-based system do not achieve better economic results. In these cases, the parent company might be appropriating the economic rents generated by the IT.

Strategic Networks, IT Impact and Global Issues

Strategic Networks (Freeman, 1979) are stable inter-organizational links that are strategically important for the participating companies. They can take the form of strategic alliances, joint ventures, and associations in the long term between suppliers and customers, etc. (Gulati, Nohria and Zaheer, 2000). There are some studies that discuss the impact of IT on the structure and effectiveness of strategic networks (e.g.

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Fulk and DeSanctis, 1995), regarding IT as a dynamic element on the network and a promoter of the reduction of transaction costs between elements in the network, which, in turn, lead to the advantages attributed to this type of structure. Among these advantages are gaining the effects of learning, economies of scale and scope, reduction of costs via the distribution of risks and via the subcontracting parts of the value chain (Gulati, 1999).

Little empirical work has been done, however, that studies the influence of IT on the structural variables of the network, such as centrality, size and network density. If, as is likely, IT has an effect on these variables (Gulati, Noria and Zaheer, 2000) it will affect the learning capability of company members of the network, and also the blocking and unblocking of new alliances (lock in and lock out processes). Thus, for example, the introduction of new telecommunication tools may leave outside of the network companies that do not use the new technology. The same effect occurred after the decline in UNIX as a standard operating system, leading to the dismemberment of various strategic networks designed to lead the operating systems market (Gomes-Casseres, 1994).

From a global point of view (see line 12 in Figure 1), new technologies may provide new opportunities for global alliances, for example with companies geographically far apart. The study of the creation of new international alliances based on IT can be the basis for new research lines. It would also be of interest to analyze the influence of the power of distance variable in different cultures and the proclivity to create IT-based networks. The relationship between IT-based networks and the economic development of the country might afford new research lines for global management. More specifically, the effectiveness of IT-based networks in promoting the development of backward regions constitutes a promising research line.

Finally there are various approaches within the field of management, which may add new ideas to the question of the behavior of IT in organizations. We are referring to the human relations framework (Mayo, 1945) and to the social systems focus and socio-technical systems focus (Emery and Trist, 1965). These approaches attempt to explain the combined effects of technologies and the human element within organizations. In the case of IT itself, the socio-technical focus has been used to underline the necessity to adequately fit together the company culture, employee training and the motivation towards the adoption of the new technologies for a satisfactory final performance of the technological tools. As can be seen, this idea has been extended and structured in later approaches, which adopt the complementarity between the human and technological elements, especially the resource based view, which we have already outlined.

CONCLUSION

As we have shown in this present work, the study of IT as an active element within the company constitutes an interesting and multifaceted area of research. We have structured these areas of proposed research, leaving aside the work of an explorative

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nature, into two parts: on the one hand those approaches that refer to the impact on the structure of the company, and on the other hand, those that study the interactions of the technology on the company's strategy and performance. In the last group we have been especially interested in those approaches, which might throw some light onto the problem of the conversion of the implantation and deployment of computing and telecommunications technologies into performance or lasting competitive advantage. This precisely has been the area that has most been studied in recent years. In the strategic as well as the structural issues we have reviewed the most significant approaches in the literature. In each of them, we have identified the criteria for when they are useful for the problem of the company management of IT, underlining the research that we consider to be still unexplored and which may provide material of interest for future study. As a result of the process, we can conclude that each one of the approaches studied can provide useful explanations in academic research as much as in management. We should also stress that IT global management area is a complex field in which studies may be especially useful that use in a combined form a number of the approaches that we have proposed.

We have also tried to emphasize the ways in which the different theoretical approaches can be connected to global information technology management issues. Although several research studies, articles and books have been published in global IT management we think that the current work constitutes an innovative approach in this field. The utilization, at the same time, of the main management theories and the background in global IT management may result in a more structured advance in global information management issues.

The theoretical review we have carried out in this paper also permits us to highlight several shortcomings of the research done up to now in the global IT area. The first limitation is that most of the studies carried out on global IT are distinctly static in character. We believe that it is necessary to introduce a greater dynamic component in the analysis of IT in a global environment. We propose two possible solutions to this problem. In the first place, there are various theoretical perspectives that we have studied in this work that prove useful in explaining the long-term evolution of management problems. Among them, the dynamic capabilities framework, or even population ecology, may prove useful in explaining or predicting the behavior of global organizations that use IT intensively. They may also be appropriate for explaining the distinct competitive capabilities of IT over time and in different places in the world. Second, applying the techniques of longitudinal empirical research may throw new light on the analysis of global IT. Longitudinal methods may uncover new formulas of evolution in the management of global IT that may prove useful as much in the academic as in the professional world.

A second limitation in the area of global IT lies in the fact that a large number of studies have not mentioned, up to now, the advances of the previous decades in organization theory. As we mention at the beginning, the field of global IT has grown enormously in recent years. However it has not had a highly significant impact on the academic community, either in management or in information systems. Research in

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global IT has developed, in our opinion, along a path that has been excessively independent of developments in the fields of management and information systems. Although the research in global IT has used some theories which are widely used in management, such as Porter's competitive strategy (1980) or transaction cost economics (Williamson, 1975), it has neglected many of the theoretical currents thrown up in the past two decades, such as the resource based view (Wernerfelt, 1984), or strategic networks (Freeman, 1979). The divorce between the theoretical development of the global information technology and general management may be one of the main reasons that explains why global IT has been out of the research scope for other researchers in management.

In short, this present study can constitute the first step in the combination of research efforts in Global IT management, and management in general. The propositions we have suggested may be disproved empirically in subsequent work, just as our work may be revised or developed theoretically. Consequently we encourage researchers from both the fields of management and global IT to follow the research line we have outlined in this article.

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