INFORMATION TECHNOLOGY IN IRELAND: THE MYTH AND THE REALITY?

Bakr Ahmed Alserhan and Teresa Brannick[*]

Introduction

Large amounts of resources have been, and will continue to be, invested in information technology (IT). Each new IT investment should enable a firm to become more efficient and/or effective; yet, frequently, few of the anticipated benefits are obtained within the projected time-frame. In many instances, anticipated benefits fail to materialize until many years after a firm introduces a new IT application. IT investments must be accompanied by careful redesign and/or restructuring of the organization to obtain many of the anticipated benefits of the investment. Yet, time and again, organizations fail to redesign and restructure their business in ways that best utilize these new resources (Tam, 1998).

Effective implementation of IT depends on the organization's vision of change, so a distinction should be made between the automation and the information roles of IT. Automating means applying technology in ways that increase the self-acting and self-regulating capacities of machine systems, thus minimizing human intervention. Given that IT can be used to reduce human intervention in production or administration, it can help where skilled individuals are scarce. Reducing human intervention in production and administration, and lowering the skill levels to operate a new technology, will cut costs and increase flexibility (Davis, 1992). Informating, on the other hand, means using IT to translate existing organizational processes, objects, behaviours and events into explicit information.

---

[*] Business Research Programme, The Michael Smurfit Graduate School of Business, University College Dublin

This latter environment requires the development of a new kind of human knowledge, which is relatively analytical, abstract and conceptual. It focuses on people, rather than bypassing them.

An emphasis on IT to improve current efficiencies assumes that the future will be the same, only more so. Firms operating from this perspective strive to do the same things, only do them faster and cheaper. To use a metaphor suggested by Porter, they try to increase their speed in the race they have entered rather than questioning whether they have entered the right race.

However, in order to thrive in a competitive world, firms must see their futures as significantly different than the present because technology provides opportunities that never existed before. The firms that have the greatest chance of staying on the business directory list will be those that use technology to create what could be and what might be, not those that improve what is.

IT and Performance

Earlier studies examining the relationship between IT investment and firms' performance found the following relationships.

Positive Relationship

Many studies have found positive relationships between IT investment and firm performance. Bender (1986) examined the insurance industry and concluded that total information processing expense was significantly related to the reduction of total operating expenses. Dunkle and King (1990) studied the payoffs from computerization in government organizations and found that major payoffs occurred in the areas of availability of information, efficiency of operational performance and interaction with the public. Similarly, a study by Harris and Katz (1991) revealed that firm performance is linked to the level of IT investment intensity.

Weill (1992) also found a positive relationship between IT investment and firm performance in the manufacturing sector. His findings revealed that heavy use of transactional IT investment was significantly and consistently associated with strong firm performance. Heavy use of strategic IT was found to be neutral in the long term and associated only with relatively poorly performing firms in the short term. Informational IT investment was found to have a neutral effect on performance.

Mahmood and Mann (1993) studied 85 organizations from *Computer World's Premier 100* list and concluded that strategic and economic

measures, as a group, were significantly related to IT investment measures. Positive and significant relationships were found between certain investment measures and organizational performance. Also, a study by Brynjolfsson and Hitt (1996) found that information spending has made a substantial and statistically significant contribution to firm output. The authors mentioned that the use of new "firm-level data which were more recent and detailed" could have accounted for the sharply different results as compared to Brynjolfsson (1993). In another study, Brynjolfsson (1996) found that IT investments generate approximately three times their cost in value for consumers. Also, Hitt and Brynjolfsson (1996) showed that IT could increase productivity and create value for consumers and yet fail to increase profits. Hence, the value of IT is often dependent on the measure used to assess it.

Tam (1998) examined the impact of IT investment on firm-level performance in four newly industrialized economies (NIEs). Although he found that IT investment was not correlated with shareholder value, the results were mixed for the impact of IT on return on equity (ROE), return on assets (ROA) and return on sales (ROS). In a similar vein, Dewan and Kraemer (1998) examined data from 17 developed countries and found evidence to suggest that they are receiving positive and significant returns on their IT investments.

Negative Relationship

Several studies made in the services sector have reported disappointing productivity from IT capital. For example, Roach (1988) reported that massive investments in IT have failed to boost national productivity growth. He cited statistics indicating that output per production worker grew by 16.9% between the mid-1970s and 1986, while output per information worker decreased by 6.6%. And in a study of American manufacturing industries, Berndt and Morrison (1994) found that there was a statistically significant negative relationship between productivity growth and the high-tech intensity of capital investments.

No Relationship

Turner (1985) conducted a survey of 58 banks and found that no significant relationship existed between bank performance and IT investment. Similarly, Strassmann (1990) reported disappointing evidence in several studies. In particular, he found that there was no correlation between IT and return on investment in a sample of 38 service sector firms. He concluded that there is no correlation

between spending on computers and profits and productivity. Another study by Loveman (1994) also concluded that investments in IT showed no net contribution to total output. Using the Management of the Productivity of Information Technology (MPIT) database, most of the elasticity estimates of IT investments were not statistically distinguishable from zero. Similarly, Strassmann (1997) examined the financial records of 66 US companies and found little evidence for any productivity improvement despite 10 years of computerization.

In summary, results on the relationship between IT investment and firm performance have generally been mixed, though recent evidence tends to show positive relationships. In reviewing past research, Weill (1992) commented that not all IT investment is alike and that the context of the firm is important for converting IT investments into productive outputs. Finally, Rai, Patnayakuni and Patnayakuni (1997) emphasized that, although IT is likely to improve organizational efficiency, its effect on administrative productivity and business performance might depend on the quality of management processes.

Objectives of the Study

The nature of this study was exploratory, so no hypotheses were postulated, but rather the following research issues were investigated:

- Identify the most common IT applications followed by firms.
- Identify certain characteristics of the participating organizations. The objective here is to see if there are any patterns among the participating companies.
- Explore the objectives and problems of deployment.

Moreover, this study relies on self-assessment of perceived benefits and changes in the organisation, and it utilises those assessments to suggest general recommendations regarding IT utilisation in firms.

Methodology

Definition of IT

A broad definition of IT, in accordance with that of Weill (1992), was adopted. It includes all hardware, software, communications, telephone and facsimile facilities. However, for statistical purposes, a

number of particular technologies were chosen for inclusion in the survey. **Table 1** summarizes the most commonly used IT tools in the firms surveyed.

TABLE 1. MOST USED IT TOOLS

	Occurrences	**Percentage**
Internet	21	68
Support system for education	20	65
Forecasting &budgeting	15	48
Wireless devices	14	45
Network for customer complaint	14	45
Accounting system	13	42
Database for supplier management	11	35
Warehouse management system	7	23
Production scheduling & control	7	23
Joint development with supplier	6	19

E-mail and Post Questionnaire

A questionnaire survey was used to collect data. The instrument was derived from an extensive literature review of published materials in journals and periodicals. The survey collected data on (i) the organizational features of the firm; (ii) IT applications; (iii) championship for IT adoption; (iv) objectives of adoption (v) benefits of adoption, (vi) adoption practices.

The development of the questionnaire involved a series of pre-tests with students and colleagues over a period of about two months. Particular attention was given to the wording, structure, sequence and overall presentation. Based on feedback, amendments were made to improve the clarity of wordings so as to further increase readability and comprehension. Three colleagues reviewed the final questionnaire before it was sent to a random sample of 100 companies in Ireland. A cover letter addressed to the information manager in each company explained the objective of the study and a stamped return envelope was enclosed for the response. Another 100 firms were chosen and an e-mailed questionnaire was sent to them.

Out of the 100 companies to whom questionnaires were posted, 67 declined participation, and 33 returned questionnaires were received. However, only 31 responses were usable. Hence the usable response rate was 31%, which is adequate for the purpose of the

study. The research reported here employed data gathered from managers and previous research to document organizational change initiatives. These data provide a description of how IT influenced, and was influenced, by the organizational setting in which it was embedded.

Survey Findings

Companies' Websites

The results of this study show that 68% of the firms have Internet access. However, this does not mean that they have a website. Doing a random search for the study's population, it was found that only 33% of the total population had a website. Moreover, many of these websites were extremely shallow, unprofessional and of little assistance to either current or potential clients. The limited existence of websites is not hard to understand as the value of the World Wide Web is not yet fully proven, and its contribution to performance even among the *Fortune 500* is still much less than optimal.

Many companies do not have any particularly well-thought-out ideas as to why they have a Web presence. At present, few businesses are making money through their Web activities, although it is not easy to obtain information that disaggregates a firm's Internet-based business from the rest of its activities. For this state of affairs to change, and for profits to be made, electronic commerce must become a significant form of business activity. Perhaps even more importantly, there would need to be a profound change in culture in the way that people do business (Greaves & Kippling 1999).

In general, the main stated objectives for having websites are as follows:

- To provide information to customers.
- To advertise a firm's products and services: The Internet represents an alternative form of advertising and is comparatively cheaper than the traditional means.
- To employ direct selling/marketing of products and services.

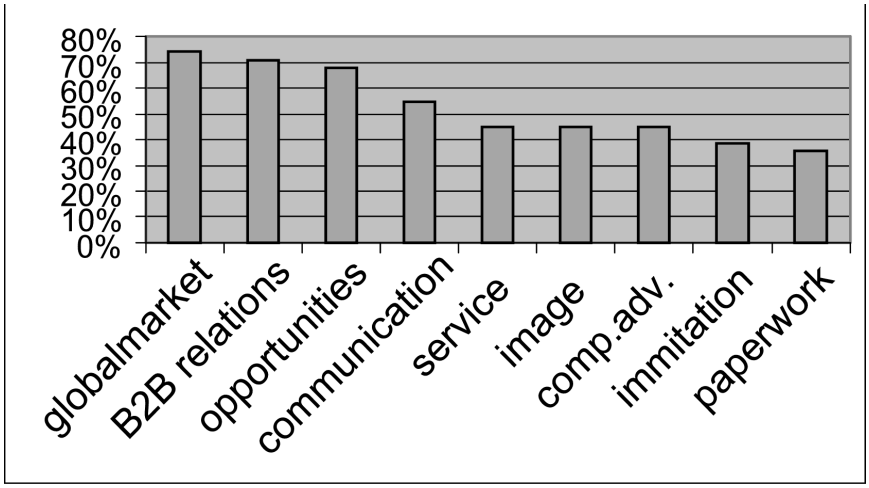
Most Web sites of *Fortune 500* firms are used for providing information rather than changing the way of doing business through online commerce. One likely reason is that the security of commercial transactions on the Internet is still being debated. Furthermore, existing electronic shopping systems provide a vendor/customer a

dialectic that offers low product differentiation and product comparability (Baty, 1995).

Vision – v - Daily Operations

Firms undertake IT initiatives for various reasons. However, most of those initiatives are carried out in vacuum or without alignment with the firm's general direction. **Chart 1** depicts the most important objectives for which firms implement IT. It should be noted that this table includes only those objectives that the firms surveyed in this study thought important. The respondents were asked to evaluate 15 general objectives of deployment extracted from a comprehensive review of deployment literature.

CHART 1. OBJECTIVES OF IT DEPLOYMENT



A cursory look will show a perfectly logical ranking of objectives. To explain, this study was carried out in Ireland, which is a small country with a very small national market. For most Irish firms to grow, they must look outside of their home country, otherwise they will find their markets shrinking rapidly due to local as well as incoming competition. This means that the first priority for Irish firms is to globalize their operations and reach as many international markets as they can serve. This logically means that they will need to improve their business relations locally and internationally and to be able to spot and capitalise on suitable business opportunities. Also, facilitating communication and improving customer relations rank

high on firms' agendas. Imitation is still a drive for deployment while reducing paperwork is the least important objective. This is probably so because many of the firms surveyed have passed the early stages of "informating" the work procedures.

Those results need not be true, as what a firm's management believes in might not be what is being implemented. It is easy to talk about globalizing a firm's operation, building good relationships with customers, and capitalizing on suitable opportunities. If these firms truly adhere to the stated objectives (and not just brag about having a documented global vision), then this should be reflected in the utilization of the IT resources available to them. Only 68% of firms had an Internet connection, 48% had a system for forecasting and budgeting, 45% had some sort of system for handling customer complaints, and only 33% had a website. Also, the average IT spending was as low as 1% in most firms. Only one firm had an IT budget of 5% of revenue. So much for a global vision.

The deployment of IT applications in many firms is still an exercise in "now what" rather than "what if" thinking. In other words, firms concentrate on improving their *status quo* rather than creating a vision of the future. Firms typically design and use new IT applications to improve what is currently done – by doing it in a more efficient manner – rather than thinking about these applications as opportunities or means to explore opportunities (Brian, 2000).

Psychological Ownership of IT

The literature suggests that a main cause for the failure to deploy IT strategically is senior management's view of IT as little more than an efficiency tool, rather than a catalyst for change. Management generally tends to view IT as the speciality of IT personnel and never develops psychological ownership of the technology. Although senior managers perceive IT as a resource, they perceive it as qualitatively different than resources such as time, money, equipment, labour, and materials. The latter comprise a set which senior mangers intuitively understand – they implicitly understand the relationship between these resources and productivity. For most senior managers, however, IT is a resource understood only through the efforts of an IT professional, who serves as translator and coach. By distancing themselves from the technology, and viewing it purely as a tool rather than a pivotal resource, senior managers often fail to probe the strategic implications of how that technology will affect internal operating decisions and external marketing decisions.

Yet senior managers are the only ones who are in a position to take the structural and strategic decisions necessary to take full advantage of the technology, and also the only ones who have the macro level view of the organization enabling them to see how the technology can best be utilized. Although IT personnel often drive new application development, and may prompt senior managers to think about IT strategically, they often lack the necessary business perspective and must therefore resort purely to efficiency–driven products.

Table 2 reflects the importance of involving all the concerned parties in implementing new IT deployment. The fact that everybody must be on board is clearly highlighted. The solution provided must be openly accepted by the work units' group as well as by the top management. The internal and the external users should have a say, and get a fair share of what is being implemented.

TABLE 2. INVOLVEMENT OF PERSONNEL

	Frequency	**Percentage**
Internal user participation	25	81
Acceptability of the solution by work unit group	25	81
Acceptability of the solution by management	24	77
Users' feelings	22	71
External user participation	21	68
Attitude of IT staff	14	45

It should be noted however that, in the research reported here, the attitude of IT personnel ranked lowest in terms of importance to the success of the deployment initiative; this is commensurate with the general traditional image of the IT personnel: technically-oriented, socially misfit employees. In effect, how they feel does not count for much; what is important is how fast their fingers move from one button to another.

Organizational change and resistance to it are arguably among the most extensively researched topics in all of organizational behaviour literature. This body of research suggests that top management must support the change, not destroy the change effort. Sometimes, however, senior management's open support of IT may simply provide a subterfuge for disguised sabotage. But once the decision to employ new IT has been reached and the funds committed, only the

most naive and self-destructive executive would publicly resist and rally support for that resistance.

Yet, to the extent that such resistance is present, it will be manifest in subtle ploys, where sabotage will leave no fingerprints. For example, senior managers could delay and/or extend the projected implementation period, erring on the side of "making sure everyone is on board". Although this tactic makes sense from a consensus and team-building perspective, and may generate considerable team support, it may jeopardize the firm's competitive position in the market. The disguised resistance may not even be conscious and purposeful. In other words, the senior manager may honestly believe he is supporting IT deployment.

Because senior managers have a need to save face and project control, they may not question their personal responsibility in delayed or failed projects. Ego-defensive routines screen out precisely the type of introspection and critical self-analysis that would uncover resistance and sabotage (Argyris, 1985).

Wires and Plugs Not Humans Interacting?

Typically, there is no one in the organization who has all the necessary knowledge to make the best decisions regarding new IT deployment. To develop applications that yield full value from such investment requires individuals who possess two types of knowledge: organizational and technical. The former refers to information about the organization; the latter refers to knowledge that enables one to know what the technology can create at a reasonable cost.

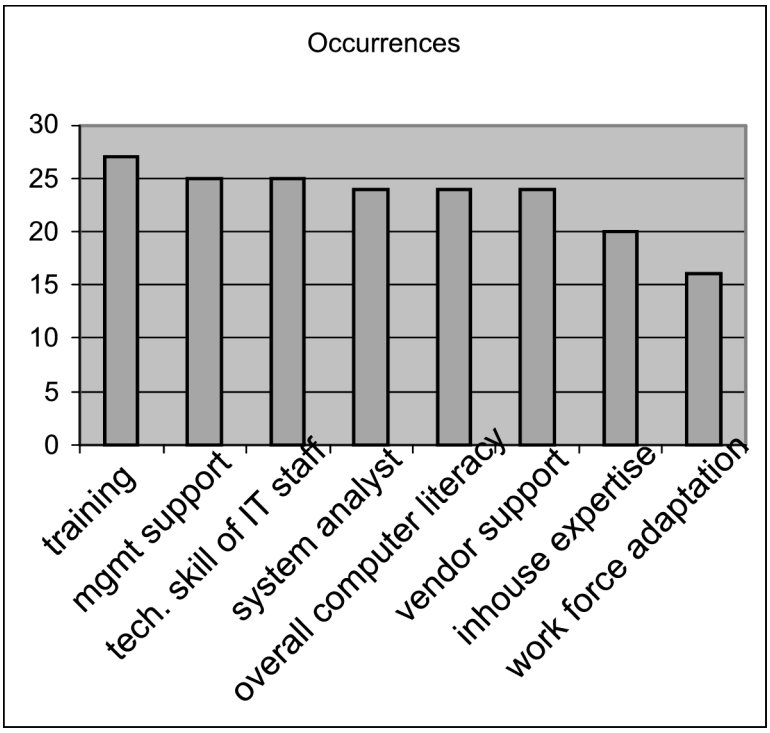
Organizational knowledge includes knowing the answers to such questions as: Where is the organization headed?, What are the internal control mechanisms?, What are the internal coordination mechanisms?, How is our market changing?, Which of our product lines are most vulnerable to changes in demographics, economic forces, or geo-political forces?, What do we do well?, What do we do poorly?

Technical knowledge includes knowing answers to a different set of questions: What can be done with the technology?, What will it cost?, What are the technical risks?, How difficult will it be for competitors to emulate what you may do, and what will it cost them?, Are there likely to be standards set in the future that will affect this application?, If so, will we be able to influence the standards? Few if any individuals in an organization possess the requisite knowledge to intelligently answer both sets of questions.

Chart 2 shows the most important occurrence aspects of knowledge and knowledge building within firms. Eighty-seven per cent of respondents thought that training was a key aspect for acquiring the necessary knowledge. Training should be directed at both managers and other personnel because, unless there is a common understanding of what the new application can and cannot do, problems will appear in the launching stages of the deployment project. The problem will be magnified, if management does not understand adequately what is being done. The importance of management support is clearly documented here, as 81% of respondents ranked top management support as vital to the success of the project. Also, the same percentage of respondents ranked the technical competence of the IT personnel as important. Moreover, 77% thought that the existence of a systems analyst, the overall computer literacy in the firm, and vendor support were very important. However, and again, the results show that much less concern was paid to workforce reactions to the project. Only 52% of the managers thought that work force adaptation was vital. This relative lack of emphasis on how employees feel suggests that only the technical aspects of deployment were being considered. Deployment therefore is mainly seen as wiring and plugging, not as human interactions facilitated by technology.

Finally, the results displayed in this chart reflect the importance of disseminating knowledge at all levels in the company. Top management usually posses a strategic view of the company, and hence should be armed with the necessary technical knowledge to improve its strategic decision making abilities. Likewise, technical staff should be trained not just technically but also strategically, in order to become more appreciative of the roles of others in the company and to be able to see more in the IT resources that they operate than screens and control keys.

CHART 2. ASPECTS OF KNOWLEDGE



Champions

In the adoption of many IT applications, a factor that has consistently been found to be important is the existence of "champions" (Zahra, 1996). They provide the necessary drive and effort to initiate the adoption of new technologies. Champions usually possess relatively high levels of business knowledge, as well as having the necessary IT knowledge. Thus, champions will be in a better position to decide how IT can be leveraged to support the business, create business value for customers, and enhance competitive advantage.

Individuals who possess technical or organisational knowledge typically bring forth suggestions for new IT applications. When functional managers suggest applications, they do so from a perspective of organizational knowledge, not technical knowledge. In such circumstances, the applications typically address problems and opportunities that can be served by tried and trusted technologies, but fail to take advantage of many technology resources that may already be available within the firm. Because functional managers are

unaware of the capabilities of newer technologies and of the technological resources that are available, it is unlikely that capabilities provided by IT innovations will be driving the firm's strategy. The consequence is that the applications suggested serve to do what is currently done in a more efficient manner. Conversely, when IT managers suggest applications, they do so with little or poor organizational knowledge. As a result, they too suggest applications that will do what is currently done in a more efficient manner. Eventually, functional managers learn what they can do with the new technology and take the steps necessary to make best use of that technology. But the process takes far longer than it should – and in a competitive environment, far longer than many firms can tolerate.

The results of this research show that 42% of the information technology initiatives were "pilot", while 35% were "department-wide" (**Table 3**). Only 23% carried out a company-wide deployment. Pilot and department-wide account for 77% of all organisational IT initiatives, where limited sections or sub-sections were included. This might be attributed to:

- Lack of understanding of IT, mainly lack of technical and/or organisational knowledge
- Negative expectations of the deployment's outcome by the firm's decision makers
- The process of gradually overcoming resistance by showing the applicability and practicality of the new applications to the work procedures.

Also, 51% of all deployment initiatives started at the department level, while only 23% started at top management level and 26% at the operations level. This can be explained by the fact that 35% of the firms surveyed implemented a department-wide IT deployment. Implementation usually starts at department level, mostly for production control, accounting, warehousing, or customer relations. It is only when the viability of the application has been proven that new IT initiatives will be carried out in order to extend the use of the current application to other departments.

TABLE 3. ORGANISATIONAL CHARACTERISTICS OF DEPLOYMENT

		Occurrence	Percentage
Widest deployment initiative	Company wide	7	23
	Pilot	13	42
	Department wide	11	35
Deployment started at	Top management	7	23
	Department level	16	51
	Operations	8	26
Idea for deployment came from	Top management	2	6
	Internal development committee	13	42
	Operations	4	13
	Department management	9	29
	External party	3	10
Organisation type	Major foreign ownership	11	35
	Local ownership	11	34
	Subsidiary	9	29

IT Deployment's Major Decision Variables

If the application is not suitable for other departments, an upgrade might be implemented. Whether to upgrade a system or introduce a new one is not an easy decision to make. Many issues need to be considered before a final commitment is made. These include factors like: security, scalability, reliability, etc. **Table 4** summarizes the importance of some of the most-frequently considered issues relating to acquiring new applications.

TABLE 4. DEPLOYMENT'S MAJOR DECISION VARIABLES

	Occurrence	Percentage
Reliability of supplier	20	65
Scalability	19	61
Changes in technology	14	45
Changes in culture	14	45
Reliability of application	12	39
Security of application	12	39
Costs	12	39
Ease of integration	10	32
Speed of implementation	10	32
Work force adaptation	9	29
Short-term relevancy	9	29

According to **Table 4**, the reliability of suppliers ranks first when making a decision to acquire a particular application. This is easily justified by the traditional uncertainty surrounding the technical ability of IT suppliers. Firms want to make sure that they will be able to get what they are paying for – a system that is up to their expectations, with pre- and post-purchase services to ensure the system will operate to the agreed standard. The second most important issue that firms consider is the scalability of the applications. It is understandable that firms want an application that can be modified relatively easily and with little extra expense. Instead of buying a new application every time a need appears, the existing application – with minor adjustments – should be able to perform the new task efficiently.

Table 4 shows that changes in both technology and organizational culture are also considered to be of great importance. Changes in technology are strongly related to the scalability, security, and integration of the application, while changes in the organisational culture are related to the degree of acceptability by the firms' work force. A more open and friendly environment will result in better adaptation in terms of satisfaction, costs, and speed of implementation.

Costs as a Decision Variable

It should be noted that cost as a decision variable ranks relatively low in importance. Only 39% of the sample thought that cost was relevant,

while 65% thought that the reliability of supplier was the most important decision variable.

TABLE 5. IT SPENDING

Revenue	IT budget	Percentage
2,500,0000	150,000	1%
2,3000,000	300,000	1%
2,2000,000	250,000	1%
1,8000,000	150,000	1%
1,5000,000	100,000	1%
1,0000,000	450,000	5%

The fact that cost does not seem to rank highly should not be overestimated. **Table 5** reveals that most firms had a very small IT budget – much less than the 9% of revenue that some leading global firms budget annually. If cost really does not matter, then a higher figure should be seen in those firms' balance sheets.

IT: An Opportunity or a Scapegoat

Forty-two per cent of the firms said that an internal development committee was the source of IT ideas. There are various reasons why committees are formed but, once they are formed, they are expected to make recommendations. A convenient and easily justified recommendation is to blame organizational problems on insufficient information handling applications. Nevertheless, if the purpose of the committee is not to solve a problem but rather to look for ways to make use of new opportunities, IT will be recommended as easily. Blaming IT seems to be the norm for the past two decades, it having been portrayed as the ultimate solution to ensuring firm prosperity and ever-lasting flexibility – as well as solving its more immediate and chronic problems.

Recommendations

To be able to implement IT initiatives in a way that will serve the organization's purposes, the following are of considerable importance.

IT as a Catalyst

Senior managers must change their world-view of the role of IT. They must develop psychological ownership of IT and start viewing it as a catalyst for redefining the firm and its competitive position in the marketplace. Managers must re-frame their assumptions about IT, and see it not as something special, different, and problematic, but rather as part of a fully integrated picture (Bensaou & Earl, 1998). The practical consequences of this are that strategic decisions and decisions regarding IT applications are interdependent. Employing IT intelligently becomes an operating norm for the firm. While this might seem easy to accomplish, it is, in fact, quite difficult. To effect this re-framing will undoubtedly require structural changes, as well as changes in the tasks that must be undertaken. If a firm is to consider changes in its external strategy, IT development and implementation efforts must be led by individuals or groups possessing organizational knowledge **and** technical knowledge; they must also be part of the strategy development team. These individuals and groups must see the "big picture", see themselves in that picture, and understand IT's role in reframing the picture.

Seeing what we have called the big picture, and the IT frame enclosing it, will require, at the very least, structural changes and, more likely than not, changes to the development and implementation tasks and processes as well. Rather than abdicating responsibility for change and organizational renewal to outside consultants or pre-packaged programmes, managers must come to accept their role in implementing the deployment.

IT: A Resource or a Drain on Resources?

Although the costs of information storage, processing and communication are decreasing at astounding rates, firms continue to devote ever-increasing resources to IT. Studies suggest that IT expenditures account for as much as 9% of revenues in some industries or 5% or more of a firm's capital stock (Brynjolfsson & Hitt 1995). The rise of both the importance and the cost of IT highlights an intriguing paradox: firms often fail to take advantage of the full potential and opportunities these investments could engender; and if, and when, they do realize financial returns, these returns appear later rather than sooner (Brian, 2000). Moreover, firms that adopt new IT without considering strategy are unlikely to gain business benefits – due primarily to the perception of IT as a drain on limited resources rather than as an opportunity for growth (Levy & Powell, 2000).

Limited financial resources are also a factor in the final recommendations in respect of many IT initiatives, and only the more visionary managers are prepared to commit financial resources to strategic systems. The main objective for many managers seems to be, as already noted, to spend available financial resources on supporting management systems that would simply improve day-to-day operations.

Team Work and Cross-Functional Responsibilities

This research reinforces the suggestion that functional managers be given IT oversight responsibilities, and that IT managers could be periodically assigned to project task forces. Cross-training, job rotation, and committee assignments will not only help reinforce the new frame of IT, but will also serve to bridge the differing world-views discussed earlier. Cross-functional teams composed of functional managers and IT professionals implicitly reinforce the message that all employees are working to achieve the same corporate objectives. Also, cross-cultural teams will help also to leverage the most important asset of the firm, its intellectual capital. Sharing, challenging and validating ideas expands the collective wisdom not only of the team, but also of the larger organization generally (Quin 1996). Team members will move from discussion of their specific expertise, "know-what" and "know-how" to discussions of common interest and company performance – they will move from what they know, to what others know, to what they start learning together.

These structural changes alone will not guarantee that problems will be resolved. Firms must also put into place processes to ensure that the proper questions will be answered during the development and implementation process. To ensure that the right questions are asked and answered, development teams must be required explicitly to ask and answer relevant "what-if" questions.

Conclusion

Researchers studying IT implementation have particularly deplored the lack in organisations of personnel skilled in IT management, analysis, design, and use. To deal with this problem, firms usually resort to:

- More investments in infrastructure
- Education and development of human capital

- Integrated user-technical development.

Prior research also suggests that for an IT initiative to be successful firms should:

- Assess IT benefits, organizational culture and suitable IT for the firm
- Determine if sufficient internal resources are available and appropriate procedures exist for the successful selection and implementation of IT
- Evaluate the external environment, support and resources, particularly if in-house resources and support are lacking.

Only after careful consideration of the above should the decision be made on whether to continue with IT acquisition. The recommended phased approach minimizes the overall risk of technology acquisition (Montealegre, 1998).

Blili and Raymond (1993) present one of the better-developed frameworks for IT strategy. They argue for a top-down process, as involvement of the firm top management is critical and that a strategic perspective is taken. Their framework comprises:

- Analysis of external environment (competitive forces, PEST)
- Analysis of firm's current business activities (transaction costs, value chain, business plan)
- Analysis of current IT in the organisation (projects underway, equipment, staff, expenses, users, software)
- Analysis of current business opportunities (SWOT, priority areas)
- Analysis of alternatives (technical, economic, operational and human feasibility)
- Evaluation and costs (budget forecasts, timetable, control, responsibility)
- Implementation plan (short and long term).

References

Argyris, C. (1985). *Strategy, Change and Defensive Routines*. Boston, Pitman.

Baty, J. B. and Lee R. M. (1995). 'Inter shop: Enhancing the Vendor Customer Dialectic in Electronic Shopping', *Journal of Management Information Systems* (11): 9-31.

Bensaou, M., and E M. (1998). 'The Right Mind Set for Managing Information Technology', *Harvard Business Review* 76(5): 118-129.

Brian, D. S. (2000). 'Improving the return on IT investment: the productivity paradox', *International Journal of Information Management* (20): 429-440.

Brynjolfsson, E. and Hitt L. (1995). 'Information Technology as a Factor of Production: the Role of Differences Among Firms.' *Economics of Innovation and New Technology* 2(4): 71-83.

Brynjolfsson, E. and Hitt L. (1996). 'Paradox Lost? Firm Level Evidence on the Returns to Information Systems Spending.' *Management Science* 42(4): 541-557.

Davis, G. (1992). 'A Model for Adoption and Diffusion of Information Systems in Less Developed Countries' in S. Palvia, *The global issues of information technology management*, Harrisburg, PA: Ideal Group Publishing.

Greaves, C. and Kippling P., (1999). 'Business Use of the Worldwide Web with Particular Reference to UK Companies', *International Journal of Information Management* (19): 449-470.

Haris, S. E. and Katz, J. L. (1991). 'Organisational Performance and Information Technology Investment Intensity in the Insurance Industry', *Organisation Science* 2(3): 263-295.

Levy, M. and Powell P. (2000). 'Information Systems Strategy for Small and Medium Sized Enterprises: an Organisational Perspective', *Journal of Strategic Information Systems* 9: 63-84.

Mahmood, M. A. and Man, G. J. (1993). 'Measuring the Organisational Impact of Information Technology Investment: an Exploratory Study', *Journal of Management Information Systems* 10(1): 97-122.

Montealegre, R. (1998). 'Managing Information Technology Against the Odds: Lessons from an Organisation from a less Developed Country', *Information and Management (*34): 103-116.

Quin, J., (1996). 'Managing Professional Intellect', *Harvard Business Review* 74(2): 71-83.

Roach, S. S. (1998). 'Technology and the Services Sector: the Hidden Competitive Challenge', *Technological Forecasting and Social Change* 34(4): 387-403.

Strassman, P. A. (1997). 'Computers Have Yet to Make Companies More Productive', *Computer-World* 31(37): 92.

Tam, K. Y. (1998). 'The Impact of Information Technology Investments on Firm Performance and Evaluation: Evidence from Newly Industrialised Economies', *Information Systems Research* 9(1): 85-98.

Tung, L. L. and Tan, J. P., (2000). 'Adoption, Implementation, and Use of Lotus Notes in Singapore', *International Journal of Information Management (20)*: 369-382.

Turner, J. (1985). *Organisational Performance, Size and the Use of Data Processing Resources*. New York: Center for Research in Information Systems, New York University.

Weill, P. (1992). 'The Relationship Between Investment in Information Technology and Firm Performance: a Study of the Valve Manufacturing Sector', *Information Systems Research* 3(4): 307-333.

Zahra S A, (1996). 'Governance, Ownership and Corporate Entrepreneurship: The Moderating Impact of Industry Technological Opportunities.' *Academy of Management Journal*, (39) 1713-1735.