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Comparative Study of IT Investment Management Processes in U.S. and Portugal

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ABSTRACT

This article investigates IT investment management processes in the U.S. and Portugal. In Portugal compared to the United States, we find less involvement of operational business users, less formalized processes, more bottom-up generation of ideas, less focus on business metrics other than financial ones, and more highly involved corporate boards. We develop a framework for understanding IT investment that includes five stages: idea generation, business case generation, investment selection, project implementation, and value realization. Several of Hofstede's factors are used to explain national cultural differences in each of these stages. Cultures with high power distance involve fewer business line employees in idea generation, fewer operational business managers selecting investments, and more centrally managed project implementations. In cultures with high uncertainty avoidance, fewer large scale strategic project ideas are generated and there is a stronger emphasis on financial criteria in information technology investment selection.

Keywords: IT business case generation; IT investment management; IT investment selection; IT value realization; national culture; power distance; uncertainty avoidance

INTRODUCTION

Corporate information assets can account for more than 50% of business capital spending (Nolan & McFarlan, 2005). Yet senior managers have questioned whether proposed savings from information technology (IT) investment materialize (Advisory Board Company, 1997). Most organizations are not generating maximum value from IT investments (Ross & Weill, 2002). IT alone does not create benefits; it is the management process that uses IT to create benefits (Brynjolfsson & Hitt, 1998; Keen, 1991). Companies that manage their

IT investments most successfully generate returns at least 40% higher than their competitors (Ross & Weill, 2002).

Many IT processes do not have standard operating procedures. Management develops its own internal processes for IT investment. Since benefits realization depends upon these processes, a better understanding of the factors that influence them could help generate greater value from IT investments. Management processes for IT investments have received minimal attention in the literature (Sherer, Ray & Chowdhury, 2002). Achieving value from IT investment requires sound business processes involving appropriate individuals through all stages of the investment cycle. We present a stage model for IT investment management that delineates management choices regarding who to involve in each stage and what processes to use.

Management processes are influenced by both organizational and national culture. There has been scant research examining the role of culture in key IT governance areas including IT investment and prioritization (Leidner & Kayworth, 2006). It is generally accepted that national culture plays a role in determining behaviors and practices that prevail in a particular business context (Davison & Martinsons, 2003; Grover, Segars & Durand, 1994; Hoftsede, 1993; Mathews & Ueno, 2001); in fact, the entire concept of management differs among nations (Hoftsede, 1993).

We focus in this article on the impact of national culture on IT investment management processes. The research question is as follows: *How does national culture impact processes used in IT investment management?* To answer this question, we first develop, in the second section, a framework for understanding the processes in IT investment management. We discuss factors that may influence an organization's choice of processes. The third section describes several case studies and develops some propositions about how cultural differences may influence management processes. The fourth section summarizes the key contributions of this research and its implications for research and practice.

IT INVESTMENT MANAGEMENT AND NATIONAL CULTURE

What choices do managers make when developing, evaluating, and implementing IT to maximize payoff? To answer this question, we need to open up the "black box" of IT investment management and adopt a process approach (Devaraj & Kohli, 2002; Soh & Markus, 1995). Table 1 presents our process framework that describes the key stages in IT investment management. This model allows us to delineate key management choices that are made, in particular, who is involved and what processes are followed in each stage.

Many of the IT management choices are driven by IT governance, the patterns of authority for key IT activities in business firms, including IT infrastructure, IT use, and project management (Sambamurthy & Zmud, 1999). Governance involves authority, control, accountability, roles, and responsibilities. It goes beyond structure and organization to include processes and human relationships including communication, liaisons, shared risks, responsibilities, rewards/penalties, and steering committees (Luftman, 2004). However, considerable diversity exists in the patterns of IT governance arrangements across contemporary firms (Sambamurthy & Zmud, 1999). To date there have been no IT governance standards (Nolan & McFarlan, 2005).

Table 1. Key management choices in IT investment

IT Investment Stage	Description	People (who?)	Processes (how?)
Idea Generation	Developing ideas for using IT in the business	Who initiates ideas? -Line employees -Management -IT -Business	How do ideas get communicated? Do we use top down or bottom up planning?
Business Case Generation	Determining the feasibility of these ideas to support the business	Who is involved? -Business managers - IT managers	How is the business case created? Do we require formal business cases or do we use an informal political process?
Investment Selection	Selecting appropriate investments	Who makes the decision? -IT vs. business -Committee vs. individual If committee, who is included? At what level are decisions made?	What metrics are used? -Strategic alignment -Financial criteria -Balanced scorecard
Project Implementation	Effectively implementing the technology within time/budget constraints	Who is responsible for implementing project within time/budget constraints?	How is the project monitored?
Achieving Benefits	Making complementary investments to achieve maximum benefits from the technology	Who is responsible? - IT group - End users - Committee	What metrics are used? How is process monitored? Is responsibility assigned?

Studies have considered a variety of factors that influence choice of governance arrangements including industry, firm size, corporate strategy, and corporate structure (Sambamurthy & Zmud, 1999). Cultural differences, both at the organizational and national level, have been shown to influence strategy and structure as well as behaviors and practices within organizations (Davison & Martinsons, 2003; Hofstede, 1997, 2001). These differences may impact the processes and relationships chosen for IT governance and subsequently the management choices in IT investment. However, while information systems researchers have begun to investigate how national culture affects a variety of issues (Ford, Connelly & Meister, 2003).

There remain significant gaps in the IS-culture research particularly in the areas related to IT strategy, management and governance (e.g., the structure and function of the IT organization within the larger organization; boundary spanning patterns of IT professionals, mechanisms/structure for IT project evaluation). (Leidner & Kayworth, 2006, p. 373)

The most widely adopted dimensions of national culture were developed by Hofstede (1997, 2001). Hoftsede's work

has been regarded as the most extensive study of cross-national values in a managerial context (Nakata & Sivakumar, 1996) with more than 1,800 citations through 1999 (Hofstede, 2001). Hofstede's work, however, has also been criticized for reducing culture to an overly simplistic set of dimensions, limiting the sample to a single multinational, failing to capture malleability of culture over time, and ignoring within country culture heterogeneity (Jacob, 2005; Sivakumar & Nakata, 2001). Despite these criticisms, studies published since Hofstede's original work (McSweeney, 2002; Schwartz, 1994; Smith & Trompenaars, 1996; Trompenaars, 1993) have sustained his conclusions (Hofstede, 2001; Kirkman, Lowe & Gibson, 2006; Smith & Bond, 1999). And researchers have favored Hofstede's work because of its clarity, parsimony, and resonance with managers, concluding that the values and dimensions continue to be relevant (Kirkman et al., 2006).

Hofstede's dimensions are defined in Table 2. We believe that some of these dimensions can explain different management choices in IT investment. In particular, planning and control choices can be explained by power distance and uncertainty avoidance, and innovativeness by individualism and uncertainty avoidance (Hofstede, 2001).

CASE STUDIES: DIFFERENCES IN IT INVESTMENT MANAGEMENT PROCESSES

We used the case study method because we were interested in the context of management action and decisions in a real setting and our research is explorative (Benbasat, Goldstein & Mead, 1987). A multiple case study design allowed cross case analysis to enable generation of propositions. We

Table 2. Dimensions of national culture[1]

Dimensions of National Culture	**Definition (Hofstede, 1997)**
Power Distance (PD)	Extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally
Uncertainty Avoidance (UA)	Extent to which members of a culture feel threatened by uncertain or unknown situations
Individualism/ Collectivism (IND)	Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family. Collectivism pertains to societies in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty
Masculinity/ Femininity (MASC)	Masculinity pertains to societies in which social gender roles are clearly distinct (men are supposed to be assertive, tough, and focused on material successes whereas women are supposed to be more modest, tender, and concerned with the quality of life). Femininity pertains to societies in which social gender roles overlap (i.e., both men and women are supposed to be modest, tender, and concerned with the quality of life).

chose two cultures that were very different on the Hofstede variables of interest. The United States and Portugal ranked differently particularly on uncertainty avoidance and individualism, with the United States ranked very high (#1 out of more than 50 countries) on individualism and Portugal very high on uncertainty avoidance (#2). Portugal also ranked higher than the United States on power distance (PD), as shown in Table 3.

To control for size and industry, we selected a similar size company in each country (U=US, P=Portugal) in each of several industries: insurance (Ins), government (Gov), health care (HC), and wholesale trade (WT). In the insurance industry we also included a Portuguese division of an American company (Ins-PU). A summary of the companies is shown in Table 4. We did not try to find similar governance models as we felt that governance itself was related to national culture. We did find that the U.S. companies had more strategic investment and spending, which we discuss in subsequent sections.

We interviewed at least the most senior IT manager in each company although additional IT managers provided input in several cases. Managers completed a short

Table 3. U.S. and Portugal ranking on Hofstede dimensions

Hofstede Dimension	United States	Portugal
Uncertainty Avoidance	43	2
Power Distance	38	25
Individualism	1	34
Masculinity	15	45

Table 4. Description of case studies

Company code*	Number employees	Number of IT employees	IT organization	% Strategic IT investment	IT costs % of revenue
Gov-P	15,000	50 + 250 out-sourced in last yr	Centralized	15-20	2-4
Gov-U	24,000	130 + 320 in business units	Federal	10-30	NA
Ins-P	>2500	>250	Centralized	10	2-4
Ins-PU	100-500 in Portugal >2500 total	10-50 in Portugal >250 total	Centralized	20	>10
Ins-U	2200	330	Federal	25-30	4.1
HC-P	<100	<10	Decentralized	0	1-2
HC-U	<100	<10	Decentralized	Minimal	NA
WT-P	<100	<10	Centralized	0	4-6
WT-U	100	2		25	.5-1

**U=US, P=Portugal, PU= Portuguese subsidiary, U.S. owned*

survey describing their investment portfolio. Interviews were semistructured around a set of questions, shown in Appendix A, which allowed open ended discussion of processes to follow-up and clarify specific details. Additionally, we reviewed any available planning documents such as sample business cases and project plans to triangulate our results. If different processes were used for different investment objectives, we asked participants to comment on the differences.

Using the qualitative data, we attempted to categorize the management decisions in each stage along major people/process dimensions. For example, in project selection, the criteria for decisions ranged from solely financial to a more balanced approach while the participants ranged solely from the IS manager to include operating business managers and sometimes the corporate boards. We then categorized each of the case studies on these dimensions. Hofstede's theory was then used to interpret the differences that may have been influenced by national culture.

We will discuss the differences that were observed in each of the stages of IT investment. We then interpret these differences through the lenses of national culture, which we summarize in a set of propositions.

Idea Generation

Ideas for the use of information systems can derive from both information systems and business users. Information systems groups use their expertise in understanding emerging technologies to develop potential business applications. Business users who are exposed to business problems and issues provide a different perspective. Users can suggest business process improvements and business managers can develop IT investment ideas that better support company strategy. Ideally input from all perspectives is useful (IT, business users, management).

IT investment ideas range from individual projects to large scale initiatives. Individual projects generally address specific problems, are often implemented in short time frames, and derive from a "bottom up" planning process. Large scale initiatives often have greater strategic impact on organizations, typically arise from top

Table 5. Case studies: IT investment idea generation

Ins-P	The IT group primarily generates investment ideas which are then evaluated by business management. Generally, these are enhancements to existing projects, although infrequently large scale projects are suggested.
Ins-PU	Project ideas are generally initiated by users, both managers and salespersons. Users make suggestions to their managers who in turn discuss these ideas with department directors. An idea is introduced to IT when the user completes an Internet project request form with rationale, timing, and impact. Prizes are awarded to encourage individual users to provide ideas.
Ins-U	More than 50 people, including every business leader, are involved in developing IT investment ideas which are generally large scale investments. Functional teams from both business and IT subsequently define specific business problems and solutions that could be addressed by these investments. Specifics are brought to the larger team.

down planning by senior managers, and generally must be effectively "chunked" for successful implementation.

While both large and small ideas and business and IT involvement are desirable, some organizations tend to develop processes that primarily focus more on one or the other. Some differences are illustrated in three cases studies from the insurance industry presented in Table 5.

We classified all the case studies based upon their primary idea generation processes in Figure 1. Most of the Portuguese companies followed an IT driven, individual projects approach with the exception of the governmental organization that recently introduced a more top down strategic approach to planning. Table 4 shows that percentage of IT investment that is strategic was generally less in the Portuguese companies compared to the U.S. companies. Differences in process are illustrated by the following statements:

Innovation is IT driven. Of course it goes to the business people to validate. Once IT comes up with the innovation, we go to the business. If they agree, we can take it to the board. After verbal agreement from the board, we write up all the details. (Ins-P)

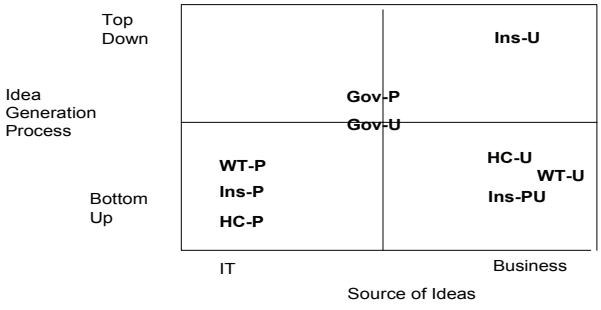
I believe that it is very important to get the senior leadership team on board .... To me the key is to have dialog and discussion among the seven member council {of business leaders}... and remove the focus from day to day problem solving .... We have long discussions, several hour discussions, on the IT strategy. It is key to have that level of dialog and discussion for the prioritization process to work. We always ask, what is the business value? How can we derive business value? I call {this process} business value driven analysis .... We carve out strategic initiatives {that are} really driven by senior level management team. (Ins-U)

With regards to high value shorter term projects (as opposed to long term strategic projects):

I pulled out the team that was logging and recording individual small requests {for projects}. Having piecemeal requests may on an incremental basis seem to be adding value but this is a very high cost model. The model that I am transitioning to is to look holistically at your functions. If there are eight or nine things you need to get done, if you put them together, look at adjacent business functions and how these can be put together, you now have a mini project which may last you 3 months as opposed to 5 days but the value that you derive will be so {much more} significant .... I am trying to get operational people to think strategically. (Ins-U)

If authority for IT implementation rests with the IT department, we expect that business users in high PD societies will defer to the IT authorities. When IND is low and PD high, we expect that business users would not be as involved in IT idea generation due to hierarchical constraints as well as lower individual motivation to innovate. High PD societies have more centralized decision structures with concentrated authority (Hofstede, 2001, p. 107). In high PD/lower trust societies, workers are isolated by bureaucratic rules (Fukuyama, 1995; Hofstede, 1980). Lower levels of trust in high PD cultures imply less information sharing (Nakata & Sivakumar, 2001). Moreover, we expect that

Figure 1. Idea generation: Sources and processes



low IND is associated with less individual innovation by business users. Consumer willingness to innovate is associated with high IND and low UA (Lynn & Gelb, 1996; Steenkamp, Hofstede & Wedel, 1999).

Planning processes in organizations are related to UA and PD norms of the dominant national culture (Hofstede, 2001, p. 381). Higher UA makes it less likely that strategic planning activities are practiced because these activities question certainties (Schneider, 1989). Lower UA has been empirically linked to higher levels of innovativeness, as indicated by national patent rates (Shane, 1993), incidence of radical over incremental or process innovations (Herbig & Miller, 1991), and increased willingness to take risks (Thong, Yap & Raman, 1996). Countries with high UA experience higher resistance to applications and higher traditionalism, with less long term goals and less detailed plans (Montealegre, 1998).

These leads to the following two propositions:

- **Proposition 1a:** In countries with lower individualism and higher power distance, fewer IT investment ideas are generated by business line employees.
- **Proposition 1b:** In countries with high uncertainty avoidance, fewer large scale strategic projects ideas are generated for IT investment.

Business Case Generation

The business case justifies the investment from several perspectives: strategic, operational, technical, and financial (Kalakota & Robinson, 2001). A complete business case demonstrates consistency with firm strategy, how the implementation will be efficiently managed, as well as the risks. Some organizations, particularly those with steering committees, have very formal processes requiring business cases on all projects, with specific preparation steps, formats, requirements and written plans (Doll & Torkzadeh, 1989). In other organizations, there may be no standard processes for business case preparation; each idea is justified based upon the case put forth, and informal dynamics predominate (Weill & Olson, 1989).

While the information systems group generally provides the technical perspective and cost information, strategic and

Table 6. Case studies: Business case generation

Gov-P	IT and business together build implementation scenarios. Business quantifies benefits, IT comes up with costs. No formal or standard processes are followed. Finance is not formally involved.
Gov-U	Prior to business case generation, every project first has a technical review, then a financial review by the Finance department. Standard process and formats are required.
Ins-U	Business people provide input to IT. IT has both finance and balanced scorecard experts with dotted line responsibility to CFO; together they put together the cost budget.
Ins-P	Very detailed plan developed. Costs and benefits (including intangibles) are estimated by the IT group.

operational feasibility assessment is enhanced with business management and user involvement. Moreover, the business should be best positioned to understand the benefits. In fact, if IT alone estimates the benefits, there may be a resultant responsibility gap (Sherer et al., 2002).

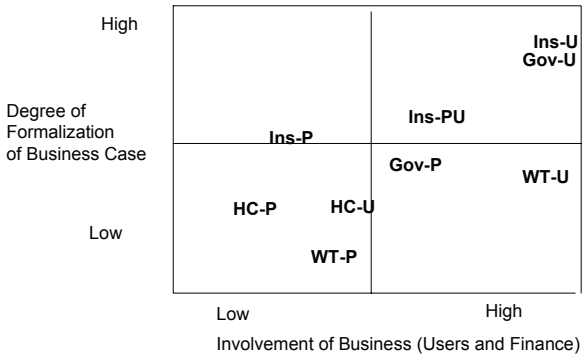
Some differences in the ways in which business cases are developed are described in the case studies in Table 6.

Figure 2 classifies business case generation in terms of business involvement and degree of formalization. Generally, we find less involvement of business, both users and finance, in Portugal with greater degrees of formalization in the U.S., although the Portuguese companies do not cluster as strongly on these dimensions in this stage compared to the other four investment stages.

When power distance is high as in Portugal, we expect that business line managers and employees, in particular, would not be as involved in any of the processes. However, with higher UA, we expected that Portugal would have more formal processes with more involvement of Finance in developing the business cases in order to minimize risk. Higher UA supports the primacy of planning (Chong & Park, 2003), the need for more detail in planning and short term feedback (Hofstede, 2001; Schneider, 1989), a higher degree of formalization (Raghunathan & Raghunathan, 1989; Rodrigues & Kaplan, 1998), and the prevalence of control systems, such as elaborate forms of planning, conservative accounting systems, and extensive written communications (Hofstede, 1980; Nakata & Sivakumar, 1996, 2001; Salter & Niswander, 1995).

We expect that the reason we did not find greater formalization during business case generation in Portugal was that there were less investment in large scale strategic projects. We found that the Portuguese companies range of investment in strategic systems was not as high as in the U.S. as shown in Table 4. Since fewer strategic business ideas were evaluated; there was less need for business involvement and formal business case justification. IT investments can be classified by objective, for example, strategic systems, traditional development, DSS, infrastructure investment, BPR, and maintenance and enhancement (Grover, Teng & Fiedler, 1998) or strategic, informational, transactional (Weill & Olson, 1989). We expect more business involvement in strategic systems and BPR compared to investments whose

Figure 2. Business case generation: Formalization and business involvement



primary objective is maintenance. We believe that business case generation processes are influenced more by investment objective than national culture, leading to the following proposition:

- **Proposition 2:** Business case processes are influenced primarily by investment objective.

This was supported by some interviews as follows:

The process depends upon the level of investment. (Ins-PU)

We don't follow the same process for all investments. It depends whether the investment driver is reengineering technology to update ancient systems, or mergers, or innovation. (Ins-P)

We do not follow the same processes for strategic projects as day to day support enhancements. (Ins-U)

Project Selection

Case studies summarized in Table 7 indicate a wide range of involvement of various personnel in investment selection decisions and different investment criteria.

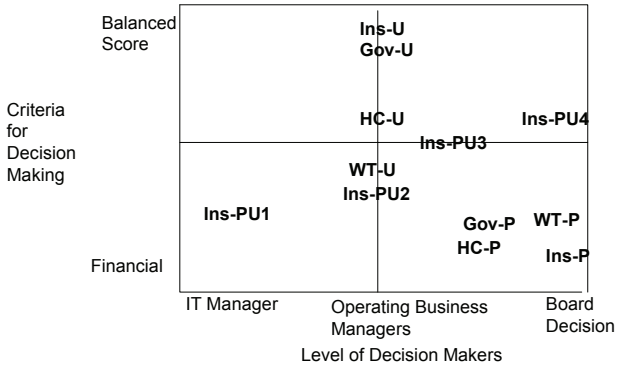
Figure 3 classifies the case studies on two criteria: decision maker and primary criteria. The horizontal axis indicates the level of the decision maker with the extreme right indicating very high level, corporate boards. To the left, we have decision making authority in the IS manager. At Ins-PU, procedures differ depending upon project size (1=smallest projects; 4=largest projects.)

Few companies left the IS manager in charge of project selection decisions. One exception was small projects at Ins-PU1 where the CIO made the decision, but even here sign off from a business manager was required. In Portugal, IT project decisions are generally made at the level of the corporate board. Generally in Portugal, the operating CIO is not a member of the project selection group even though idea generation is driven primarily by information systems. In the Portuguese companies, financial criteria were the key driver in decision making about IT investment. In the U.S. companies, there was often a more balanced analysis of the drivers for IT investment. While financial analyses were

Table 7. Case studies: Project selection

Ins-P	The corporate board (comprised of political appointees who do not rise from the company ranks) meets weekly and makes all investment decisions. Quantitative financial criteria are used to make all decisions.
Ins-U	Investment decisions are made by representatives of the executive council including CIO, CFO, Director of Distribution, and Chief Underwriting Officer. A balanced scorecard approach is used. The CIO organization includes a balanced scorecard person with dotted line responsibility to the CFO.
Ins-PU	Depending upon project size, there are different levels of approval: 1. Small projects less than 10 MD approved by Portugal CIO. 2. Medium projects less than 50,000 €: IT committee made up of management team, Portugal CIO, business area managers who meet every two months. 3. Projects more than 50,000 € are approved by CEO Portugal. ROI is the sole criteria. 4. Projects more than $200,000 are approved by headquarters in U.S.
Gov-P	Every project must be approved by the corporate board, appointed by the political administration. The corporate board is comprised of President, COO, CFO, and other administrators. IT reports to COO.
Gov-U	The IT Governing Committee (politically appointed) comprised of CIO, Chief of Staff, Managing Director, Solicitor, Financial Director, reviews all requests and makes decisions with consideration given to strategic priorities, legal mandates, health/welfare/safety. Money is taken out of department budgets for expected productivity improvements, drawing from an established productivity bank.

Figure 3. Project selection: Criteria and decision makers



generally done, they were only a part of the overall decision making criteria.

Decision making authority for IT project selection is a component of IT governance which is shaped by corporate governance arrangements (Sambamurthy & Zmud, 1999). Corporate governance systems are in turn shaped by social characteristics and values of society (Rehman, 2004). Differences in PD affect corporate governance (Hofstede, 2001). A nation's commonly shared administrative practices constrain the actions of firms within that nation (Simon & Lane, 2004). Thus, we expect that national culture (particularly PD) influences IT project selection processes through corporate governance, particularly involvement of corporate boards in IT governance decisions.

Typically IT governance studies discuss distribution of IT decision making among three constituencies: corporate IS, divisional IS, and line management. In the U.S. and U.K., IT investment decision making is often shared among these constituencies with steering committees charged with investment decision making (Earl, 1989; Karimi, Bhattacherjee, Gupta & Somers, 2000). Most corporate boards are uninvolved in IT spending and strategy and only a small group of companies have established rigorous IT governance committees on their boards, despite the fact that corporate information assets can account for more than 50% of capital spending (Nolan & McFarlan, 2005).

In Portugal most top listed firms rely on the state or feature controlling families who shun outside management (Davis Global Advisors, 2002).[2] These boards are intimately involved with IT investment decisions. This reflects Portugal's culture of high PD where power over spending is closely controlled by outside boards. We expect that investment decision making in high PD countries will be closely controlled by either corporate boards or very senior business executives, often not including IS management.

In addition to who makes IT investment decisions, there are differences in the importance of alternative criteria for decision making. Some companies rely solely on quantitative financial rather than qualitative and nonfinancial metrics whereas others incorporate a more balanced approach to project selection. An early 1990s study reported that both "support of business objectives" (qualitative) and "internal rate of return" (quantitative) were the top two criteria to select high value IT projects in four countries with low PD and UA and high IND and MASC – U.S., Great Britain, Australia, New Zealand (Bacon, 1992). While a portfolio of financial measurement methods is available (Advisory Board Company, 1997), some researchers have called for utilization of qualitative methods to measure intangible benefits (Wen & Sylla, 1999; Wiseman, 1994). The balanced scorecard approach augments financial metrics with goal related measures from the perspective of the customer, internal business process, and learning and growth (Martinsons, Davison & Tse, 1999; Van der Zee & De Jong, 1999).

UA is positively associated with more extensive external accounting reporting systems (Ray & Gupta, 1993). Accounting systems are uncertainty reducing rituals (Hofstede, 2001). Quantitative measures reduce project uncertainty by providing specific cost and impact information. Intangible benefits are more ambiguous, difficult to assess, and therefore uncertain. Thus, we expect that countries with high UA will generally focus primarily on financial criteria to make IT investment decisions.

Even within a single company, quantitative criteria are not uniformly used on all investment decisions (Bacon, 1992). For some applications such as maintenance, compliance, CEO top priorities, and strategic necessities, traditional financial methods may not be required to make the business case (Luftman, 2004). We expect that investment objective moderates the impact of UA on the requirement for financial targets in IT investment selection decisions. In fact, the prevalence of strategic projects in the American companies perhaps influenced the need to incorporate balanced scorecard approaches.

Our study provides the basis for two propositions regarding the impact of national culture on IT investment selection decision making processes.

- **Proposition 3a:** When PD is high, IT investment decisions will primarily involve the most senior levels of the corporation in decision making.
- **Proposition 3b:** When UA is high, there is a stronger emphasis on financial criteria in IT investment selection decisions. This, however, may be influenced by investment objective.

Project Implementation

It has been estimated that three-fourths of all large systems are "operational failures" because they either do not function as specified or they are simply not used (Gibbs, 1994). And almost one third of all software projects are canceled before the development cycle is complete (Smith, Keil & Depledge, 2001). Much has been written about improving project implementation processes through effective project management (Boehm & Ross, 1989; Jurison, 1999; Schwalbe, 2002). Almost every study of project success stresses the importance of senior management involvement in the process. In some organizations, IT managers lead these projects. However, business as well as IT professionals need to work together to insure successful project completion because not all project completion risks are within the control of the technical or software project manager (Sherer, 2004). In some companies this is accomplished by having a business manager lead the team or through joint IS and business project management.

When requirements change, the impact on project schedule must be clearly understood and appropriate decisions made about incorporating change. Often this requires mechanisms for resolving differences. Formal risk resolutions techniques such as project reviews can be instituted with formal processes for managing and reporting cost, time, human resources, quality, communication, risk, procurement, integration and scope (Schwalbe, 2002). Many companies are working to improve their project management maturity by developing more standard metrics and procedures (Crawford, 2002). As a result many companies have instituted Project Management Offices (PMOs) that provide centralized project management capabilities and assistance, standardizing project management through disciplined processes (Santosus, 2003).

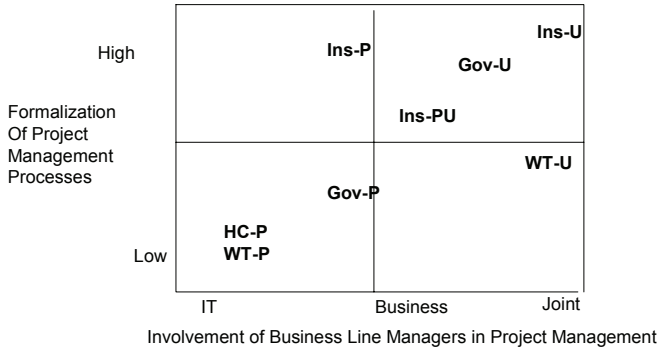
The case studies in Table 8 show some of the differences in the way in which companies carry out the project implementation phase.

Figure 4 shows some differences in terms of the level of involvement of the business in the implementation process and the degree of formalization of the project management processes. The Portuguese companies tended to have less formal project management processes, similar to

Table 8. Case studies: Project implementation

Ins-P	The IT group has major responsibility for implementation. Each project has a board appointed steering committee which can include users, board members, and sometimes operating managers. Steering committees meet monthly and approve any changes. Changes are discussed thoroughly but once a decision is made, the board is rarely questioned.
Ins-PU	A business sponsor or team leader from the business side is always assigned if a project is greater than $200,000, and sometimes assigned for smaller projects. A PMO is used.
Ins-U	Joint responsibility is assigned to both IT and business managers. There is a governance board for each project.
Gov-P	The IT account manager (who is knowledgeable about the business) is the project leader. A business owner is appointed. All scope changes go back to the board. A formal scope change process, project management techniques, and a PMO are being developed. Risk assessments are not currently done.
Gov-U	If the project affects multiple departments, a project manager is assigned from PMO. If it impacts a single department, it is managed by that department. They have specific project management reporting requirements and use risk management techniques.

Figure 4. Project implementation: Process formalization and business involvement



findings in Greece (Serafeimidis & Doukidis, 1999) which has similar Hoftsede rankings on UA, PD, and IND. However, the different Portuguese companies differed in their level of formalization. In a culture with high UA, we would expect formal processes to manage projects. High UA is associated with higher degrees of organizational formalization (Rodrigues & Kaplan, 1998) and control (Hofstede, 2001). However, when individualism and masculinity are high, such as in the U.S., we also expect formal mechanisms to be needed to resolve conflicts and differences. Since most of the Portuguese companies are striving to achieve a higher degree of formalization in project implementation processes, for example, just implementing PMOs, the difference in level of formalized project management processes may be due more to less maturity of project management processes in Portugal and differences in investment objectives compared to the U.S. than to differences in Hofstede factors.

American companies tend to involve more business people in managing the processes, either making them project leaders or joint leaders with the IT managers.

We have both IT and business project managers and a governance board for each project .... Our project structure is such that we have either a program manager reporting to one of the senior vice presidents or an IT project manager and a business project manager who co-manage the project.... CEO has a staff meeting each month…which is a communication and interaction tool, not a decision making group. (Ins-U)

Participation of end users in IT development decreases with more management control as PD increases (Shore & Venkatachalam, 1995). In Portugal, the corporate boards, not end users or business management, are very involved in managing the implementation of the project. This was not found in any of the U.S. companies. We expect that this is due to differences in PD which have led to different types of corporate governance arrangements in Portugal compared to the U.S.

Sometimes people know what they need to do but not able to explain why or they are afraid to .... Even if they know it is not going to work, they don't say anything. They do not question the Board. (Ins-P)

I {IT} am the project manager on all projects. I try to get every area manager involved because they should be responsible for processes and making organizational changes and they can do what they want. I negotiate with them to get them to change. Twice, I had to go to the board to see if they could pressure the area managers to change. In one case, it took three years to convince the area manager of need to change. (HC-P)

This leads to one proposition.

- **Proposition 4:** When PD is high, project implementation is more centrally managed at higher levels in the organization.

Value Generation

Payoff from information technology investment is dependent upon successful implementation of appropriate change management initiatives that must accompany the investment (Sherer, Kohli & Baron, 2003). Conversion effectiveness, a function of implementation process, organizational culture, and management skill (Weill & Olson, 1989) may be influenced by national culture. Payoff also depends upon appropriate reviews of the investment to insure that benefits are achieved. If benefits are not being achieved, then appropriate responsibility can be assigned to insure that the necessary organizational changes are made.

Many change-related technology projects fail because they focus primarily upon deploying the technology and not on the organizational changes needed to use the technology appropriately (Sherer et al., 2003). Best companies assign clear responsibilities to individuals who can accept accountability for the outcomes of IT decisions (Ross & Weill, 2004). The metrics used to evaluate the benefits can drive the types of changes that are made. If appropriate metrics are not used, organizational change will not occur. Benefits can best be achieved if appropriate business people are involved in making the organizational

changes. Senior management needs to insure that these changes occur.

Often companies do not follow through with postproject reviews to assess the achievement of the return on the investment. Frequently a project's return on investment is defined in terms of reduced headcount, but not all headcount reductions actually take place (Luftman, 2004). These post investment audits can help organizations increase their benefits from their investments (Sherer et al., 2002).

The case studies in Table 9 describe some differences in responsibility assignment for value realization and degree of audit of investments.

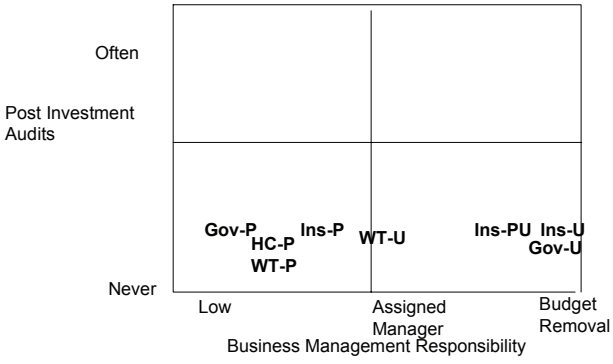
In Figure 5 we classified the companies that we interviewed based upon their usage of post investment audits and level of responsibility of business for realizing value from the investment. We expect that greater business responsibility accrues if cost is taken directly out of budgets compared to simply assigning a business sponsor.

We found no companies that did much in terms of post investment audits in either culture. We would expect that cultures with high UA might focus more on post

Table 9. Case studies: Value generation

Ins-PU	If a project requires headcount reduction, they include the names of people whose jobs will be reduced. No post investment audits are done.
Ins-U	Responsibility for organizational change is assigned to a member of steering committee. CFO takes anticipated cost reductions out of the budget of the business area when the project is approved.
Gov-P	No specific responsibility is assigned for value realization. IT sometimes plays the change management role with the account manager triggering needed actions within the business.
Gov-U	They take anticipated cost reductions out of the budget of the group affected. Specific responsibility for value realization is assigned to the affected group.

Figure 5. Value realization: Investment audits and business responsibility



investment audits. However, everyone we interviewed discussed how priorities change as the next project is introduced. Few organizations took the time to go back to find out what value they were getting from their former IT investments.

We found that most of the Portuguese companies did not assign responsibility for value realization to business management.

IT people believe that [change management] should be led by business people. We all believe that the business people should be responsible. Unfortunately, this is not always the case. We have to play this role more than we like to. We are in the position that we see all the ... problems, we identify what the business people have not taken care of like they should …. We have to contribute. We promote this by having account managers that are not just IT people. They know well the business processes. They stimulate the business areas to provide change. (Gov-P)

The American companies not only assigned responsibility to a business user but generally took money out of the budget of the business unit responsible for the change.

If it requires funding, we have several options within government, whether it comes from capital budgets, operating budgets , or ... a productivity bank. If you have a project which you can show will have real payback and the dollars are taken out of your budget (so you must be real sure that you can get that payback), then you can submit to that. If it does not qualify for that, you can take the dollars out of your operating budget. With the tight budgets of the last few years, we have not seen many projects taken out of operating budgets. Most have been capital budget projects or productivity banks. [Business users] have to be fairly cognizant of what costs will be since dollars will be taken out of your budget. Maintenance comes out of central IT budget or departmental budgets. It's great to go out and get a new system but you must be responsible for maintenance. (Gov -U)

We would have expected that in cultures with high PD, responsibility would be assigned to senior managers. However, we did not find that senior *business* managers had this responsibility. Moreover, in cultures such as Portugal with higher UA, we would have expected even stronger responsibility assignment for value realization. One of the key issues for Portuguese companies is that headcount reduction is generally not feasible in Portugal. Thus, Portuguese business managers are not accountable for these types of reductions. Since Portugal has less strategic investment than the U.S. and they do not eliminate positions, focusing on productivity rather than profitability (Devaraj & Kohli, 2002), they may not involve business managers as much. Moreover, the corporate governance arrangements resulting from high PD (powerful board, strong centralized IT groups) reduces sharing of responsibility with business units.

- **Proposition 5:** Degree of business unit responsibility for achieving value from IT investments is a function of the investment objective and corporate governance arrangements.

Table 10. Dimensions in IT investment management

Stage	Process Dimension	People Dimension
Idea Generation	Top down versus bottom up	Business involvement
Business Case Generation	Degree of formalization	Business involvement
Project Selection	Criteria used (financial only; balanced)	Level of decision makers
Project Implementation	Formalization	Business involvement
Value Realization	Post investment audit	Business responsibility

CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH

We structured IT investment management processes into five distinct stages and delineated key management choices in each stage. Previous research simply categorized different stages but did not focus on value generation nor management choices (Serafeimidis & Doukidis, 1999). We emphasize the processes used and people involved in each stage. We also recognize the need to realize value through complementary change management to business processes.

Through case studies, we determined dimensions that distinguished the processes used in each stage, summarized in Table 10. A key contribution of this research is the identification of the different dimensions that distinguish management choices in each of these stages. In all cases, there was a significant difference between degrees of process formalization. This was particularly the case during business case generation and project implementation. Future research will investigate whether degree of process formalization during IT investment analysis and implementation is related to level of benefits achieved from information systems and show whether culture moderates this relationship. During idea generation, processes varied from broad strategic planning to discrete project idea development, between opportunity and problem focus. We expect that these differences could lead to different objectives for investment. A significant difference in investment selection processes was driven by requirements for using different criteria. Reliance on financial criteria as compared to more balanced criteria distinguished companies in their investment selection processes. Future research will investigate how broader criteria might impact value achieved from investment. While we expect that companies would differ significantly in the degree of post investment audit, affording some companies greater opportunities to increase value from investments, we found very few companies completing these analyses. We expect that companies that complete post investment analysis would be more successful in future projects.

We also found significant differences in the role played by the business units in each of the stages of IT investment management. Moreover, there were also differences in level of authority of key decision makers in IT investment decisions, even when the decisions had similar strategic impact. Differences in business unit in-

volvement may directly impact the value generated from the investments. We expect that projects requiring substantial change management will generate greater value if business management is more involved. However, cultural differences may alter the dynamics of business unit involvement.

Another contribution of this work is the identification of the analysis of IT investment management processes in another culture, similar to the work of Serafeimidis and Doukidis (1999), and a comparison of these processes across two different cultures. Comparing IT investment management processes in Portuguese companies compared to U.S. companies, we found less involvement of operational business users in Portugal. We also found that board members are much more involved in decisions involving the use of IT in Portugal compared to the U.S. However, business users and managers are more involved in the U.S. We found that Portuguese companies tended to have less formalized processes, more bottom up generation of ideas, and less focus on business metrics other than financial ones. We expect that this is the result of cultural differences that have led to different models of corporate governance for information systems. This may also be influenced by different investment objectives.

We used Hofstede's factors to interpret some of the cultural differences that we found. A set of propositions were developed to guide future research in this area. We suggest that investment objectives primarily impact business case processes and influence both investment selection and value realization processes. We believe that higher UA and PD in Portugal may influence the processes used during most of the investment management stages. During idea generation, investment selection, and project implementation, higher PD cultures have different processes and involve different people. We expect that cultures with high PD involve fewer business line employees in idea generation, fewer operational business managers selecting investments, and more centrally managed project implementations. With higher PD business users will defer to authorities. If IT is responsible, then the business will defer as well to these authorities. In cultures with high UA, we expect that there are fewer large scale strategic projects ideas generated and a stronger emphasis on financial criteria in IT investment selection. Strategic investments have higher levels of uncertainty. Therefore they will be less likely to be undertaken. Specific financial criteria showing the value in financial terms will support the need to reduce uncertainty.

This study makes several contributions to the research literature:

1. Framework for IT investment management including specific management decisions regarding process and people
2. Application of framework to analyze case studies
3. Development of key differences between two cultures
4. Interpretation of the differences through the Hofstede framework leading to a set of testable propositions

Our research contributes to research streams on cross cultural IS, global IT management, IT governance, and IT management. In particular, it addresses the recently recognized gap in IS culture and governance research (Leidner & Kayworth, 2006).

The IT investment framework could help IT managers understand key decisions that they are making and their impact. For example, what are the choices that they need to make about who to involve and how to go about the processes involved in each of the stages of investment management. This will provide them with a framework to consider how their choices might affect their outcomes to achieve greater value from their investments. This research can also be helpful for managers to consider how national culture might be influencing their processes. This could help managers select processes that fit best with their cultures. It could also help managers in multinational corporations who are trying to rationalize their processes for developing, using, and managing information systems and technologies in different countries. Policies and processes that motivate developers and users may have different effects in different countries. Efficacy of different planning and control systems may differ in different cultures. This understanding could help managers do a better job in these multinationals. This is especially important today as many IT investments are being deployed across nations and regions.

This research has a number of limitations. As with any case study research, only a small sample of companies was included. Second, while we tried to select companies in each industry with similar strategic focus, there were some differences among the companies particularly between countries. This was particularly the case with governance arrangements as well as investment objectives. Third, Hofstede's work, while widely cited and used, has also drawn criticism. Hofstede's study is dated and there have been many changes in Portugal in the last decade with both increased globalization and Portugal's entry into the European Union. Hofstedes' factors have not been studied in recent Portugal. All interviews were done in English, even in Portugal, so that the sample of Portuguese companies may be biased.

Future research is needed to confirm the current validity of the Hofstede factors for distinguishing national cultures today. Based upon these results, a broader study of companies in more than two cultures can be carried out to test the propositions developed in this article. This would involve a large scale survey in several different cultures (based upon validated Hofstede factors) that would control for different investment objectives. The survey would measure factors along the identified dimensions that distinguish cultures. A second area of future research would link practices with outcomes. We would like to develop a set of best practices for different cultures. To accomplish this task, we need to test the impact of different processes on outcomes for each stage of the IT investment management process. We are in the process of developing metrics for outcomes in each of the stages. Through a large scale survey, we will collect data on processes and then collect outcome metrics that we can relate to these processes.

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ENDNOTES

1 Long term orientation was added as a fifth factor. However, we have chosen to focus on the original Hofstede factors because of the availability of Portugal ranking.

2 Portugal has moved to reform its corporate governance standards. In 1999 Comissao de Mercado de Valores Mobiliarios (CMVM) released a 17-point best practice code modeled on OECD guidelines. However, compliance with these rules has been unsatisfactory (FT.com, 2004) with only 14% of companies complying in 2001 (Alves & Mendes, 2004). In 2004 either a family or the state controlled most listed companies with limited power of other shareholders to influence strategy or hold dominant shareholders to account (FT.com, 2004). We expect that this will change as more Portuguese companies adopt new corporate governance standards, with Portugal's involvement in the European Union, and increased globalization. At the same time, we anticipate increased corporate board involvement in the U.S. as a result of the increased recognition of the high value of IT investments and studies raising awareness such as Nolan and McFarlan (2005).

APPENDIX A.
Guided Interview Questions

1. Describe the process to bring ideas for new investments to senior business management.
2. How involved are each of the following in generating ideas: business vs. IT, line management vs. senior management?
3. How often are these ideas strategic vs. operational?
4. Is a business case always prepared?

5. Is there a defined process for business case preparation? If so, please describe.
6. How often are each of the following included in the business case: expected benefits, financial analysis, risks, stakeholders and business areas impacted?
7. How often do each of the following participate in development of the business case: IT, finance, business senior management?
8. How complete are the business cases?
9. Do business cases always address long term strategic impacts?
10. What criteria are used to make investment decisions and how often are they used? (qualitative vs. quantitative, financial vs. non-financial)
11. What factors are considered in the investment decision, e.g. existing and future portfolio of applications?
12. Is responsibility clearly defined for investment selection and who is involved?
13. Is a steering committee involved? If so, when are they involved and who is on the committee?
14. How often are members of the business area impacted by IT investment participating?
15. What is the role of IT and finance in investment selection?
13. What types of projects are selected?
14. Are project management processes always followed? If so, describe them.
15. Do reviews take place regularly? Explain the process including responsibilities, process, and content.
16. How are project changes managed?
17. How involved are senior IS and business management in the project?
20. How does project management communicate with business and IT?
21. Who is on the project teams?
22. How often are projects completed on time? within budget?
23. Is there a defined process for change management? If so, describe it.
24. Is there a business sponsor responsible for change management initiatives?
25. Are complementary changes adequately funded?
26. Is there a communication plan to address change management?
27. Are reward system changed to support desired changes in behavior associated with new technology? Explain how.
28. How often are post investment audits completed?

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