

25 ENTERPRISE TRANSFORMATION AND THE ALIGNMENT OF BUSINESS AND INFORMATION TECHNOLOGY STRATEGIES: LESSONS FROM PRACTICE

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Abstract

The phenomenon of enterprise transformation has been the subject of much debate in the literature. Previous research in this area has tended to focus on the organizational effects of IT-enabled change; however, researchers have pointed out that the manner in which IT affects and is affected by an organization's structure and process has not been the subject of systematic investigation. The role that an organization's IS function has to play in this process has also been largely ignored. This case study of IT-enabled change in a large telecommunications service provider captures both of these important dimensions to the phenomenon. The strategic alignment model of Henderson and Venkatraman (1993) provides a suitable reporting framework for this study's findings, which confirm that the organization's IS function had a significant role to play in facilitating organizational change. In order to be effective in this role, however, the IS function had to undergo considerable transformation in all areas of its operations—that is, in each of the dimensions of its IT

strategy, IS infrastructure, and processes. That said, the function's systemic competencies and IT-related skills proved to be the pivotal factors in enabling this internal change.

Keywords: Information technology, IT-organizational alignment, organizational change, IS strategic planning.

Introduction

Information technology (IT) has moved from the periphery to the center of everyday business and social life, playing a pivotal role in the transformation of all organizations (Scott-Morton 1991). This transformational capability is indicated by the ability of IT to render previously opaque aspects of organizational life visible, knowable, and shareable (Zuboff 1988). Indeed, Zuboff provides a fascinating account of the power of IT to reconfigure the nature of work and the social relationships that organize productive activities. These arguments are not new, however. In 1958, Leavitt and Whisler provided a seminal insight into the potential of IT to effect organizational change. Notwithstanding this long research tradition, there are conflicting and inconclusive findings in the literature on the subject of IT use in the process of organizational change and the attainment of competitive success (cf. Markus and Robey 1988; Robey and Azevedo 1994; Robey and Sahay 1996). Such observations have led Keen (1993) to conclude that, although fundamental, IT is not the key ingredient in the transformation of organizations and the achievement of competitive advantage; rather, it is the innovative and effective *management* of IT that provides the key factor.

Elsewhere, Pfeffer (1994) has argued that managerial involvement alone is insufficient, the locus of participation in the process of organizational change should include all social actors with a stake in technology-enabled transformation (see also Orlikowski 1996; Robey and Sahay 1996). Hence, the interplay of technical and social dimensions, including managerial influence, all coalesce to socially construct organizational realities (Berger and Luckmann 1966; Fulk 1993). Accordingly, Henderson and Venkatraman (1993) argue that it is not sophisticated technological functionality, but organizational capabilities embodied in the firm-specific knowledge of organizational actors, which are used to leverage IT to enable organizational transformation. The challenge for researchers who investigate the phenomenon of IT-enabled organizational transformation is, therefore, to identify and capture the social web of conditions and factors that shape organizational reality, and to give account of their contribution to and role in the transformation process.

The strategic alignment model proposed by Henderson and Venkatraman (1993, 1994) provides a suitable research model and framework for the investigation of IT-related enterprise transformation (cf. Markus and Robey 1988; Robey and Azevedo 1994; Shani and Sena 1993). When employed within the context of the present interpretive study, the strategic alignment model helps paint the required "rich picture" of IT-enabled transformation so that the phenomenon can be understood with reference to both organizational and technological infrastructures, contexts, and processes (Markus and Robey 1988; Pettigrew 1987).

Given the foregoing observations, the objective of this study is to illustrate the role that an organization's IS function has to play in the process of organizational transformation through its contribution toward business and IT strategy implementation. While leveraging IT is taken as a given in the process of organizational transformation and the attainment of competitive advantage, the role and contribution that an organization's IS function can make to this process has not been the subject of comprehensive investigation; there have, nevertheless, been some notable exceptions to this (see, for example, Feeny and Willcocks 1998; Rockart 1988; Rockart, Earl, and Ross 1996). More important, however, is the absence of a comprehensive body of in-depth, empirical research to help IS practitioners and researchers enhance their understanding of the dynamic nature of this phenomenon.

The paper is structured as follows. The next section of this paper introduces the strategic alignment model within the context of previous research on organizational change and related IS/IT issues. The third section describes the study's research strategy, while the fourth describes the case using the framework provided by the model and using associated extended narratives. The final section then discusses the research findings and presents several conclusions.

Information Technology and Organizational Transformation: A Strategic Alignment Perspective

It has been suggested that studies of the organizational consequences of information technology should not rely on simple causal models; rather, theoretical models that capture the social and technical complexity of the phenomenon and which emphasize "empirical fidelity" are advocated (Markus and Robey 1988; Robey and Azevedo 1994). Chervany (1973) argues that empirical investigations of IS-related problems require a research framework that aids in the identification and examination of a phenomenon's various dimensions and provides a structure for correlating and synthesizing the results of independent research. Furthermore, Teng and Galletta (1991) maintain that a young field such as IS requires "pre-theory" frameworks to guide research activities while en route to theory development. The strategic alignment model of Henderson and Venkatraman (1993, 1994) complies with these prescriptions; it is therefore adopted for use in the present study of IT-enabled organizational transformation (see Figure 1).

Henderson and Venkatraman (1993) developed their strategic alignment model to help practitioners conceptualise and direct the strategic management of IT. The model reflects the fact that, for many organizations, competitive advantage depends on the harmonious interplay of business strategy, IT strategy, and the IT and organizational infrastructures and processes (see, for example, March and Sproull 1990; Moreton 1995; Walton 1990). It is defined in terms of four domains of strategic choice: business strategy, information technology strategy, organizational infrastructure and processes, and IT infrastructure and processes. Each domain is characterised by its own particular dimensions. The external strategic domains are expressed in terms of their scope, competency, and governance dimensions, while the internal domains are expressed in terms of their infrastructures, processes, and personnel skills. One of the model's chief strengths is that it is based on the premise that firms are competing in an increasingly volatile, competitive, global environment, and that to be successful requires knowledge-

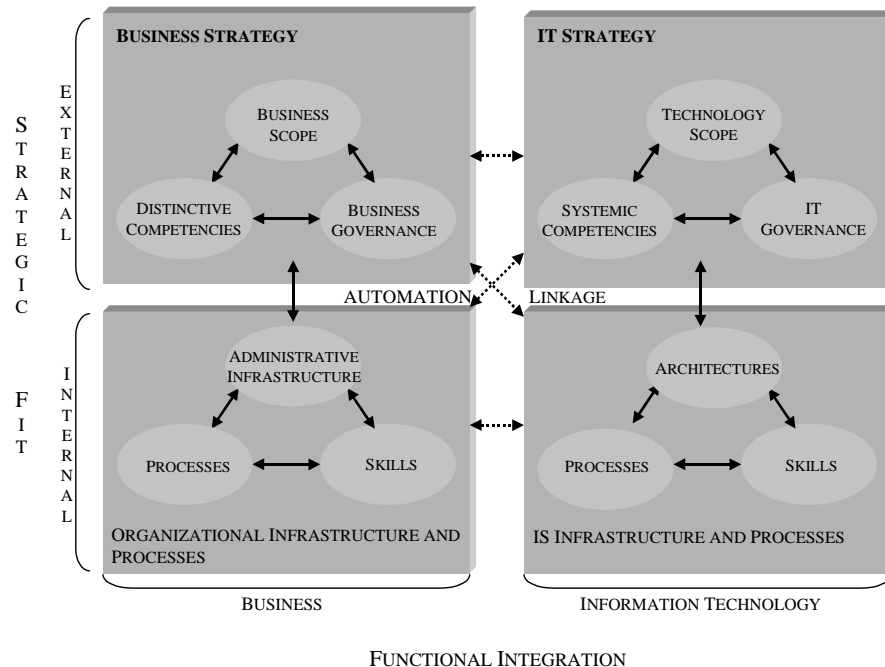


Figure 1. Strategic Alignment Model (from Henderson and Venkatraman 1993)

intensive organizations to continuously leverage IT in enabling its human and intellectual capital to develop and redevelop its distinctive competencies in a process of organizational renewal (see Doz and Thanheiser 1993; Edvinsson and Malone 1997; Hamel and Prahalad 1994).

Within the context of the *business strategy* domain, *business scope* refers to the decisions that determine where the enterprise will compete; *distinctive competencies* pertains to the areas that determine how the business will compete in delivering its products and services; *business governance* concerns the choices that enterprises make when competing in the market place, e.g., whether alliances are entered into or not. The relevant dimensions of *organizational infrastructure and processes* are *administrative infrastructure*—the roles, responsibilities, and authority structure; the *business processes*—the manner in which key business functions are carried out; and *skills*—the knowledge and competencies of organizational actors.


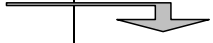
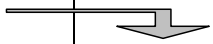

IT strategy is conceptualised in terms of *technology scope*, that is, the specific types of technology that are considered to be critical to the organization; *systemic competencies* refer to the salient characteristics and technological strengths of the IT systems; and *IT governance* issues refers to the manner in which IT systems are developed. The *IT infrastructure and processes* domain is also conceptualised along three dimensions: *IT architecture*, *processes*, and *skills*. The policies and decisions made in regard to the integration of application systems, systems software, and hardware into cohesive

platforms that are captured by the *IT architecture* dimension. The *processes* by which IT systems are planned, developed, implemented, and operated also form a critical dimension. Finally, the *skills* dimension is captured by the experience, competencies, commitments, values, and norms of the participants in the planning, development, implementation, and operation processes.

Strategic fit describes the extent to which business and IT strategies are married to their related infrastructures and processes. Organizational processes need to keep pace with business strategies, while IT infrastructures and processes must be consistent with the overall strategies that brought them into being. There are, however, strong arguments in the literature to the effect that it is an organization's knowledge base and, particularly, its competencies in acquiring and applying this knowledge that lies at the core of all competitive advantage (Blackler 1995; Leonard-Barton 1995; Nordhaug 1994). In as much as IT pervades the dimensions indicated by the model, so too do individual knowledge, knowing, and competencies, as these are employed in the formulation and implementation of strategy—business or IT. While the model implicitly and explicitly captures these dimensions, such factors are made explicit in the use of the model and its associated framework when describing the case.

Based on their extensive analysis of the phenomenon of strategic management, Henderson and Vankatraman (1993) propose four dominant strategic alignment perspectives—the first two have business strategy as the driver, while the third and fourth propose IT strategy as enabler (see Table 1). The roles that business and IT managers play in each of the alignment perspectives are of particular interest, as indeed are the performance criteria employed to evaluate the IS function's contribution.

Table 1. Transformation Alignment Perspectives (Adapted from Henderson and Venkatraman 1993)

DRIVER DOMAIN	DEPENDENT DOMAINS	BUSINESS MANAGEMENT ROLE	IS FUNCTION MANAGEMENT ROLE	PERFORMANCE CRITERIA FOR THE IS FUNCTION
Business Strategy	Organizational Infrastructure  IT Infrastructure	Strategy formulator (articulates strategy logic and choices)	Strategy implementor (implements IT infrastructure)	Financial targets achieved (cost-center focus)
Business Strategy	IT Strategy  IT Infrastructure	Technology vision (to support chosen business strategy)	Technology architect (formulates/implements IT strategy)	Technology leadership achieved (innovation and deployment of IT solutions)
IT Strategy	Business Strategy  Organizational Infrastructure	Business visionary (articulates how IT impacts in business strategy)	Catalyst (interprets IT environments and trends for business managers)	Business leadership achieved (product leadership, market share, growth etc.)
IT Strategy	IT Infrastructure  Organizational infrastructure	Prioritizer (allocation of scarce resources, joint ventures etc.)	Executive leadership (to ensure that business service levels are attained)	Customer satisfaction (measured on service quality)

Henderson and Venkatraman argue that the domains which see business strategy as driver provide the optimum route to successful alignment of IT and business strategy. In regard to IT strategy as enabler, Selznick (1957) points out that the “retreat to technology” often associated with IT-enabled strategy is fraught with danger for it assumes that ends are given and that all that is required is the determination of suitable technological means to those ends. This approach therefore runs the risk of ignoring important institutional dimensions when formulating or implementing transformation strategies (see Markus and Robey 1988; Orlikowski 1996); possible reasons for this are offered by Weick (1990). While the prescriptive perspectives outlined in Table 1 are normative and appear simplistic, they do, as Henderson and Venkatraman point out, draw managerial attention to the fact that IT in itself is not a panacea for business ills, neither is it the sole consideration when attempting to achieve competitive advantage. Following Henderson and Venkatraman, Luftman, Lewis and Oldbach (1993) stress the need for managers to be aware of and consider all four perspectives in order to fully comprehend the implications for IT use in strategy formation. In a related vein, Keen points out that the ubiquity and wide availability of IT means that organizations now have ready access to the same technologies; it is, therefore, the innovative way in which these information technologies are employed that bestows competitive advantage, and not technology *per se*.

It is clear from the above that the strategic alignment model provides a suitable framework for the investigation of IT-enabled transformation in organizations. It explicitly identifies the external and internal contexts in which organizational change originates and occurs: in addition, the model includes dimensions that describe both the process and the content of change (cf. Pettigrew 1987). Hence, the alignment model suitably captures the complex web of conditions and factors that constitute domains and dimensions of interest. While the model may be open to criticism in that its conceptualisation of strategy appears to be exclusively informed by organizational imperatives (e.g., incorporating planned, gradualist, and punctuated equilibrium models of change) and technical imperatives, its underlying philosophy also accommodates an emergent perspective and, as such, addresses many of the reservations voiced in regard to extant models of organizational change (see Markus and Robey 1988; Orlikowski 1996).

The Research Approach

Researchers argue that the specific mechanisms by which IT affects and is affected by organizational form have not been described in any systematic manner (Fulk 1993; Henderson and Venkatraman 1994; Shani and Sena 1993). Robey and Azevedo report that researchers tend to adopt simple causal models that portray IT as an independent variable predicting changes in organizational structure and process. Hence, they advocate that simplistic models should be abandoned in favor of holistic approaches which seek to attain an understanding of social interpretations, organizational processes, and contexts (cf. Markus and Robey 1988; Pettigrew 1987; Walsham 1993). Many within the IS field argue that information systems are, in effect, social systems (Kling and Iacono 1989; Land 1992) and that they, and their enabling technologies, are socially constructed (Checkland and Holwell 1998; Fulk 1999; Lea, O’Shea and Fung 1995).

Following on from this, the fundamental ontological perspective of this study is that institutional reality is socially constructed (Berger and Luckmann 1966).

Henderson and Venkatraman's (1993) strategic alignment model of IT-enabled organizational transformation suitably captures several dimensions of the complex socially constructed nature of the phenomenon, viz., organizational and IT-related contents, contexts, and processes. Researchers have argued strongly for the use of such approaches in conducting interpretivist research (see, for example, Pettigrew 1987; Walsham 1993). Hence, in order to contribute to a cumulative body of interpretivist research on IT-enabled organizational transformation, the findings of this study are reported and analyzed using Henderson and Venkatraman's model.

Operationalizing the Research Approach

This study focuses on the adoption and use of IT for organizational transformation in Telecom Eireann. It is informed by Guba and Lincoln's (1994) constructivist research paradigm and employs the hermeneutic method, in conjunction with the qualitative research techniques advocated by the constructivist paradigm, in the execution of the research strategy. It is outside the scope of this paper to provide a detailed account of either the constructivist paradigm or the hermeneutic method employed: the reader is, therefore, referred to the works of Lincoln and Guba (1985), Erlandson et al. (1993), and Butler (1998) for a full description of these issues. In keeping with the tenets of the constructivist paradigm, a qualitative, case-based research strategy was adopted: this strategy involved an exploratory, single instrumental case study (Stake 1994). The case design used has been described by Yin (1989) as "post-hoc longitudinal research." Research into the selected case was conducted through the use of individual interviews and analysis of comprehensive documentary sources. Conventional data analysis and techniques of reduction and display were used (see Miles and Huberman 1994; Patton 1990). Finally, the case report approach was used to write up the research findings.

Being a member of the organization chosen for study, one of the authors was what Bødker and Pedersen (1991) have termed a "*cultural insider*." This provided the researchers with valuable insights into the organization's culture and climate and greatly aided in the interpretation of the case.

The Transformation of Telecom Eireann: A Strategic Alignment Perspective

The organization chosen for study is Telecom Eireann, the Republic of Ireland's national telecommunications company (telco). It is a state-owned company with two minority shareholders: Telia—a Swedish telco—and KPN—a Dutch telco. Telecom Eireann provides universal telecommunications services within Ireland and presently enjoys a monopoly in many of its service areas. There are 10 companies in the Telecom Group, the majority of which are wholly owned subsidiaries. As of early 1998, Telecom employed fewer than 11,500 staff.

Telecom Eireann's origins hark back to its previous incarnation as a government agency called the Department of Posts and Telegraphs. Operating as such, it conformed

to what Burns and Stalker (1961) have termed a mechanistic model of organization—that is, it was overly bureaucratic, highly centralized, and rigid in its practices. During this period, the organization hadn't shown a profit in 15 years. In 1984, it became a semi-state body and its name was changed to Telecom Eireann. In the year ending April 1985, Telecom Eireann incurred a loss of IR£65M on a turnover of IR£389M with a debt of under IR£1 billion. Some 12 years later, in the year ending April 1997, Telecom returned a profit of IR£114M on a turnover of IR£1.2 billion, with a debt of IR£373M. In the intervening years, Telecom had also reduced its staff from over 18,000 to 11,500. From the very beginning, company management realized that it had to change the culture, structure, and business processes of the organization, and it took active measures to do so. This strategy was effected within the framework of industrial democracy: the company and its labor unions entered into a policy of participation on all issues of major concern to its management and employees. To operationalism its policies, the company instituted a profit-sharing scheme based on the achievement of financial and operational targets; it also changed its organizational structure to decentralize decision-making on operational matters to regional operating units. Thus began the company's lengthy transition toward a more *organismic* mode of organization; however, it is now, some 14 years later, under the its present CEO, and with IT as an enabler, that Telecom is beginning realize Burns and Stalker's ideal model of the firm.

The framework in Table 2 is based on Henderson and Venkatraman's strategic alignment model; it presents a meta-analysis of the status of IT-enabled transformation in Telecom Eireann as of mid-1998. What the framework does not capture is the dynamic process which led to this transformation. Hence, the following subsections present an extended narrative on the framework's component dimensions that relate specifically to the role of the company's IS function in the transformation process. The first subsection examines the change wrought by and in the external and internal dimensions of the business, while the second subsection examines the external and internal dimensions of the IS function's activities.

Business Strategy, Organizational Infrastructure, and Processes: 1994-1998

The company's Annual Report for 1994/95 describes several environmental forces that were driving factors in the required transformation of the organization. These forces include technology, competition, globalization of the telecommunications market, and the customer. Previous research has delineated the impact that such environmental forces have on the formulation of IT strategies and the development and implementation of associated infrastructures by organizations operating in dynamic environments (Konsynski 1993; Konsynski and McFarlan 1990). On the business side of things, Telecom's CEO articulated the performance criteria that would be addressed by his business strategy, viz.,

- *Financial*—Operating costs were deemed to be excessive in comparison to international norms, these would have to be trimmed, especially staff costs, which were particularly burdensome; the pricing structure would also need to be altered significantly;

Table 2. Strategic Alignment Framework: A Meta-Analysis of the Transformational Change in Telecom Eireann

DOMAIN/ DIMENSION	DESCRIPTION
BUSINESS STRATEGY	
<i>Business Scope</i>	Grow market share in local, regional, national, and international segments of the Irish telecommunications markets. Market segmentation specifically targets corporate customers, the domestic consumer market (including small and medium sized enterprises), mobile, Internet service provision, and multimedia segments.
<i>Business Governance</i>	The majority shareholder is the Irish government (65%), strategic alliance formed with KPN (PTT Telecom BV, Holland) and Telia AB (Sweden) who own 20%, with options for a further 15%. The employees recently entered into an employee share ownership plan (ESOP) agreement for 15%. Shareholders nominate non-executive directors to sit on the board of the company; ultimate responsibility for company operations rest with the board. Telecom had eight wholly-owned subsidiaries that compete in several related markets, e.g., financing and treasury management, marketing Telecom's services in the U.S., residential security systems, electronic trading services. Major shareholder in Dublin metropolitan cable TV market. Minority shareholder in directory publishing and telecommunications R&D.
<i>Distinctive Competencies</i>	Ability to meet customer needs by targeting sales, marketing and service delivery capabilities at segmented customer markets. Provision of customized, competitively-priced packages to business customers. Minimisation of operating costs by streamlining customer contact, service delivery, billing, and repair operations. Capabilities to meet the challenges posed by the ongoing price reduction program and still maintain product and service quality. Increased capabilities to provide total solutions, particularly to the highly competitive corporate customer market, that include ISDN, virtual business network, frame relay, world-class service and flexible tariff choices to the mobile market, and provide a superior Internet service provision. Community focus by sponsoring various programs in association with social, charitable, media, and sporting organizations.
IT STRATEGY	
<i>Technology Scope</i>	Local area networking and wide area networking technologies integrate mainframe and minicomputer systems, workstations, PC-based and notebook-based mobile computing platforms. A company-wide Intranet platform is under development, as are handheld terminals, Interactive Voice Response (IVR), Virtual Front Office, and Electronic Commerce Systems.

Table 2. Strategic Alignment Framework: A Meta-Analysis of the Transformational Change in Telecom Eireann (continued)

<i>IT Governance</i>	Focus on the development of cross-functional systems that support business processes. The IT Directorate are jointly developing future methods of operation (FMO) based on reengineering operational business processes with Bellcore (U.S.) and the Business Process Design directorate. Bellcore (U.S.) are also operating as systems integration consultants to the ITD. A “buy versus build” policy is in operation which sees the ITD source off-the-shelf vendor application packages. The focus has changed to integration of bespoke outsourced turnkey and off-the-shelf third-party vendor applications and on IT infrastructural development. Decentralization of development to IS subfunctions within each directorate within the group. Satellite ITD development groups are to be set up to address developer resource shortage by recruiting from the internal labor market. The IS functions of the strategic alliance partners will provide systems solutions to help accelerate the development program. Contract and consultant staff also augment ITD resource needs.
<i>Systemic Competencies</i>	The integration of existing and new systems into the generic OSS will provide the necessary support for the company’s strategies. Extensive knowledge of the business area, as well as the policy of PD and JAD are considerable strengths. Developers within the ITD are generally multi-skilled, and therefore tend to maximize productivity when operating in small-to-medium teams of five or more to develop corporate platforms. Adoption of an I-CASE application development environment for the all in-house and third-party development provides a standardized environment for developers and facilitates enhanced developer productivity and process and product improvements. Other measures employed to improve both the process and product of systems development were the application of capability maturity model (CMM) and the introduction of a quality program (TQM): these helped improve system reliability, cost-performance levels, systems maintainability, documentation, etc.
ORGANIZATIONAL INFRASTRUCTURE AND PROCESSES	
<i>Administrative Infrastructure</i>	The administrative infrastructure underwent radical transformation in early 1997. The company was restructured into 12 directorates from the existing eight. Three are subsidiaries—Eircell, Cablelink, and Enterprise; six are corporate support functions—Human Resources, Group IT, Group Finance, Group Corporate Services, Business Process Development, and the Resource Business Unit. The remaining three are the core business directorates viz. Corporate Business, Business and Consumer Services and Networks and Group Technologies. Each of the latter has its own decentralized HR, finance, and IT subfunction. The company’s CEO heads up the management team, while the Board has ultimate responsibility for the running of the company. Management personnel from the strategic partners play an active role in each business unit.

Table 2. Strategic Alignment Framework: A Meta-Analysis of the Transformational Change in Telecom Eireann (continued)

<i>Processes</i>	The key overall process within the organization is that of a participative partnership. This is reflected in the manner in which the three core customer-facing business units operate. Key overall processes in Networks and Group Technologies are the ongoing digitalization program, network infrastructure expansion, operation, and maintenance. In Business and Consumer Services, key operational processes are access network (telephone line network), service delivery, service maintenance, and restoration. The company sales and marketing processes are embedded in both the Corporate Business and Business and Consumer Services directorates. Integral to the operation of these processes are the Telesales and Business Service Centres. These processes will continue to be supported by existing systems as they are evolved to OSS subsystems. The OSS will be the key enabler of all business processes within the organization.
<i>Skills</i>	As with IT-related skills, sales and marketing skills are a scarce resource within the company. One of the major benefits of the strategic alliance is the transfer of sales and marketing expertise from the alliance partners.
IS INFRASTRUCTURE AND PROCESSES	
<i>Architectures</i>	Mainframe and minicomputers employ Teradata DBC/TOS, IBM/MVS/ESA, IBM VM/SP5&6, Amdahl, DEC VAX/VMS, PRIME/PRIMEOS hardware platforms/operating systems. Windows NT and Novell NOS for LAN servers. IBM-compatible PC platforms for all knowledge workers with Windows 95 and MS Office as standard. These platforms facilitate a range of IS which includes a Corporate Data Warehouse, TPS, FIS, MIS, DSS, GDSS, GIS, and Workflow Automation systems. There are more than 20 major corporate platforms that fall into these categories and several dozen non-integrated end-user and proprietary systems. The headline systems are in the process of being integrated into an overarching superstructure that includes legacy and new systems—the operational support system (OSS).
<i>Processes</i>	The traditional bespoke development of in-house systems using the SDLC with an ad-hoc approach to method and CASE use no longer applies. Since 1996, the ITD has increasingly applied an I-CASE supported RAD-based prototyping approach for all in-house development. Activities such as ongoing documentation of legacy systems, mainframe and database administration and operation, comprehensive end-user and technical network systems support, reskilling of the developer resource, etc., are all considered vital support processes.
<i>Skills</i>	While reskilling of the developers resource is considered vital to maintain the directorate's competency profile, existing developers are considered to be highly trained, multiskilled, competent IT professionals: these include project managers, business and systems analysis, programmers, technical specialists, database administrators, etc. While the requisite skills exist, they do not in the desired quantity. Various programs have been initiated to address this skill shortage. Suitable individuals are to be recruited from both the internal and external labor markets.

- *Marketing and Sales*—the development and delivery of an innovative range of services to meet customers' evolving needs and stimulate market growth;
- *Operations*—The key service indicators, although improving, fell short of international quality standards in the areas of service provision and fault repair.

In addition, he stressed the need to enter into a strategic alliance with a major international operator to provide Telecom with a global telecommunications platform and to bring their knowledge and expertise of the industry to help accelerate the pace of change in the organization by strengthening and enhancing existing capabilities. The CEO maintained that the success of the company's business activities and the attainment of performance targets was (and still is) very dependent on the quality of the support services offered by the IS function. Accordingly, he changed the IS function's position within the company structure and elevated it to directorate status (as indicated above, it had been a department within the personnel directorate). This change in the IS function's standing was prompted by the recognition of the pivotal role IT would play in the achievement of the company's strategic objectives. As a consequence of this change, the power asymmetry that existed between the IS department and its business clients was mitigated. Hence many of the negative effects of "political" influence and infighting among and between company directorates and functional units, especially in relation to the focus and prioritization of systems development activities, were overcome.

The results of a strategic business review conducted in the early part of 1995 helped chart future business strategy. The CEO's vision of an overarching IT superstructure, the so-called operational support system (OSS), was to enable and help operationalism the transformation process. Into this system would be integrated all existing legacy and newly developed systems. The OSS would serve as a "one-stop-shop" for customers, managers, administrative, sales, and operational staff. Relevant managers and staff would be provided with access to all customer-related information using an integrated workstation. However, the implementation of this strategy involved radical changes to fundamental business processes and staffing arrangements: hence, a participative approach, that encompassed both management and staff, was considered as being the best approach for OSS development and implementation. Responsibility for making that vision a reality was given to the newly formed IT directorate.

Following this, several other major events occurred that would have a major impact on the trajectory and progress of the OSS development program: the first was the signing of a strategic alliance with KPN and Telia; the second was a total restructuring of the company under the "Organizing to Compete (OTC)" strategy. The former saw significant knowledge-transfers into Telecom to aid in its transformation, while the latter was the first major step in the transformation process which saw the management structure de-layered and the company radically restructured. The number of reporting layers at corporate HQ were reduced from nine to five, and from nine to six in operational units across all business units. More importantly, the liberalization of the telecommunications markets brought about by government legislation has seen the entry of significant competitors in the corporate, business, and consumer sectors, as well as in the buoyant mobile telephone market.

The company's ongoing response to these competitive threats takes the form of a tariff rebalancing strategy which attempts to bring its prices in line with those of national competitors and with those existing in the international telecommunications markets.

However, Telecom's ability to compete on the basis of price is hampered by its high staff costs that threaten profitability and also limit its scope for price reduction. Although early retirement and voluntary severance programs have been in existence for some time, they have not delivered the necessary reductions in staff and associated costs. The transformation process currently in train aims at staff reductions in the order of approximately 2,500 over a five-year period. Apart from this reduction in headcount, staff will, for the first time ever, be expected to contribute 5.3% of their earnings to the company's pension fund, and also take on board new overtime pay arrangements. A greater degree of flexibility will also be introduced into staff attendance times and hours worked.

Existing business processes have and are being redesigned to accommodate these aspects of the company's transformation. That said, it is certain that considerable industrial unrest would have ensued had not the company entered into a partnership with staff to bring this change about; this participative process is now described.

Joint Strategic Consultative Process

One of the key elements in enabling the transformation process was the partnership approach adopted by both management and the labor unions. Since its inception as a state-sponsored organization, Telecom has adopted a participative approach to the implementation of organizational policy and decisions. This position was recently underlined when the company reiterated its policy in this area viz. *"The process of consultation with unions in regard to all the implications for staff of technological change, is one to which the company remains fully committed."*¹

To give effect to this policy, the company has instituted several joint bodies; for example, the Computer Liaison Committee (CLC), whose members are drawn from both company management as well the labor unions, deals exclusively with issues surrounding the introduction of information systems within the organization. Two other technology-related forums of note here are the Joint Technology Committee (JTC) and the Joint Working Party (JWP). However, in order to institute the radical transformation planned for the five years from 1997 to 2002, a more innovative approach had to be adopted. A Joint Strategic Consultative Group (JSCG) was formed in 1995 to give effect and introduce a formal structure to the partnership approach to change. A framework agreement for the transformation of the company was drawn up in consultation with the unions at this forum. In this agreement, the finer details of the OTC strategy were fleshed out. In order to achieve commitment to the desired business process changes, reduction in operating costs, and increased quality of service to the customer, the company entered into an Employee Share Ownership Agreement (ESOP) that would give employees a 15% stake in the company. This would replace the now defunct bonus scheme, but would be tied to achieving the transformation goals. Of particular emphasis here were IT-related measures in the transformation deal. These and other issues will be addressed in the following section.

¹Statement of Copmany Position on Current Industrial Relations Issues, October 1995.

IT Strategy, Infrastructure and Process: 1994-1998

The IT directorate is a centralized functional unit whose chief responsibility is the development, maintenance, and support of all corporate IS. Based in Dublin, it has a staff of over 240 spread among its eight divisions. The Directorate was restructured in 1995 as part of an ongoing endeavor to create a “customer-centric culture” using an account management structure and a “customer first”² quality program. The ITD director viewed this cultural change as being critical to the success of the directorate’s various activities. It was the first serious attempt to align the directorate’s IT strategy, infrastructure and processes with business strategy, infrastructure and processes. This change preempted the OTC program to some degree; however, the implementation of the OTC in the ITD saw the number of divisions increase to eight in order to closely align the ITD’s subfunctions with those of the core business directorates. The new divisions include the financial and administrative systems, sales and marketing systems, billing systems, and operations systems subfunctions. The remaining subfunctions include the OSS, IT strategy, IT architecture, and the data center divisions. The OTC program saw senior and ITD project manager positions increase by some 22%, and the establishment of decentralized IT subfunctions in other directorates with internal reporting relationships. Other measures in the transformation strategy saw the creation on an internal labor market to help redeploy staff into resource-starved areas within the company—the ITD is one such area. The problem of obtaining appropriate developer resources was and continues to be a major headache for IS function management.

A Transformation-Oriented Development Strategy

In 1995, there was a significant backlog of systems to be developed for the business constituency. The priority attached to the development of an OSS greatly added to the existing development backlog. IS managers argued that all future systems development projects would have to be congruent with the OSS philosophy; that is, systems had to support key business processes rather than the specific needs of particular functional units. These systems would, it was envisaged, transcend traditional business, geographical, and functional boundaries. Examples of systems under development are the sales support system, alarm event and monitoring in the network, and work management systems. Eight such systems are presently under development, while a further 42 are in the pipeline. Each business process-related system will have a planning and implementation team made up of representatives from the ITD, the business unit concerned, and the Business Process Design directorate. The systems to be developed are prioritized according to the business case made and availability of IT resources. In addition to this, IS function managers consider it vital that each development endeavor possess joint terms of reference between the IS function and business constituencies in the form of a *project charter*. Prior to the project commencement it is also important that “four or five key points or toll-gates are identified where the project does not proceed unless certain events occur on the business side...this has implications for

²Organizational term for total quality management (TQM).

change management and end-user training, etc.” (IT Manager). Agreement on the toll-gates and possible responses are integrated into the project charter. In addition, the provision of development-related infrastructural resources and systems implementation have been devolved where possible to business project managers, users, and intra-directorate IT subfunctions. The object of this exercise is to free up scarce developer resources within the ITD so that it can press ahead, on as wide a front as possible, with the significant challenge of IT-supported business change.

It is recognized that the ITD cannot develop all of the change-related OSS subsystems in-house. Hence, systems are being sourced from third-party vendors either off-the-shelf or on a bespoke turn-key basis. In addition, the benefits afforded by the strategic alliance are being leveraged as systems already in use with KPN and Telia are being evaluated for their suitability for transfer into the OSS. The experiential knowledge and competencies of the alliance partners are also being exploited to inform the selection, planning, and development of new systems. Following their extensive experience with similar projects in the U.S., consultants from Bellcore International are working with the ITD to help provide a systems integration framework.

The Provision of the Change-based IT Architecture

The provision of an IT architecture that enables enterprise transformation is considered to be a considerable challenge by the IT director. To ensure that the IT Directorate made the right choice of IT infrastructure, senior IS function managers were given the responsibility of scanning the external environment for suitable, innovative technologies and IT solutions that could be integrated into such an architecture and enable business strategy for the attainment of process change and competitive advantage. In the past, the company has invested in various information systems to meet particular needs in functional areas of the company. As can be seen in Table 2, there was no attempt to maintain standards in respect of the type of IS to be developed, IT platforms employed, or to ensure that these systems were interoperable, or capable of integration. Any attempt to enforce development policies along these lines were invariably frustrated by the immediate imperative of delivering working systems as quickly as possible. There was no effective IT strategy for the company and no major effort to devise one was ever seriously attempted. Consequently, there are many incompatibilities between these various systems and IT platforms, most of which are inherently difficult to change or evolve. As of 1995, many of the ITD staff were engaged in maintenance activities in support of legacy systems, rather than in the development of new ones. This trend has since been reversed, and existing and new systems are being evolved into the OSS whose constituent subsystems will include network, business, administrative, service management, customer, financial, and marketing support systems. These will be overlaid on historical MIS and will be serviced by what has been described as a virtual, integrated database. These new systems, several subsystems of which are already in place or nearing completion, will support and enable cross-functional business processes in pursuit of organization objectives, rather than the individual needs of functional units (cf. Moreton 1995). A common interface, based on access right and privileges, will be provided to all business and operational users.

Transformation of the Development Process: I-CASE Enabled RAD

The traditional approach to information systems development in Telecom Eireann has been centered on internal development of bespoke solutions using the SDLC. The underlying rationale for this approach to ISD has been that these systems must accommodate and support established business processes, many of them peculiar to Telecom Eireann. Over time this approach has changed. The ITD now perceives its chief function as being a procurer and integrator of packaged IS, although it will continue to develop some of its systems internally. In the past, no long-term commitment was made by the Directorate to the adoption of any particular systems development methodology, technique, or CASE tool. In the absence of such standards, developers and project managers have tended to adopt their own. Therefore, up until recently, IS development was very much an ad-hoc affair in regard to development methods and the use of CASE to support these methods. In 1995, the directorate introduced an application development environment (ADE) based around an integrated CASE (I-CASE) workbench called Information Engineering Facility (IEF from Texas Instruments). The IEF I-CASE environment delivered on its promise of increased developer productivity and process and product improvements within the context of a RAD-based development project. Hence, IEF had been adopted as the IS function's application development environment of choice for in-house bespoke systems development within the organization. Thus, the management goal of introducing a function-wide development environment was realized.

Social Actor Participation in the Transformation Process

In adherence to this participative approach to the development of its information systems, each systems development project within Telecom has a designated business owner or project sponsor. For large projects, a development steering group (DSG) is formed from the constituencies of interest within the organization. Managers from the relevant business areas and IT Directorate (ITD) normally comprise these groups. IT professionals and managers from the Business Process Design Directorate also participate in planning and implementation stages. Two project managers jointly manage each project: a user project manager drawn from the business constituency and a development project manager drawn from the ITD. The latter manages the physical development of the system; the former manages business user input into the project in areas such as the provision and management of user-representatives, user groups, user test teams, and infrastructural resources. The development team normally consists of one or more business user representative from interested constituencies and a team of developers from the IT Directorate. User representatives actively participate in most development activities, apart from programming and the technical aspects of systems development. Although key users are interviewed to elicit system requirements, user groups are also formed to provide the development team with a core group of users for further requirements analysis and to verify and ensure that the system, as developed, will meet these requirements. User participation is characterized by both the industrial democracy and participative management. Hence, a combination of participatory design (PD) and joint application design (JAD) are utilized in systems development. These

participatory mechanisms provide users with opportunities to express their “world views”, resolve political conflicts, and help negate potential power asymmetries between developer and user. This helps to create an environment that enhances and facilitates the associated change process.

Skills: Change-related IT Resource Issues

Although a highly skilled cadre of IT professionals exist within the ITD, the required degree of IT-enabled change could not have been facilitated with existing developer resources. Several tactics were employed, within the context of the transformation and OTC strategies, to address such issues. For example, IT subfunctions were set up within the newly formed directorates; managers within these IT departments have direct reporting relationships to senior management in each business unit. In addition, the responsibility of acquiring the appropriate developer resources to staff these subfunctions lies with business unit management. Although this strategy removes some of the development-related burdens from the ITD, there still remains the question of sourcing the required developer resources for both the ITD and these new IT subfunctions. As part of its OTC strategy, the company has set up a Resource Business Unit to provide new job opportunities for staff who require redeployment as a result of business process- and technology-related change; hence, the company has established an internal labour market to help business directorates, such as the ITD, obtain much needed human resources through internal recruitment. The ITD has specifically targeted this market because many staff possess IT-related skills and competencies and are therefore suitable for direct internal recruitment and require little in the way of training. Consequently, *satellite units* with direct reporting relationships to the ITD are being set up in geographical locations where appropriate staff surpluses exist: these will typically consist of teams of 20 to 30 developers. External recruitment of suitably qualified IT professionals, either direct from college or from industry, on either a contract or tenured basis, is also occurring. In addition to this, IT management recognizes that the existing skill set within the ITD needs to be evolved to meet its new strategic role. As a consequence of this training programs are presently being put in place to upgrade developers' skills.

Discussion and Conclusions

Whatever the merits or possible demerits of the strategic alignment model as a normative, practitioner-oriented conceptual model for enterprise wide transformation, it proved to be a valuable research vehicle for the present investigation into IT-enabled organizational change. Drawn as it is from Henderson and Venkatraman's (1993) experience and research in strategic management and IT, the model provided a useful framework within which to conceptualize, analyze, and present the research findings of this case study on the contribution of the Telecom Eireann's IS function to the transformation of the company's business infrastructure and processes. That said, several weaknesses with the model deserve mention; these will be highlighted in the following discussion of this study's findings.

It is clear that Henderson and Venkatraman's model emanates from what Winograd and Flores (1986) have termed the "rationalistic tradition"; here, as Introna (1997) points out, managers are perfect, rational, and purposive beings who are technological experts. The assumptions underlying this conception of organizational behavior are far from the reality of organizational life, as Introna has illustrated (cf. Fransman 1998; Pfeffer 1994). In line with their model's rationalist perspective, Henderson and Venkatraman imply that the adoption and implementation of the various strategic alignment perspectives (i.e., the two perspectives that view business strategy as the driver of change and the two perspectives that see IT strategy as the enabler of change) is a straightforward and unproblematic process where the means to specific ends are known, and where the outcomes of organizational action are fully congruent with actors' intentions. This was clearly not the case in Telecom Eireann, as the needs of various constituencies within the organization had to be met, and certain structural arrangements made, over time, in order to successfully implement strategy and give effect to its associated change. Indeed, had not these issues been addressed, the organization's strategies could not have been implemented. This study takes note of these weaknesses in the model and has illustrated a range of influences that have a significant impact on strategy formation and execution. Chief among these weaknesses is the assumption that IS functions in organizations possess the political muscle and wherewithal to formulate and implement IT strategy and also contribute to and shape business strategy. This has not been the case with many organizations as the IS function has, in the past, operated in a support rather than in a strategic role. This situation has, in the recent past, begun to change as IS managers have been placed in senior management positions (see, for example, Rockart 1988). One question that arises from this observation is "how and why does an organization's IS function move from being merely a support function to being a key business unit, that is, from being a strategy implementor to a strategy formulator," and what are the consequences for the organization? The previous sections of this paper have offered a detailed description of this process; what follows is a discussion of the salient issues with explicit reference to the model.

Up until 1994/95, Telecom Eireann's IS function operated in a support function only; hence, a power asymmetry existed between the IS function and other business units. This state of affairs meant that the strategy execution perspective of business strategy—that is, the alignment perspective with business scope as the driver, business processes as the target, and with IT architecture as the implementor—was the only game in town. Up until this time, as the model correctly predicts, the IS function's sole performance criterion was that of a cost-center approach to meeting budgetary targets. As of 1998, however, the IS function is measured on performance criteria associated with all four alignment perspectives suggested by the model. In addition, as Table 3 implies (refer also to Table 1), the IS management's role has moved beyond that of being a mere strategy implementor and has grown to be one of executive leadership, technology architects, and IT catalysts. In 1994, for example, when the organization's new CEO elevated it to directorate status, the IS function developed strategies that saw it enhance IT infrastructure and processes to meet organizational needs; customer satisfaction was for the first time introduced as a performance criterion for the function. From 1995 on, the IS function had a major input into the formulation of business strategy and actively drew up and integrated its own strategies accordingly. It was about this time that senior IS management stressed that the success of the IS function depended

on the achievement of technological competence in the deployment of innovative solutions for its business clients. The senior IS executive also placed great emphasis on changing the traditional structure and processes of the function to closely align it to both business structure and process. Accordingly, he initiated a process of transformation within the IS function that centered on matters of IT scope and architecture, governance issues, improving the systems planning, development and implementation processes, and focusing on acquiring and enhancing the developer resource in terms of its skills and competencies. It is clear, then, that Telecom Eireann's IS function grew from having a narrow IT scope and limited IS architecture, narrow IT governance and basic IS processes, but strong systemic competencies and IS skills to a position whereby (1) its IT scope is sufficiently broad, but focused on business imperatives, as are its IS architectures; (2) it has adopted a pragmatic approach in terms of its choice of IT governance options and has developed sophisticated IS processes; and, finally, (3) it now possesses distinctive systemic competencies and enhanced IS skills. It must be emphasised that the pairing of these dimensions is not accidental; they emerge from the findings, and tend to map onto each other—something implied by, but not made explicit in, the model. What is noteworthy here is that, without the existence of strong systemic competencies and required IS skills, it is difficult to imagine how this organization's IS function could have transformed its IT scope and architectures, IT governance and processes. It is evident that the experiential knowledge of the IS function's personnel that had developed over time and become embedded within the function's processes and routines etc. was leveraged by IS managers, under the leadership of the IS executive, and with the support and sponsorship of the CEO, to strengthen the related dimensions of IT strategy, infrastructure, and processes. Indeed, IS management now looks beyond the IS function to appropriate staff with IT-related skills and competencies from the business areas of the company in order to leverage their knowledge in the pursuit of its alignment strategies. The critical observation here is the recognition of the pivotal role of and link between the IS function's systemic competencies and portfolio of skills; indeed the same could be said of the business dimensions of the model. This observation is congruent with extant thought on the importance of organizational knowledge in the literature (see, for example, Blackler 1995; Edvinsson and Malone 1997; Leonard Barton 1995; Nordhaug 1994) and is particularly relevant with respect to recent observations in the IT literature (see Feeny and Willcocks 1998). The addition of such a perspective could strengthen the model as it would allow its somewhat sterile "rationalistic" view of organizational life to be broadened in order to recognise the role and importance of firm-specific knowledge. This last point was not lost on Telecom's IS management as, in the four years since 1994, the IS function has matured and has developed a wide range of competencies and skills in all aspects of its operations; a consequence of this has seen IT become the driver of corporate strategy. Furthermore, the performance criterion of attaining leadership in many areas of Telecom's business is now seen to rest squarely on the capabilities of the IS function to develop IT-based future methods of operation. The implications of these issues for strategy alignment within Telecom Eireann are presently discussed.

In articulating the strengths of their model, Henderson and Venkatraman point out that it possesses an "intrinsic dynamic nature." As a result, they advise managers to be aware of the need to "evolve" from one the model's four strategic perspectives to another in what they describe as the dynamic process of strategy formulation; however, they

provide no specific example of when or how this may be either relevant or necessary. This indicates the need to specifically delineate a temporal dimension for the model. It is clear from the above consideration of the IS function's past role that all four of the dominant alignment perspectives were adopted by Telecom Eireann management, not in any preplanned or predetermined sequence, but given the overall objectives set by the CEO within the context of his business and technology vision, the strategies emerged from the interplay of business-related and IS function-related factors. The strategy sequence ran from the conventional alignment perspective of business strategy as driver, which had been the traditional perspective adopted in this organization, through the sequence illustrated in Table 3. The time period for the transition from (2) to (4) was four years. Hence, one may conclude that the "pace of change" and "degree of change" that has occurred, and is planned to occur, in Telecom Eireann is directly related to the existence and use of all four strategy alignment perspectives by company management. One question that arises here is, do all organizations exhibit the same type and sequence of transition in relation to strategy adoption? Luftman, Lewis and Oldbach suggest not; however, they fail to provide empirical evidence to support their observation and its normative prescriptions. Furthermore, is it possible that all four perspectives coexist in mature organizations that possess particular skills and competencies in IT, and where the IS function is a partner in the process of strategy formation rather than a mere functionary?

The answers to these questions are complex; that said, what can be garnered from this case study is there may exist different rates and degrees of strategy-driven change in organizations. For example, the time-frame for change in some organizations may be short, for others it may be a quite lengthy process. In addition, the "degree of change" may be viewed as being directly proportional to the scope of the strategy(ies) employed. There is, also, the possibility that the resultant change may not accord with that planned. Furthermore, as was noted in the introduction to this paper, and illustrated in the findings, although management's visible hand is at the helm, it is only one of many required to successfully navigate a vessel—such an emphasis on the pivotal role of the experiential knowledge of social actors at all levels within an organization has tended to be ignored in the past. It is, perhaps, a truism that the benefits of strategic transformation in post-industrial organizations could not be realized without the judicious use of IT. That said, information technology does not appear as if by magic once managerial hands beckon. The multitude of components that constitute what is generically referred

Table 3. Sequence of Strategic Alignment Perspectives in Telecom Eireann

	DRIVER STRATEGY	STRATEGY FOCUS	STRATEGY TARGET
1.	Business Strategy	Organizational Infrastructure	IT Infrastructure
2.	IT Strategy	IT Infrastructure	Organizational Infrastructure
3.	Business Strategy	IT Strategy	IT Infrastructure
4.	IT Strategy	Business Strategy	Organizational Infrastructure

to as IT have to be acquired, integrated, and then woven into the social fabric of an organization—the key factor here again is the experiential knowledge embedded in the competencies and skills of the organization's IS people. When enabled to do so, an organization's IS function can build on and enhance this critical foundation in order to transform itself in terms of its IT governance and processes, scope and architectures. From the solid foundation provided by its transformed competencies and skills, structures and processes, the IS function must then apply its own human and technological resources in concert with organizational stakeholders, their representatives, and outside agencies such as IT vendors to help socially construct information systems that help transform the organization. What is unusual in this organization, and reported herein, is, perhaps, the manner in which this occurred.

In conclusion, then, this paper provides insights into the complex network of contextual influences at work in the IT-enabled transformation of organizations. Simplistic models of organizational change have failed to capture fully the phenomenon in all its richness and delineate the critical role that an organization's IS function has to play. The strategic alignment model, adapted and presented herein as a research framework, and suitably broadened in line with observations made in this concluding section, provides an appropriate point of departure for future studies on the phenomenon of organizational transformation and on the role of the IT in enabling such change; in so doing it thereby helps contribute toward a cumulative body of knowledge on the phenomenon.

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