

INFORMATION TECHNOLOGY PERFORMANCE AND PROCESS: FOUR CASE STUDIES

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ABSTRACT

The payoffs from investment in Information and Technology (IT) and the organisational, managerial and technological requirements necessary to bring about successful performance have proved difficult to find since the advent of the IT era. In this chapter, we investigate the levels of IT investment undertaken, and the subsequent performance benefits found in a number of Irish organisations. The chapter also focuses on the processes that contribute to successful performance and with the difficulties of attempting to measure results. Our results indicate that organisations that have a clear strategic focus that embraces IT investment achieve greater benefits. We also find that the management component is the most critical issue in terms of assuring successful performance outcomes. Finally, the chapter presents a model for optimising the benefits from IT investment.

22.1 Introduction

A question that has puzzled economists and IT managers and practitioners for the best part of the last 20 years has been whether IT investment leads to greater productivity growth at the level of the individual firm. In addressing this question there has been a long-standing debate as to whether the revolution in IT was paying off in the form of higher productivity (Strassmann, 1990; Brynjolfsson and Hitt 1995; 1996; 1998). The results of early studies were mixed, with service firms in particular, showing weak or non-existent links between IT and productivity (Strassmann, 1990), with some manufacturing firms showing positive results on IT investment (Barua et al., 1995). Later and more rigorous studies found that IT investments contributed to firm productivity, and that over time firms were learning to apply IT capital more productively (Bresnahan 1999; Brynjolfsson and Hitt, 1995; 1996; 1998).

The empirical research to date indicates a number of factors that have been found to affect IT performance. Key amongst these are the need for strategic alignment (Henderson and Venkatraman, 1993), alignment between business and IT strategies (Croteau and Bergeron, 1999), close IT and business strategy alignment (Tallon, Kraemer and Gurbuxani, 2000), executive support for IT and joint IT and business strategy development (Luftman, Papp And Brier, 1999), and bi-directional strategic leadership involving IT and business functions (Rockart et al., 2000). An additional key research finding has been that value from IT emerges only through its use by an organisation, both strategically and operationally, incorporating its interactions with customers, suppliers and perhaps even regulatory authorities (Tiernan and Peppard, 2004), and that IT productivity and firm performance is affected by the levels of capital deepening and diffusion.

The research linking IT investment to benefits and performance in Ireland is limited (Remanyi and Brown, 2001). This paper attempts to partially remedy this deficit. It will examine the principal managerial and other practices that impact on IT performance, as well as the impacts and benefits that arise from IT investment. Four case studies from different sectors are examined.

22.2 Research Questions

This chapter addresses three fundamental questions:

1. How does IT affect organisational performance?
2. How significant is strategic alignment to the optimisation of organisational performance?
3. What other significant factors contribute to the impact of IT on organisational performance?

22.3 Case Organisations and Methodology

The research questions were explored in four diverse Irish organisations. The organisations are referred to as case firms from here on and are shown in the following Figure 22.1.

Figure 22.1: The Case Organisations

<p>Case Study A</p> <p>Large traditional manufacturer. Long established firm. Large employer. IT Manager not on TMT (Top Management Team). Wide product range. Intensely competitive industry sector. Considerable change underway in organisation. Major investment in IT. Declining profitability.</p>	<p>Case Study B</p> <p>Medium-sized bank. Long established firm. Also operates outside of Ireland in three distinct market areas. Employs 500. IT Manager on TMT. Bespoke banking products. Niche operator. Competitive industry. Maintaining IT investment levels.</p>
<p>Case Study C</p> <p>Large local authority. Long established. Employs 500 and increasing. New IT Manager not on TMT and IT function new. Long established firm. Monopoly provider. Limited change underway in administrative processes. Annual budgetary allocation for IT investment.</p>	<p>Case Study D</p> <p>High-tech manufacturer of computer printer products. Subsidiary status. In operation just three years. Employs 200 and growing. Tight management team. IT Manager on TMT. Massive IT investment. Fiercely competitive industry.</p>

Two of the organisations are manufacturing firms, a high-tech multinational manufacturer and the other a traditional indigenous manufacturing firm. The third is a medium-sized bank with bespoke products and the final organisation is a municipal authority. The organisations will be referred to respectively as the High-Tech Manufacturer, the Traditional Manufacturer, the Bank and the Authority.

The case studies differed substantially from each other and so exhibited the extreme situations and polar types suggested by Pettigrew (1990) as being an important feature of case study research design. Yin (2003) describes the scope of a case study as an “empirical enquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used”. He also indicates that the case approach is preferable when ‘how’ or ‘why’ questions are being asked, when the investigator has little control over events, and where the focus is on contemporary phenomena. For these reasons the case approach has been adopted.

22.4 Findings

22.4.1 Strategic Alignment

All of the case organisations professed to having either formal written or unwritten strategic plans, with three of these conceding that there was a weak relationship between these overall strategies and their IT strategies. The Authority indicated that the concept of strategic planning was new to the organisation, having only recently been introduced. Decisions about IT activities for municipal authorities in Ireland are centralised. This has resulted in the Authority depending on national directives to progress its IT development. In addition the Authority was subject to a national rollout of its IT plans (Strategic Management Initiative, 2006). This had led to its strategic plans being compiled at short notice, and mainly because of the bureaucratic process involved, a weak sense of ownership of the plan by individual departments and managers. As a result, the role of IT was viewed as peripheral to the work of the Authority, being viewed mainly as a service provider to its activities.

The Traditional Manufacturer had a five-year strategic plan but there was no apparent or serious attempt to integrate the IT function into the plan. As a result, IT was perceived as fulfilling the role of a service provider to the main production and administrative departments. In the two previous years the Traditional Manufacturer had largely introduced a new Enterprise Resource Planning (ERP) system using SAP (Systems, Applications and Products) software to which the IT function, as a service provider, had released some of its staff. This system had been implemented with the strategic aim of introducing a computerised ‘customer-pull’ system, linking sales orders from its various markets to activate production requirements and delivery. The firm had failed to realise this key strategic aim; no progress being made up to this case enquiry stage, and almost three years after the overall programme had been instigated. Aside from this, there was no strategic connection between the IT function and the top management team and the IT Manager was not a member of this team.

In the Bank’s case the role of IT was accepted by its senior managers as serving a purely transactional purpose with high selling skills at the customer interface viewed as being more critical to business success. This successful bank nevertheless had a clear strategic intent and rationale and this focused approach was perceived as being largely responsible for driving the business forward. Resulting from its transactional focus the IT function played a reactionary role in responding to the service and operational demands placed on it. On a more strategic basis, there was no evident or coherent approach to overall IT planning visible, and as a result piecemeal approaches were adopted for the development of IT systems within the Bank.

On the issue of strategic alignment the High-Tech Manufacturer showed itself to be clearly superior to the other case firms. This firm was a new multinational subsidiary in Ireland, and followed a clear corporate strategic plan. The High-Tech Manufacturer also represented the clearest case of integration of the IT function with an overall corporate and subsidiary strategy. Essentially, the aim of this strategy involved being the lowest-cost producer within the industry and within worldwide markets for its products. Internally, the firm also displayed a high and effective integration of IT within its operational and administrative departments. Its relative newness as an organisation was in contrast to the other case firms each of which had been in operation for at least forty years. IT processes in this case firm used the most up-to-date hardware and software. It also had a fully integrated and automated production system, managed through an effective ERP system, coupled with an administrative and office-based software system. The

latter system incorporated its HR and payroll systems. It was very evident that this case firm utilised IT to considerable strategic advantage. This was a prime reason for it becoming the second most competitive producer throughout all worldwide group subsidiaries, a considerable achievement in competitive terms. These results were attributed by the management team to the clear linkage achieved between overall and IT strategy at corporate and subsidiary level, and between the strategic and operational components of the business. Success was also attributed to how IT had been instrumental in integrating its production processes, mainly through a computer-controlled statistical process system at shop-floor level, and its successfully computerised integration of its production and administrative systems.

This organisation had virtually succeeded in achieving real-time communication with its parent company in the United States through the use of an Electronic Data Interchange system, which converted data and information from the manufacturer, for corporate use. As a result of the effective use of IT, the organisation's management claimed a half-day turnaround performance from receipt of product material to customer dispatch, and have become the second best performer in cost and delivery performance terms within the group's twenty-eight group subsidiaries. By any yardstick, these achievements are quite exceptional. For these reasons, this organisation clearly distinguished itself from the other case organisations studied. Its key distinguishing and advantageous features lay in its relative newness, its focus on strategy at different operational levels, the visible integration of its strategic and operational activities and its centralising of the IT function.

22.4.2 Strategic and Operational Integration

In three of the four studies there was an acceptance that the IT function was not being valued as a strategic resource. Only in the case of the High-Tech Manufacturer was there a clear indication that the IT function had been viewed, and used, as a strategic resource. In this sense, it was central to bringing about low-cost production, acknowledged superior cost and quality performance, and extremely short customer delivery times. It achieved these key strategic targets by the use of IT systems, through its strategic and operational alignment and coherence, and also through the management of its operational and administrative processes and controls. The final component in its success lay in its ability to communicate effectively, through the medium of IT, with its parent organisation. This linkage was critical to success for the High-Tech subsidiary since the parent company dealt directly with all suppliers in the interests of subsidiary organisations. It was clear that there was a strong interplay between the successful functioning of IT and the quality of its management, both strategically and operationally, and that this led to successful outcomes. The successful harmonisation of the organisation's general and IT technology, with its functional and office departments, further contributed to this success. The quality of management in this situation would have been assisted by the tightly knit nature, and limited size, of the top management team as well as by its strong parent company direction. It was apparent that IT, together with management quality, served a critical role in furthering the organisation's competitive advantage.

None of the other organisations succeeded in matching the performance levels of the High-Tech Manufacturer. It was not possible to get details of tangible benefits from investment in, and use of IT. In the case of the Traditional Manufacturer the newly introduced ERP system, despite its considerable investment, had failed to realise many of its targeted aims and benefits. At the conclusion of this case research several key areas of the organisation's operations had

not been integrated into the system and the organisation had not attempted, partly for funding and cost reasons, to achieve integration of the system with other group companies, suppliers, or customers. This failure mainly came about because different companies and suppliers with which the case firm did its business used different version ERP systems, leading to an inability to 'talk' successfully to each other. ERP systems, unlike older IT systems are fully integrated, enterprise-wide, real-time information systems. ERP system products, such as SAP, JDEdwards, Oracle and Peoplesoft, are offered mainly by German and American proprietors. A further reason for failure in this area was that its key overseas trading company was reluctant to changeover to a SAP system so that the necessary integration between both organisations could be achieved. In addition to its new ERP system, the Traditional Manufacturer also used Peoplesoft software, for all its HR activities, together with separate software systems for its payroll and ordering systems.

Neither the Bank nor the Authority had an enterprise-based IT system, with IT operations being focused on a number of separate software systems. Also, none of the organisations had as yet attempted direct on-line electronic interchange with external organisations, their suppliers or their customers. Management style in these organisations varied from traditional/bureaucratic to very reactive styles. These styles are not conducive to planned management processes, or to emphasising the need for strategic, as well as managerial planning and control. There was no evidence of an alignment of overall strategic approaches with any obvious IT strategy, or of any overall alignment of IT technology with the organisational infrastructure concerned.

The realisation of the full benefits of an ERP system is extremely challenging for any organisation. This includes the possibilities for gaining external advantages. Electronic Data Interchange (EDI) and ERP systems attempt to mix and match various hardware and software systems, internally and externally, to an organisation's advantage. Achieving this successfully can lead to the realisation of synergies, economies and cost improvements. The inability to realise these benefits occurs because of the difficulties created in attempting to get various software systems to 'talk' to each other. This is aside from any incompatibilities of hardware systems that may also exist. The case involving the incompatibility of the ERP systems used by the Traditional Manufacturer's main trading company, already cited, is a clear example of IT systems failing to 'talk' to each other, with the loss of probable benefits. In the working of ERP systems, an organisation is not likely to admit that the ERP system that it uses is less than satisfactory, or does not achieve all that is claimed for it, in case this confers by such an admission, advantage to a competitor. Systems such as SAP, JD Edwards, Oracle and Peoplesoft may not work in particular situations but for the reason stated there may be an unwillingness to admit this. Furthermore, the companies that distribute the various ERP systems have shown a reluctance to date in collaborating on the use of common ERP software since this would remove what they perceive to be their own distinctive competitive advantage. These issues are compounded further by the whole question of ensuring that these IT systems are secure, particularly when they work outside of the firm's internal environment. The need for security may therefore further inhibit management willingness to participate in EDI and ERP systems that operate outside of these boundaries. Arising from the above challenges it can be very difficult, very costly, and very time-consuming for organisations to achieve electronic data interchange between various IT systems. Only in the case of the High-Tech Manufacturer was there satisfactory evidence that a relevant and worthwhile level of interchange and integration had taken place.

22.4.3 Inclusion of the IT Manager on the Top Management Team (TMT)

Although cited by some of the literature as essential to the successful functioning of IT in an organisation, only two IT Managers in the case studies were included in the top management team and only one in a top management team that considered IT strategy as part of a wider overall business strategy. The most successful case was that of the High-Tech Manufacturer where the IT Manager also had a dual role as Engineering Manager and sat on the top team. In this joint capacity he had responsibility for the installation of all plant, machinery and IT systems. His actions were entirely governed by the need for performance achievement, within strategic aims and goals, and within a philosophy of continuous improvement in output, cost, quality and safety. Since its inception the firm had succeeded in achieving a 20 per cent annual improvement in these performance indicators and at the time of the case enquiry had been asked for a further improvement of the same magnitude for the following year.

In the case of the Bank, the IT Manager was a member of the top management team but this membership arose entirely because of his position as a head of function. The IT manager reported directly to the Bank's Chief Executive. Because the Bank didn't have a formal IT strategy, top management tended to concentrate on operational issues to the detriment of more strategic IT issues. The focus of attention therefore tended to be on the maintenance of the status quo in IT matters rather than on any radical or revolutionary review, or action, aimed at assisting IT as a function to support the future success of the Bank. During the term of this case enquiry, it was revealed that Bank's management had taken the first step in exploring the possibility of outsourcing its IT services. The pursuit of the outsourcing option reinforced the bank's IT operational focus and the wisdom of this possible move was not fully understood by, or agreed with, some of the management team.

In the remaining cases of the Traditional Manufacturer and the Authority, the respective IT Managers were not members of their top management teams and both position-holders reported to the senior financial executive of each organisation. In each case the separate IT managers had a bias towards the technical aspects of their roles and were limited in their overall business exposure and to the business of their top management teams. Under these circumstances, IT decisions within both organisations were made by members of the respective top management team, most of which had little, or no, appreciation of IT systems or for the technological and business opportunities that they presented.

22.4.4 Hybrid Managers and the Rotation of Roles

Of the four case studies undertaken, the highest level of hybrid skills amongst managers was evident in the case of the High-Tech Manufacturer. Hybrid skills refer to the possession of dual business and IT skills. A hybrid manager therefore is one that displays equal competencies and ease when faced with either operational or IT issues. In this case firm it was also evident that the entire workforce had a high level of IT skills that fully supported operations. There was a strong consensus within management, which indicated that these high-skill levels came from the substantial training provided by the organisation to its general workforce. Formal training in IT for all shop-floor employees varied from six to eight working weeks during the first year of their employment, although this decreased in the second and subsequent years as the levels of IT mastery increased. Managerial and office-based personnel were expected to have at least a

working knowledge of most IT applications prior to joining the organisation. These knowledge and skill levels were further built on by relevant booster-training programmes, which were specially designed to improve user skills when working with organisational IT systems.

None of the other organisations succeeded in matching this level of hybrid skills amongst its managers or workforce. In the case of the Traditional Manufacturer, a minority of managers displayed high-level business as well as IT skills. This was however mainly confined to professional incumbents, including financial executives. Most managers displayed a basic level of IT ability, although some were very poor in this area, possessing little or no ability. Hybrid skills amongst IT staff were low; skill levels being heavily biased towards their technical and user IT strengths. It was evident that the greatest levels of IT and business-related skills rested with the trainers who were concerned with the training of personnel for the newly installed SAP system. Essentially, these personnel were very familiar with shop-floor processes and had progressed to becoming IT trainers. In these roles, the personnel involved had managed to successfully integrate their shop-floor skills with a high mastery of related IT skills. In the cases of the Bank and the Authority the levels of hybrid skills were variable. However, the clearest example of an IT manager having very strong hybrid skills was found in the case of the Bank. This manager exhibited superior IT and technical skills together with very strong business and project management skills. He clearly understood the necessity for a strategic approach to IT and to business development but his view did not prevail within the top management team. Otherwise, with some exceptions, mainly confined to the executives heading up, or engaged with specific executive functions, the levels of hybrid skills in both case firms were extremely limited. In both organisations, and outside of the functions just referred to, the highest levels of IT proficiency rested with specialist administrative or professional staff, such as accountants, engineers, statisticians and office-based staff. Personnel in these situations displayed high IT ability related to their own immediate work responsibilities, but their overall business awareness tended to be confined to these responsibilities.

In the case of the Authority, a localisation of skills arose because of the natural division of the Authority's work between inside and outside operations, with computerisation being largely confined to in-house staff and some departments such as planning and engineering services. Because of the unsuitability of most outdoor services for computerisation, it was considered unlikely that the substantial bulk of outdoor staff engaged in cleaning, maintenance and other similar activities would ever have to use IT in their everyday work.

With the Bank, IT personnel were hired as IT specialists. They were not perceived to be bankers, so it was difficult for them to acquire, or to be perceived as having, hybrid business and IT skills. In the case of the Traditional Manufacturer, some personnel were rotated between IT and business roles, but this was a one-dimensional approach confined to a limited number of IT personnel being seconded to support training for the installation of the new SAP system. Reciprocation of business personnel to IT positions didn't occur. In sum therefore, outside of the exemplary practices exhibited by the High-Tech Manufacturer on the issue of hybrid skills, the other organisations displayed, with some exceptions only, variable and limited hybrid skills amongst their personnel.

22.4.5 IT Capital Deepening and Diffusion

Capital deepening concerns the per capita allocation of IT equipment and resources to employees. A comparison of the four case studies revealed varying levels of capital deepening across the four organisations. The heaviest capital deepening occurred in the case of the High-Tech Manufacturer where everyone in the organisation either had a computer or instant access to one. IT capital deepening was therefore extremely high. This level of deepening and accessibility afforded numerous benefits including the key achievement that operatives managed and controlled the operational process, mainly through a system of Statistical Process Control (SPC). The basis of control in this computerised system lay in the information it produced regarding output, quality and defect levels. This organisation also displayed the highest levels of capital diffusion amongst the four studied organisations. Capital diffusion refers to the breadth of operations covered by IT coverage; high diffusion exists when the technology spills over to cover areas not previously covered and full diffusion exists where IT technology has diffused or spread to all operational and support areas covered by an organisation. The High-Tech Manufacturer had reached a state of full diffusion since computerisation had spread to all organisational processes and departments. This included IT communication, through data interchange facilities with its corporate organisation, full computerisation of its materials receiving procedures, all manufacturing and shipping processes and all administrative and office-based systems.

The level of capital deepening experienced by the Traditional Manufacturer had increased with the introduction of its SAP based ERP system. However, the progress of this new IT investment was being seriously impeded because of restrictions imposed on funding of the SAP system. In addition, major difficulties were encountered in achieving data interchange between its SAP system and the different version ERP system operated by its most major trading company located in its key overseas market. Change of management and people difficulties lay at the core of this problem and as a result the firm failed to achieve computer integration, between both trading entities. In this case study, it was confirmed that despite the considerable investment that had been expended on the SAP system, renewal investment in computers and related software had actually declined due to limitations on overall investment funding. In capital diffusion terms, although most of the organisation's operations were covered by IT technology, large gaps still existed in the computerisation of the organisation's production and stock control functions.

In the case of the Authority, although there was evidence of IT capital deepening in some office, engineering and planning processes, there still remained large parts of the organisation where capital deepening had not occurred. Capital deepening in the office environment had been recently prompted by the introduction of a newly computerised financial system. This system was a commercially available software financial package titled Agresso. Despite its introduction it is probable that many of the remaining work areas of the Authority will continue to be unsuitable for computerisation, including many of the outdoor activities covered by its remit, including roads, sewerage and water services. Some capital diffusion of IT had taken place, just prior to the case enquiry, with the computerisation of motor taxation services through an internet-based system. It was also intended that some rent collection processes would be partly computerised with the introduction of hand-held computer devices.

In the Bank's situation there was little evidence of IT capital deepening or diffusion with the ratio of staff to computers being about three staff to each computer. Specialist and executive staff however, had access to their own computers. Most of the Bank's stock of computers was at least three years old. Coincidental with this case enquiry, the Bank had taken its first steps towards outsourcing its IT requirements. In this case a 'piecemeal' approach to the development of IT systems appears to have been adopted over the years. Piecemeal systems contrast with strategic approaches and tend to emphasise short-term and reactive solutions rather than business-centered, longer-term solutions. It is possible that the Bank's short-term approach originated from the lack of strategic importance placed on IT within the Bank's operations and the higher strategic importance attached to pure banking processes.

22.4.6 Use of Complementary Organisational Capital

Bynjoľsson and Hitt (1999) claim that IT capital is disproportionately associated with other complementary assets and support this claim by the assertion that for every dollar of IT capital spent, a typical firm accumulates between four times and 19 times that amount on complementary costs. These complementary costs include the cost of developing new software, populating a database, implementing a new business process, acquiring a more highly skilled staff, or undergoing a major organisational transformation; all of which go unaccounted on a firm's balance sheet. An explanation of this is that firms must incur substantial adjustment costs before IT becomes effective. Based on best manager estimates within the case organisations, combined hardware and software costs were running at between two per cent and four per cent of each case organisation's revenue. If Brynjolfsson's assertion is accurate, then it is apparent that, relative to IT investment, complementary organisational investment is very substantial. However, on the issue of IT measurement, none of the four case firms concerned could provide any detailed or accurate information on the annual levels of hardware, software or complementary organisational expenditure experienced by them. This problem is partly caused by the accounting treatment of software systems as being revenue rather than a capital expenditure item in Britain and Ireland, and by the absence of detailed management accounting information.

Aside from cost considerations, all the case study firms viewed complementary organisational investment as being essential to success. The two manufacturing case firms invested the most heavily in this regard, although the High-Tech Manufacturer followed a clearer strategic direction. Both had invested heavily in ERP systems, with associated hardware and software systems, and had followed clear implementation, change management and quality management programmes. Additionally, both organisations had employed either vendor or consultancy support, and had carried out substantial training and re-training of all employees in new IT systems and procedures. They had also introduced IT steering committees, and project teams to guide their separate organisations, to steer and support development and to measure results. All four case firms had failed in their efforts to measure results in any tangible sense, although senior management with the High-Tech Manufacturer were forceful in claiming major benefits in competitive position, cost reduction, quality improvement, high labour skill levels and high productivity as a result of the firm's investment in, and use, of IT. The system set up for measuring IT benefits in the case of the Traditional Manufacturer had failed to do so while the Bank only attempted to measure likely benefits at the pre-investment planning stage. The Authority made no attempt to measure benefits. Despite its failure to formally measure results,

the High-Tech Manufacturer had been the most effective in surmounting the many human and organisational challenges experienced when new IT technology had been introduced and used. The fact that it was a relatively new organisation may have been helpful in this, since this was accompanied by a facilitating learning culture, where negative attitudes and resistance to change had not yet been encountered. The other case firms had been in operation for between 35 and 80 years where distinct cultures and practices had grown apace with the growth of the organisations.

In the cases of the Bank and the Authority, each had employed complementary organisational capital, but the level of this investment was in no way as substantial as that of the manufacturing organisations. Both, however, displayed some of the complementary investment features of the manufacturing organisations, such as IT steering committees, IT training for new employees, and training for work applications. In the case of the Authority this extended to training for office staff in its newly computerised financial system. Both organisations were also actively supported by IT functions that strongly emphasised IT operational efficiency. In the absence of more strategic or integrated IT investment, the role of complementary organisational capital was not as readily apparent. Also, in both organisational cases, the levels of complementary organisational investment were limited, either by a system of budgetary funding which emphasised annual rather than strategic investment, or by a management system that almost exclusively emphasised the operational and transactional aspects of IT investment.

22.5 Conclusions

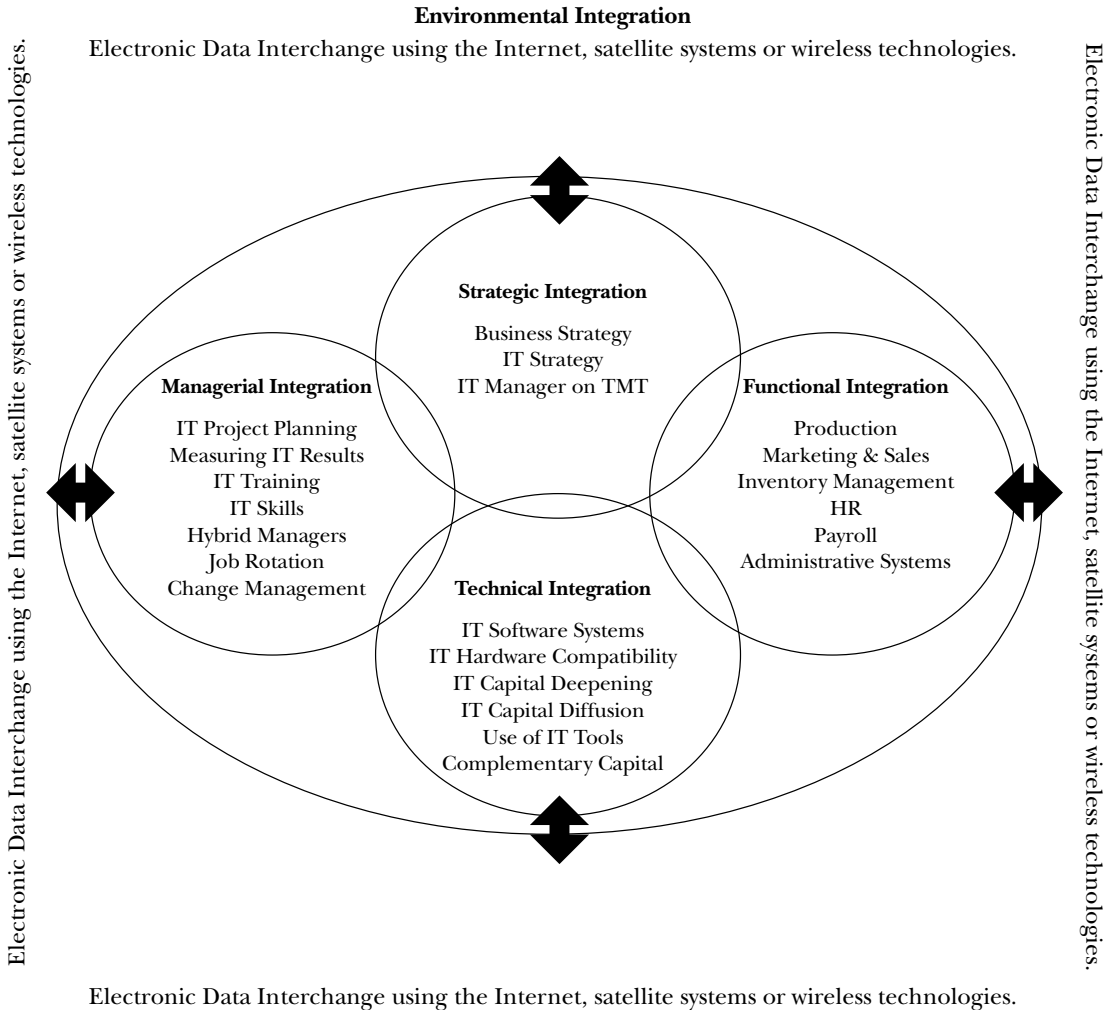
This study has examined four contrasting case studies with a view to establishing the impacts that IT had on organisational and IT performance. The results of the separate case studies indicate that IT significantly impacts on performance, both positively and negatively. It does this mainly through the ways that IT investment is managed and used, and through the levels of IT effectiveness and IT efficiency that are achieved. This research has indicated that IT investment and use affected one of the case firms in a most significant and positive way. This high-technology case firm was also the newest of the four case firms studied, being in operation for a period of just three years. In terms of claimed and perceived benefits, including competitive performance, this was the most successful of the four cases examined. The causes of this success included the possession of a defined and acted upon overall business strategy, integrated with an overall business vision and with a subsidiary IT strategy, coupled with executive support for effective IT investment and use. Effective IT investment and use embraced a commitment to the training and utilisation of hybrid managers and the deployment of bi-directional leadership, as well as to satisfactory levels of IT capital deepening and diffusion and the successful integration of the strategic and operational business components. The final factor in its success lay in its exploitation of an ERP system, which permitted seamless electronic integration inside, and outside, of its internal operating environment. The managing of these issues largely determines how IT affects organisational performance. Although the other case firms exhibited use of some, or a number, of these practices the perceived results were either limited, or non-existent.

None of the other case firms could claim to be as successful in terms of achieving cost reduction and other competitiveness benefits, including flexible and responsive production, effective quality improvement and high productivity, or in meeting the requirements identified for success. The main obstacles to more successful performance in the other firms stemmed from either weak strategy articulation or action, from lack of executive commitment to the

effective management of change or to constraints imposed by cultural, capital or operating expenditure limitations.

A model encapsulating the major and minor issues revealed by the case enquiries is presented in the proposed model for ‘The Enhancement of IT Performance’ shown in Figure 22.2 below.

Figure 22.2: The Enhancement of IT Performance



This model emphasises that organisations must successfully cope with two environments when investing in and using IT systems; the internal organisational environment, and the external environment. Successful IT performance will come from the degree to which these environments are integrated and harmonised with the strategic, managerial, technical and functional components within the business shown by the Model.

The proposed model accords with much of the relevant literature and reinforces the view that a business strategy which incorporates an IT strategy component is intrinsic to successful IT and overall business performance. The results also add to the existing literature by indicating that optimum performance cannot be achieved unless all of the factors highlighted by the model are aligned and integrated within a clear strategic perspective, including the need to integrate IT systems and their management across an organisation's internal and external environments.

It is concluded that IT affects performance depending on how it is deployed and managed in a firm, that strategic alignment is a necessary prerequisite to the optimisation of organisational performance, and that five main factors, together with many associated subsidiary factors, contribute to the impact that IT has on organisational performance.

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