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The Institutionalisation of User Participation for Systems Development in Telecom Éireann

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EXECUTIVE SUMMARY

It was in 1984 that Telecom Éireann first introduced institutional mechanisms which facilitated employee participation in the formulation and execution of corporate strategy. However, almost ten years elapsed before the full benefits of user participation were realized in the development and implementation of organizational information systems. Two systems development projects that are perhaps exemplars of the manner in which user participation was and still is effected in Telecom Éireann, and which offer unique insights into this multi-faceted phenomenon, are described herein. This case study not only illustrates why user participation is important for systems development in organizations, it also provides evidence that user participation is insufficient for success in systems development if appropriate attention is not given to change management issues associated with the implementation of developed systems. The lessons learned by Telecom Éireann in addressing such issues helped it to evolve its participative policies into a partnership approach to organizational change that helped ensure the success of its strategy of IT-enabled organizational transformation.

BACKGROUND

As the Republic of Ireland's major telecommunications utility, Telecom Éireann provides universal telecommunication service and enjoys a monopoly in many areas of its business. Being a state-owned company, Telecom Éireann's majority shareholder is the Irish Government, which retains a 65% stake in the organization. The remaining shareholders include Telecom's employees, who hold a 15% stake, and two European telecommunication's operators—KPN (PTT Telecom BV) of Holland and Telia (AB) of Sweden—who jointly own 20% of the company. KPN and Telia also possess options to purchase a further 15% of Telecom's equity. Telecom Éireann entered into a strategic alliance with these companies in January of 1997 in a deal that saw KPN and Telia offer

Telecom access to a global telecommunications platform that would enable it to deliver improvements in both the quality and price of its products and services. Despite the many competitive challenges it faces, Telecom's future seems bright, but this was not always so. In its first set of published accounts in 1985, Telecom Éireann reported a loss of IR£65 million on a turnover of IR£389 million with a debt of under IR£1 billion. Some fourteen years on, however, in the published accounts for the year ending 1997/98, the company announced a profit of IR£155 million on a turnover of IR£1.35 billion, with a debt of IR£172 million. In the intervening years, Telecom reduced its cost base by cutting staffing levels from over 18,000 to 11,000. From the very beginning, Telecom's management realized that it had to divest itself of the bureaucratic image and practices of its previous incarnation as a civil service department within the Irish Government. The then CEO was faced with the considerable task of changing the culture, structure, and business processes of the organization—this change was effected within the framework of industrial democracy. It was within this framework that the company and staff labor unions entered into a policy of participation on all issues of major concern. To help operationalize its policies, the company instituted a profit sharing scheme for all employees based on the achievement of financial and operational targets; it also changed its organizational structure to decentralize decision making in relation to operational matters to regional functional units.

Telecom Éireann's annual report for the year 1994/95 describes several key forces for change in the telecommunications industry in Ireland viz. technology, competition, regulation, globalization of the telecommunications market, and customer choice. In order to meet the challenges posed by such forces, the company's newly appointed CEO felt that Telecom had to radically improve its ability to meet customer needs by (a) targeting sales, marketing and service delivery capabilities at segmented customer markets; (b) providing customized, competitively-priced packages to business customers; and, finally, (c) minimizing its operating costs through streamlining customer contact, service delivery, billing, and repair operations. The use of information technology (IT) was considered by the CEO to be the pivotal factor in enabling this strategy. Some of these initiatives were not novel as measures were already established to rectify certain weaknesses in the company's operations; for example, the need for both of the information systems (IS) described in the case study was articulated in early 1994. These systems were proposed in order to help minimize operational costs and streamline telephone service delivery and repair processes.

Under the leadership of its new CEO, Telecom underwent a radical transformation in the four years up to 1998: for example, the company's organizational business processes and structure were changed significantly (see Exhibit 1, Appendix A, for the current organizational chart) and its IT infrastructure was altered to facilitate and support such change. Although the participative policies and practices that existed within the organization in 1994 were sufficient for the degree and pace of organizational change undertaken in the 1980s, the CEO deemed such policies and practices to be ill-suited for the radical measures he had in mind. Existing participative structures and processes were, therefore, enhanced and augmented to ensure that both management and staff were committed to the transformation of their operational roles and work practices in the achievement of corporate strategy. One of the most significant measures undertaken by the company was to replace the existing profit sharing bonus scheme with an employee share ownership plan (ESOP) that saw staff acquire some 15% of the company's shares in exchange for which they would agree, among other things, to cooperate and participate fully in the IT-enabled transformation of the organization. It must be noted that it was the labour unions that first tabled and championed this initiative in the face of notable opposition from the government of the day; however, the ESOP deal had the unequivocal support of the CEO and his management team. This change in the organization's approach to user participation in the IT-enabled transformation of the organization did not occur overnight, the structure and process of user participation for information systems development within Telecom Éireann had been in the process of change since 1994.

SETTING THE STAGE

While Telecom Éireann's policy on employee participation was applied with success in many of the company's operational areas in the first ten years of business, and the industrial unrest seen in

the 1970s became a thing of the past, there was one area of the company's operations in which this policy had little effect—that is, in the development and implementation of corporate information systems. In the first ten years of its existence the company did not have a coherent policy on the use of information technology to informate and transform its business processes. Certainly, several large-scale corporate systems, e.g. transaction processing, financial and management information systems, were introduced or upgraded; however, there was little in the way of integration taking place due to the non-alignment of business and IS strategies—indeed, it must be said that until 1994 the company did not possess an IT strategy as such. Neither was there any attempt to institute change into company operations based on the introduction of information systems: change, when it did occur, was incidental and of little overall consequence. Users participated in the development of corporate information systems, but given the prevailing approach to systems development and to participation by users in this process, the benefits associated with user participation in the introduction of IT were never fully realized.

In the mid-to-late 1980s, personal computers (PCs) and networking technologies were in widespread use throughout the organization; these technologies were not employed to automate or informate business processes in conjunction with corporate IS, rather their main use was in providing office automation and personal productivity tools to end-users. Nevertheless, as a consequence of the introduction of such technologies, administrative and operational managers and staff began to fill the information vacuum by developing their own PC-based solutions to informate their activities and hence work smarter. However, because of the uncoordinated ad-hoc approach to the development of these systems, coupled with an overall lack of cross-functional integration and knowledge transfers between members of the business community, the systems developed and implemented by end-users remained ineffective in a macro-level context. The major advantage of this trend in end-user computing was to heighten an awareness of the benefits that could accrue from the use of IT in supporting business processes and organizational decision making. The experiences that end-users had in this area proved to be crucial in later years as a cadre of IT-literate managers and operational staff was available to participate in the development, implementation, and use of corporate information systems.

The major reason for the aforementioned uncoordinated approach to the development and use of IT was that, up until 1994, the organization's IS function was a relatively obscure department within the personnel directorate. As such, the Information Systems Department (ISD), as it was then called, was merely seen as a servant to business directorates and, because of this power asymmetry, it lacked the political muscle to institute its own policies for systems planning, development and implementation. Up until the early 1990s, political issues and the scope of the IS function's development activities colored its relationships with the broad community of users in the organization. From about 1990 on this situation began to change as information systems with a wider organizational scope and impact began to be developed and implemented. As a result, the ISD began to establish good working relationships with the business community. All this had a positive impact on the type and degree of participation by users in the systems development process. However, because of the aforementioned lack of political clout, the IS function could not acquire the type and degree of participation it desired to ensure success in all its development endeavours.

In 1993, Telecom's board of directors concluded that the company would have to be in a position to respond to increasing competitive pressures or face disastrous consequences. In order to effect the necessary change, a new CEO was selected and appointed in 1994. This individual proposed a number of innovative and radical plans to help transform the organization. Telecom's new 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 and services offered by its IS function. Accordingly, in 1995 he changed the IS function's position within the company structure and elevated it to directorate status. 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. In reality, however, this change in the IS function's status had already taken place in 1994 when the CEO first assumed the reins of control and informally invested a strategic role in the function. As a consequence of this change, the power asymmetry that previously existed between the

IS department and its business clients was effectively mitigated. Hence, many of the negative effects of 'political' influence and infighting among company directorates and functional units, especially in relation to the focus and prioritization of systems development activities, and the quality of user representation on development projects, were overcome. This change in status, coupled with other related events, allowed the IS function to effectively manage its relations with business units and associated user communities within the organization. In enabling developers to manage better their relationships with users; it also greatly enhanced the quality of user participation in systems development within the organization. The IS function's experiences with the development of the two operational support subsystems described in this case study bears witness to this.

Thus, the newly formed IT Directorate (ITD), or Group IT as it is now known, was a centralized functional unit whose chief responsibility is the development, integration, maintenance, and support of all corporate IS. Based in Dublin, it has a staff of over 240 spread among its eight divisions. In keeping with its new status and strategy, the directorate was restructured internally in 1995 as part of an ongoing endeavor to create a *"customer-centric culture"* using an account management strategy; this change in orientation was supported by the introduction of an intra-directorate *"customer first"* (organizational term for what is Total Quality Management, TQM) quality program (see Appendix Exhibit 2, for the ITD's organizational chart as of 1995). The IT director viewed this change in culture as being critical to the success of the directorate's various activities—particularly, in its efforts to maximize the benefits of participation by users in systems development. It was the first serious attempt to align the directorate's IT strategy, infrastructure, and processes with business strategy, infrastructure and processes. This change pre-empted the organizational restructuring begun under the CEO's Organizing-to-Compete strategy (OTC) to some degree. The implementation of the OTC in 1997 saw the number of divisions in the ITD increase from six to eight in order to closely align the ITD's sub-functions with those of the newly restructured core business directorates (see Appendix Exhibit 3). The new divisions include the Financial and Administrative Systems, Sales and Marketing Systems, Billing Systems, and Operations systems sub-functions. The remaining sub-functions include the operational support system (OSS), IT Strategy, IT Architecture, and the Data Center divisions.

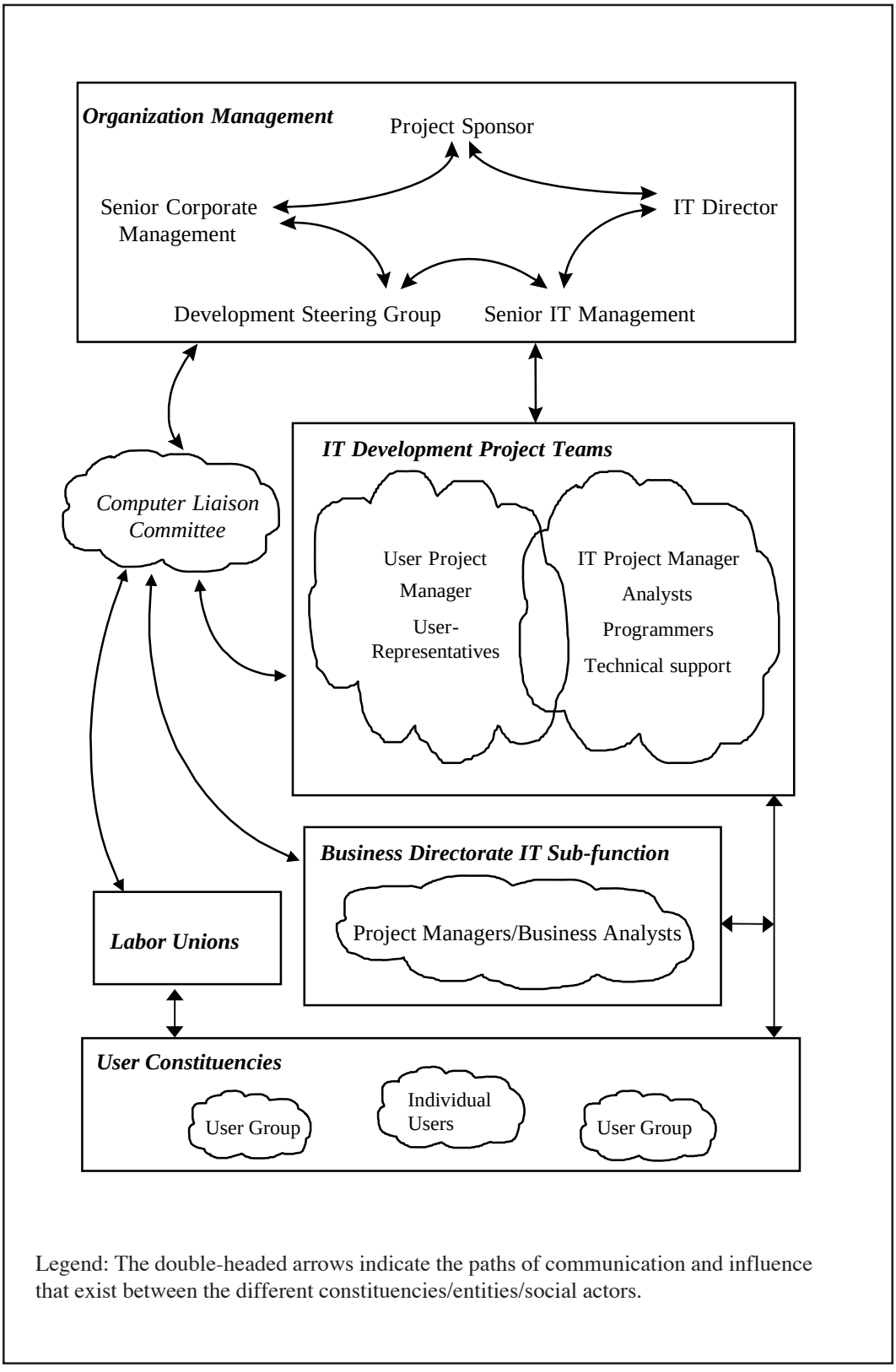
A JOINT STRATEGIC CONSULTATIVE PROCESS

Telecom Éireann's participative approach to the implementation of organizational policy and decisions 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."* 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 the company's management team as well as 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 by the company. In 1995 the CEO put together an umbrella forum called the Joint Strategic Consultative Group (JSCG) to introduce and implement a new approach to the company's partnership approach to change. A framework agreement for the transformation of the company was drawn up by management in consultation with the unions at this forum. Of particular emphasis here was the continued recognition by all concerned of the need for a high degree of user involvement in expediting IT-based solutions across the enterprise.

The Structure and Process of User Participation within Telecom Éireann

One of the areas where Telecom Éireann's participative approach in the formulation and implementation of its business policies is particularly evident is in the development of its corporate information systems. In order to operationalize this approach, users at all levels, from top management to operational staff, participate in the development, testing and implementation of corporate IS. Accordingly, each systems development project within Telecom has a designated business owner or

Figure 1 The Structure of User Participation and Involvement in Systems Development in Telecom Éireann



Legend: The double-headed arrows indicate the paths of communication and influence that exist between the different constituencies/entities/social actors.

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 the ITD normally comprise these groups. Two project managers jointly manage each systems development 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 etc. Development teams normally consist of one or more user representatives from interested business 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 in Telecom is characterized by both the industrial democratic and participative approaches to systems development. Hence, a combination of participatory design (PD) and joint application design (JAD) are utilized in systems development.

Figure 1 illustrates the structure that operationalizes the company's participative policies in the area of systems development. Apart from the IT sub-function within business directorates, which is a relatively new element in this structure and which was introduced in 1998, the figure describes the different constituencies within the organization who were involved or who participated in systems development in 1994/95. This structure, and the processes that underpin it, is generally considered to have had a positive effect on user attitudes toward and behavior in development activities. As one of the ITD's project managers pointed out, the participatory mechanisms employed within the organization *"provide users with opportunities to express their 'world views'…help resolve political conflicts, and help negate potential 'them-and-us' situations arising between developer and user."*

CASE DESCRIPTION

As previously indicated, the restructuring of the company's IS function by the newly appointed IT director gave new meaning and effect to the concept of user participation for systems development within the organization. Empowered by its new status as a business unit within the company, the IT directorate's managers and systems developers could now secure and encourage suitable business users to actively participate not only in traditional analysis and design activities, but, also, throughout the development process, where required. The establishment of a *"quality-based culture"* by the IT director also meant that the already positive attitude developers had toward users was enhanced by the *"customer-focused"* orientation of the director's quality initiative. On the other hand, users were now more aware of the power and benefits of IT, and were confident in the ability of their labour unions to maintain tenure of employment and conditions of service for those effected by the introduction of new IT systems. This meant that users who actively participated in the development of new systems, which radically altered their operational roles and working conditions, were not, as one user put it, *"turkeys voting for Christmas."* This was the general climate in which the development of the information systems now described took place.

The Generic Appointment System (GAS) and the Geographic Information System (GIS) development projects were two of the first undertaken by the newly formed IT Directorate in 1995. The genesis of these projects predates the introduction of the company's overarching IT superstructure—the operational support system (OSS) which lies at the core of Telecom's business and IT strategies. That said, the GAS and GIS constitute two vital elements of this superstructure and, as such, provide technology platforms that help implement the company's strategies and enable its new business processes.

The Generic Appointment System grew out of a business need in one key area of the company's operations—its telephone repair service. Business managers across the organization recognized the need to make efficient the manner in which repair service workloads were managed, and associated service appointments made with customers. One of the goals to be achieved by introducing this new system was the elimination of unproductive visits by operational staff to customer premises when

customers were absent. The GAS would also assist supervisors in their task of allocating workloads to their repair teams, which consist of operational staff. Both groups therefore had a keen interest in the development and implementation of this system as it impacted on some of their basic functions. The GAS also supports the operation of the company's ten fault-handling and repair centers.

The Geographic Information System was developed to provide a graphical database of the telephone network in the general Dublin area. Heretofore, the planning and drawing office functions manually recorded network-related details using paper-based records and maps. The business manager responsible for this project recognized that there would be significant improvements, in terms of economic and operational efficiencies, to be gained in using a GIS in this area of the company's operations. However, the implementation of the GIS meant that a radical change had to take place in one of Telecom Éireann's operational business processes. Accordingly, the development of the GIS posed significant challenges to the business sponsor, users and developers alike. On the one hand, there was the issue of change management associated with the radical change in work practices/roles of the users in operational units who then performed telephone network mapping, planning, and record handling duties. On the other, there was the challenge of developing a highly complex and sophisticated information system within a proprietary application development environment.

Table 1 presents an analysis of both the GIS and GAS projects in terms of the salient issues and impact of user participation on the development of these systems. It can be seen that the characteristics, impact, and positive outcomes associated with user participation varied little across these projects. The following sub-sections provide a more detailed exposition of several salient aspects of participative development in the case.

GAS and GIS Project Characteristics

A development team that consisted of a user project manager, a development project manager, two analysts, the CASE vendor consultant, one programmer and a user representative carried out the development of the GAS; three user groups and several individual users formed the bulk of participating users from the constituencies of interest. A computer aided systems engineering (CASE) enabled rapid application development (RAD) approach saw development take place within a three month time period; that said, the implementation of the first phase of the GAS took a further six months. As a distributed IS, the GAS is comprised of 8 relational databases that serve up to 180 windows-based PC terminals in fault-handling centers around Ireland, and a further 400 in operational depots nationwide. The GAS project came in on time and budget.

The GIS development team consisted of a user project manager, a development project manager, two analysts, three programmers, two user representatives, and a team of ten end-users whose primary role was to input graphical data and carry out test functions. User groups were also drawn from the two constituencies of interest—the drawing and planning functions. Consultants from the software vendor also participated in the development process. The GIS was built around a proprietary graphical database engine that serves up to 40 high-end workstations. The first phase of the GIS development took almost two years to complete. The implementation and rollout of the first phase took a further year. The project failed to meet the scheduled completion date, and also exceeded budget.

The Content and Context of User Participation in the GAS and GIS

Although adhering to the basic structure and process of participatory systems development, the content and context of user participation in the GAS and GIS development processes differed in significant ways. Developers on the GAS project, for example, needed to understand how staff in the fault handling centers accepted and tested faults on customer lines and equipment and then dispatched them to repair teams and, since fault-handling staff were the initial point of contact for customers, the manner and circumstances in which fault-related service appointments were made with customers. Customer service provision and repair teams are responsible for the repair of customer lines and equipment and the provision of new lines and customer premises equipment—both of these activities involved the making of appointments with customers to gain access to their premises to either install

Table 1: A Comparative Analysis of Issues related to User Participation in the GIS and GAS Projects

1. General Dimensions	Description	GAS	GIS
Type of system under development	Operational Support Sub-System.	x	x
Participation vs. involvement	Users immediate to the project team(s) participated, while the majority of users were mainly involved in the development process.	x	x
Type of user participation	Consultative, representative, consensual.	x	x
Degree of user participation	Participation by advice (indirect) ranging to participation by strong control (direct).	x	x
Content and extent of participation	Pan-lifecycle for user representatives, that is they were present throughout the development process. Individual users and user groups participated formally at key points in the development process—e.g. analysis and design, testing and implementation —and informally throughout.	x	x
Formality and influence of participation	User representatives were co-opted into the development project team. Development steering groups were formed for management users, and user groups were formed to participate in requirements analysis, design verification and testing. Significant user influence was exerted, especially through labour unions and joint management/union forum.	x	x
Organizational perspective on participation.	While user participation in both projects was characterised by the industrial democratic form of participation, there also was an element of participative management in evidence. A combination of participatory design (PD) and joint application design (JAD) were utilised for systems development.	x	x
Users participating	User project manager, user representatives, user groups, and individual users employed. Joint staff/management bodies were also involved.	x	x
Location of development project team	On-site at the business client's offices.	x	x
2. Contingencies			
2.1 Organizational Variables			
Organizational policy on systems development	Organizational policy on participative development fully implemented.	x	x
Influence of organizational culture on team subcultures.	Shared organizational culture ensured that the team subculture was receptive to user participation in systems development.	x	x
Time for development	Although there was a very tight project time schedule, it did not impact negatively on the degree of user participation.	x	x
Financial resources available	Budgetary resources did not affect the degree or quality of user participation.	x	x
Top management commitment	A high degree of support existed from organization and IS function management. A high degree of top management support existed in the first phase, but this waned in subsequent phases. There was also a lack of support from senior IS function management.	x	x

2.2 Project-Related Factors			
Initiator of the project	Business Management.	x	x
Project complexity	Moderately complex project, several functional groups were involved, functional boundaries crossed. Highly complex project, functional boundaries crossed.	x	 x
Degree of task-structure	Low-to-Medium-level task complexity, moderately defined business process.	x	x
Development Technology available	CASE workbench (IEF) that fully supported prototyping, significant impact on the quality of user participation: user representative trained in CASE tools. Proprietary development tools, SSADM employed in analysis and design, user representative trained in SSADM.	x	 x
Expected change brought about by the system	High degree of change for one user constituency. New business process supported. Radical change to user role-related activities in two user constituencies.	x	 x
2.3 User-Related Factors			
User perceptions of organizational climate	Users felt that a favourable development climate existed. Users were of the opinion that the organizational climate was negative; however, they felt that a favourable development climate existed.	x	 x
Willingness to participate	Users eager to participate.	x	x
Ability to participate	The use of dual project development teams (user and developer), greatly facilitated user participation.	x	x
User characteristics & attitudes	Very positive attitudes by users. User computer literacy a problem. Shared organizational culture of benefit in accommodating different 'world views'.	x	x
3. Factors within the participation process that impact on the degree and effectiveness of user participation			
User/analyst relationships	Very good. Relationships were enhanced by the existence of a common organizational culture and favourable development climate in project teams.	x	x
Influence & power relationships	Several institutionalised checks and balances existed which countered any power asymmetries or political opportunism that may have arisen. This was due to the implementation of organizational policy by all the constituencies involved in systems development. Positive management attitude toward and acceptance of user input.	x	x
Communication	High degree of user/analyst communication. Greatly enhanced by on-site development, training the user representative in IS development method and tools, and the prototyping approach adopted. Some improvement in communication brought about by user training in SSADM and on-site development.	x x	x x
4. Variables moderating the participation-success link			
Perceived control	The type and degree of user participation gave users a sense of ownership and control over the system as developed, despite eventual reservations over the systems utility. Change management difficulties dominated and coloured user attitudes toward the system.	x	x x
Desired level of participation	Good fit between desired & actual levels of participation by users.	x	x
Perceived importance and relevance of system to users	Medium to high degree of relevance as evidenced by the change management and industrial relations difficulties.	x	x

or repair equipment. If involved in the repair process, technicians would receive customer appointments from the fault-handling staff or, alternatively, as with the provision of customer service, they would make appointments themselves. The customer team leader was very much left out of the loop in the control and execution of these business processes, except in regard to allocation of certain types of work and the routine issue of customer service orders to team members. Business managers felt that team leaders needed to exercise more control over the activities of the technicians in their teams, and the new appointments system would help effect this. Operational users from these three constituencies therefore participated in the development process. Business managers participated in development activities either directly as part of the development steering group or indirectly through the user project manager. Then, of course, the influence of the labour unions had also to be factored in, as any change in work practices would ultimately require their agreement. In summary, developers needed to understand existing operational processes and also work with users and their managers in order to create a more efficient customer appointment process in order to map it unto the proposed information system.

The user requirements for the GIS were equally complex, but in a different way. Here, developers had to capture in great detail the geography and content of the Dublin metropolitan telephone cable network infrastructure. They also had to understand how this information was utilized within the network planning process so that the process could be effectively enabled using IT. Company draftsmen were traditionally responsible for supplying the network planners with the raw material for the planning process—that is, detailed drawings of the network infrastructure. This work was highly skilled and labour intensive. The draftsmen's knowledge therefore had to be captured by developers and embedded within the new system. In addition, the views of business managers and labour unions had to be taken into account due to the radical nature of change to the existing business process that would be introduced by this new system.

The key actors in the elicitation of the detailed user requirements were undoubtedly the user representatives. These individuals acted as interpreters and advisors to the developers in their efforts to understand the existing business processes and the manner in which the new systems would impact on the proposed changes to these processes. In the GAS project the user representative was intimate with existing processes and work practices across the constituencies of interest. A planner and a draftsman acted as user representatives on the GIS project. User project managers on the development teams looked after the interests of managers in the associated business constituencies. In both projects, user representatives were trained in the CASE tools and development techniques employed by developers, and participated in the use of these tools and techniques alongside members of the development team. This was a significant departure from usual practice in Telecom Éireann. In addition, user representatives also took an active role in the implementation of these systems. In the GAS project, for example, the user representative had sole responsibility for the technical implementation and rollout of the new system. Users who did not participate directly on development teams did so at individual interviews and at group sessions with the systems analysts and user representatives during the requirements analysis phase. In addition, these users also participated in prototyping activities. In both projects selected users were formed into teams in order to comprehensively test the developed systems.

Issues Impacting on the Effectiveness of User Representatives and User Groups in the Development Process

The high level and quality of participation in the GIS project was commented on by one developer: "*The team greatly benefited from the presence of user representatives. I was up to speed with user needs all the time.*" These sentiments were strongly endorsed by developers in the GAS project also. In regard to both project teams, participating users were fully aware of the favorable attitude that developers had towards their contribution and responded accordingly. Nevertheless, developers in the GAS and GIS projects articulated the need for more active participation by certain users as it was felt that an increased level of participation by such users could have helped mitigate many of the contentious change management issues surrounding the implementation of these systems. Although formal and informal communication mechanisms existed within the development

project teams to facilitate the expression of users' views on the systems development product to developers and business management—e.g. formal project meetings, user group sessions, representations via the user representatives and user project managers etc.—many users decided to make representations directly to their labour unions in order to have particular issues raised at meetings of the Computer Liaison Committee (CLC). Why then did users resort to such tactics given the availability of more direct mechanisms? A possible reason for this was offered by a user on the GIS team who was of the opinion that such mechanisms were inappropriate because many of the problems users had with the new systems were of a 'political' nature—that is, they were related to the changes wrought by the new systems on user work-related roles, remuneration, responsibilities and conditions, the automation of certain tasks by these systems, and so on. Users felt that the project team managers did not possess the necessary wherewithal to resolve these issues locally. In both projects, the development project managers were totally against modifying agreed system features to mollify particular users—so too were senior IS function managers. Even so, it must be said that, on the whole, users were eager to participate and get involved in developing the GAS and GIS—for a small minority it was only to find ways to protect the status quo, it was clear, however, that the majority had a keen interest in shaping and influencing their future working lives.

Although the CLC acted as a formal forum for thrashing out political issues that arose as a consequence of systems development, the airing of such matters were not confined exclusively to this body. The development-related group workshops provided a quasi-formal mechanism for highlighting such issues because of the manner in which the workshops were constituted. Each workshop consisted of developers from the relevant project team and end-users from one of the user constituencies with an interest in the development process. The group workshop sessions on the GAS project tended to be used as a platform for political infighting between different user constituencies, as users from participating groups would introduce arguments to oppose or alter system features favored by users from other groups and operational areas who were not present at the individual group sessions. Users in all groups also tended to play on the known objections of absent groups in order to influence development outcomes—in terms of system features that supported planned changes to existing business processes—in their favor. Because of the degree of political conflict between the various groups, the user representative on the GAS project observed that there was a need *"to have all the user groups affected by the systems development project present at each of the workshops; this avoided the emergence of a 'them and us' situation between users, and between users and developers."* In the GIS project a similar situation existed in that there was a clear conflict of interest between the network planners and the draftsmen. But, as one developer pointed out, *"they seemed to pull together fairly well and put their differences aside while participating in the development of the GIS…their grievances were with the company, not with each other, so they left it to their respective unions to deal with."*

Choosing the 'right type of user' to participate in systems development was a problem that exercised the minds of business and IS managers and developers alike prior to the commencement of systems development on the GIS and GAS projects. IS managers and developers were eager to secure the most knowledgeable and proficient user project managers and representatives in order to make their *"lives that much easier"* in arriving at a full set of user requirements and in converting these requirements into a system that would be accepted by the business constituency. At a time when developer resources were scarce, issues like developer productivity and project life span were uppermost on the minds of IS function managers. This led one senior manager in the ITD to argue that *"if the ITD were going to commit scarce and valuable resources to a project, then business managers should do likewise."* In the GAS and GIS projects the selection of user representatives was perceived as a key issue due to the active role that they were expected to play throughout the development process, and in the subsequent testing and implementation of the developed systems. On the business side, however, it was clear that managers had to balance the need to maintain their most experienced people in key areas, with the need to ensure that the new systems would adequately capture reflect business needs. On top of this, the staff labour unions also exercised a significant say in the choice of operational user selected to participate in systems development as either members of the user groups or as user representatives. It is important to note, however, that the existence of

a committed project sponsor on the business side for both the GAS and GIS projects was seenby developers and users to be decisive in all this, in that it was at this level that the final decisions were made in regard to the quality of user representative and the makeup of the user groups. In any event, it was evident that developers were quite pleased with the choice of user representatives and user group members in both projects.

The coordination and control of developer and user development-related activities was uppermost on the minds of the project managers involved. One scarce resource in any project is time, and the more time developers spend with users, the less time they spend developing. Project managers were mindful of this and set out to manage closely these activities in order to achieve the right balance. In any event, this problem was largely overcome by the fact that both user representatives and developers often shared the same tasks, especially in the requirements analysis and design phase. As expected, regular project meetings helped developers to keep abreast of each others' progress and activities; and the joint nature of such meetings provided user and development project managers with an opportunity to keep both user representatives and developers abreast of external issues such as industrial relations problems etc. This forum also provided a mechanism for user representatives to air their views on the manner in which the development of the GAS and GIS systems was proceeding and on the operational features of the emerging systems. Here, user representatives could formally convey the views and wishes of the user constituencies whom they represented. It must be noted, however, that because user representatives were expected to participate closely with developers and, indeed, often perform the same tasks as the developers on the project teams, there was, as one user put it, *"the danger of going native"* and losing not only sight of their own role and purpose but, also, credibility with the user constituencies whose views they were supposed to represent. The user representative on the GAS team therefore spoke of the need to *"take [him]self out of the immediate development environment, and get back into the field"* in order to maintain contact with his work associates.

This problem of *"going native"* also applied to the GAS and GIS user project managers, but was to some extent mitigated because the development teams were sited at the main business center where they maintained their office accommodation—this allowed user project managers to maintain close formal and informal social contact with their peers. As previously indicated, user project managers were responsible for the provision of project-related accommodation, materials and facilities on the one hand, and for the implementation and testing of the developed systems on the other. They also managed the user resource throughout the development project and looked after user training once completed. There was also a very important role to be played by them in ensuring continuing commitment by business management to development goals and objectives. In the past, development teams had experienced difficulty in obtaining the required level of user involvement in many of the above areas and welcomed the contribution that business managers could make as user project managers.

Pan-lifecycle End-User Participation and the Benefits of On-site Development in the Business Area

Pan-lifecycle participation in systems development refers to the active participation and involvement of end-users at practically all stages of the development process. As indicated previously, developers, project managers, and senior IS managers in Telecom Éireann considered this approach to system development to be vital for the success of their development endeavours. Nevertheless, a senior IS manager pointed out that the benefits which accrue from this approach to user participation really depend on the type of business process being supported by the target system, and on the level of social and technical complexity of the development process. The business process supported by the GAS, for example, had a low to medium degree of task structure—in other words, the day-to-day tasks of operational users were neither well-defined nor highly structured—and the development project possessed a moderate level of technical complexity. The GIS system was similar in that the business process it supported possessed a medium degree of task structure, but the technical complexity of development process and its product was relatively high. In addition, both projects clearly exhibited a high degree of social complexity as users from several functional areas were

involved in the development of these systems. Taken together, then, these factors indicated that a high degree of user participation was required because of the need to accommodate in-depth the views of several 'competing' user constituencies. The term 'competing' is employed here because users from the different functional areas involved in systems development of the GAS and GIS felt that they were involved in what could be described as a 'zero sum game' for control over the business process.

Another major consideration in adopting this particular approach to user participation was that due to a scarcity of developers in the IT directorate, users were encouraged to become more actively involved in systems development activities, particularly at the design and implementation stages. In addition, IS managers considered that the type and degree of user participation they desired could only be achieved through the policy of on-site development at the business users' offices—indeed, both projects were housed on the same floor in one of Telecom Éireann's Dublin business centers. Prior to the development of the GIS and GAS, most systems development took place off-site, that is, within the IT directorate's own place of business. Senior IS and development project managers recognized that there were significant benefits to be gained from on-site development at business users' own accommodation. For example, IS managers thought that this policy would provide additional opportunities for informal and indirect user participation, thereby improving user/developer communication and fostering good relations at all levels. Certainly, the level of formal and informal contact that resulted from developers and users sharing the same office space confirmed this belief. As the GIS development project manager pointed out, *"day-to-day contact between all concerned facilitated the growth of a community spirit between [his] team of developers and the users involved in the project."* Having developers and users in such close proximity also helped negate some of the ill feeling toward the new systems and the concomitant change to existing business processes as users perceived such change to be coming from within, rather than being thrust upon them by an outside agency.

User Participation and the Use of Technology for Systems Development

The traditional approach to information systems development in Telecom Éireann has been centered on internal development of handcrafted, custom-built solutions using the systems development life cycle (SDLC). The traditional approach was modified for the GAS project in that IT, in the form of an integrated computer aided systems engineering (I-CASE) workbench or application development environment (ADE), was employed throughout the development process in what was a prototyping-led rapid application development approach (RAD). Some use of older CASE technology was made on the GIS project, but only in the diagramming and modeling activities in the requirements analysis phase. User representatives on both projects received training in the use of these technologies. The user representatives were at one in stating that such technologies facilitated a more active role for them as participants in the development process; however, the type of technology employed on the GAS project was deemed to be of greater benefit in this regard. Developers too commented on the improved level of user/developer communication in these projects over previous development projects where CASE technologies were not employed. In a sense, communication was improved because the CASE technology enabled a sharing of 'world views' between developer and users on the properties of the emerging system. It did this by offering a common schema or language that mediated or negated the traditional schism between technically-oriented developers and business-oriented users. This feature or benefit was even more apparent with the ability of the I-CASE tool-set to prototype the new system by allowing the user representative and members of the user groups to design elements of the system in close cooperation with developers. Thus, the systems requirements for the GAS were elicited and refined through a dialectic process that saw developers and users jointly decide on what was both technically feasible and desirable in terms of system functionality. The lesson from this experience was that technology, far from excluding users from a role in the development process, required more input and participation by users and hence helped realize many of the benefits that user participation can bring to systems development.

User Participation and Management of Change in Systems Development

Project managers, developers, and users all agreed that the issue of change management

associated with the implementation of the GAS and GIS systems exerted a critical influence on the trajectory of the development process and its outcomes in terms of the difference between the planned systems features and those contained in the systems as developed and implemented. Of course, all this had a concomitant impact on the business processes to be supported by the new systems. For example, the user representative on the GAS project reported that *"staff at the fault handling centre felt that their jobs were being whittled away and that the control of the fault handling system was being shifted to the repair teams.*" This situation engendered a negative attitude towards the new system within this user constituency and strongly influenced the deliberations of the Computer Liaison Committee (CLC) in having the system's features modified somewhat in order to arrive at a suitable compromise for users in this operational area.

Even though the development project teams were embedded within the user community, and user groups were employed in the elicitation/verification of requirements, in what could be described as a fully participative development exercise, industrial relations problems arose in relation to both systems, as developed, when the time came to implement them. Although the GAS had been accepted as developed by all the constituencies of interest, the CLC over-rode decisions taken and agreed to by the user representative and the user groups. This situation occurred despite the fact that one of the CLC's members had been involved throughout the development process as a participating member of the one of the user groups. A developer on the GAS project provided an explanation for this and reported that influential users who did not participate in the development process had voiced their *"unhappiness with system features…[and that this had] prompted the CLC to say no to the implementation of the system."* Hence, prior to its implementation at a trial site, several modifications had to be made to the GAS in order to address these objections. A very similar scenario existed in relation to change management issues that arose during the life of the GIS project. Although business managers in the relevant areas were aware of the potential for significant change management problems to develop when the system was implemented, they took no action prior to the development of the GIS to address these issues. These problems related to the radical nature of the change in work-related roles, responsibilities and remuneration of one of the user constituencies involved, and although these users were satisfied with the system as developed, they were unhappy with the consequences of the system's introduction. Therefore, the absence of adequate managerial attention to the issues of change management meant that, although both systems were developed with the active cooperation of users, both projects encountered user-related obstacles and resistance at the implementation stage. This proved to be the major weakness with the company's approach to user participation for systems development, and was an issue which would have to be addressed if the CEO's ambitious IT-enabled strategy was going to achieve any measure of success.

The general characteristics of user participation in both development projects described in the case accords well with the model presented in Figure 1. Taking into account the radical changes that were planned to the company's structure and business processes, the major problem facing the company's managers was how to preserve participative practices that were productive, and which would help give effect to its strategies, and eliminate those that were counter productive. The following section discusses such issues.

CURRENT CHALLENGES/PROBLEMS FACING THE ORGANIZATION

What has been described in this case study is perhaps an exemplar of the institutionalization of user participation for systems development. In both development projects there was a happy ending in that the systems were implemented and have been successful in use. There was, however, *"a fly in the ointment,"* as one IS manager put it, in that the considerable effort applied by developers and users in the construction of two key operational support sub-systems almost came to naught due to the mismanagement of change. Despite the high level of commitment by all parties to participative development practices, and the positive influence this has had on the culture and climate of the development environment and, also, on the development trajectory of the GAS and GIS systems, when it came time to implement these systems within the organization to support the proposed new business processes, significant problems arose because of the disagreeable change that the systems would bring to the work-related roles and responsibilities of operational staff. The company's senior

managers felt that business management and the labor unions should share the burden of responsibility for this state of affairs: business managers, for example, were unwilling to address change management issues head on and, instead, hoped that such issues would somehow be resolved during systems development by the user and development project managers; on the other hand, the unions were unreasonable and unrealistic in that many of their demands were overly influenced by the views of a powerful minority of their members. This was the major lesson learned by both Telecom Éireann's senior management team and labor union leaders from their experiences with user participation in projects like the GAS and GIS. Union leaders and company management recognized that, because of the harsh competitive realities of the telecommunications business in the 1990s, the issue of change management was going to be critical to the success of the company's strategic goals and objectives. Hence, as a consequence of past experience, it was something that the company and the unions took great pains to address when IT was employed to enable the transformation of the organization from 1998 onwards.

To recap then, it is clear that while the institutionalization of user participation, as described in relation to the GAS and GIS projects, was effective in purely development terms, it had, however, very little impact on the issue of change management in the implementation of these systems. Nevertheless, among the benefits of this approach to systems development were that participating users were empowered to take an active role in all development activities and non-participating users had their perspectives and interests taken into consideration; as consequence of this, users developed favorable attitudes toward the new systems and were committed to their use once the change management issues were resolved. It is also clear that the successful elicitation of what were complex requirements in the GAS and GIS were better apprehended and understood using this approach. Furthermore, the pan-lifecycle nature of participative development ensured that the end product closely matched user requirements and, hence, facilitated a high level of user satisfaction with the developed systems. It must also be noted that, given the significant challenges facing the company in developing and implementing what is a formidable portfolio of proposed systems over a very short time frame (1998-2002), Telecom Éireann is fortunate to have developed a competence in mining and applying its human resource in this area, as the experiences recorded in these two examples indicate. However, the problem facing Telecom Éireann's management and its partners, the labour unions, was: 'How could they maintain and build on the benefits of user participation and overcome what could become a fatal *'Achilles heel'* for the company—that is, organized resistance to change by its employees coupled with poor management of change by the company's business managers?'

To address the problems associated with resistance to change and transformation management, the labour unions proposed a blanket, up-front agreement to cover all future IT-enabled change to the company's business processes, whatever the consequences for the staff concerned, in exchange for a 15% stake in the company for their members. As indicated in the introductory sections, this has been agreed to and has been implemented as of mid-1998. It is unlikely then that the type of industrial relations problems which plagued the implementation of the GAS and GIS will arise in relation to the introduction of planned future systems. Still, this will not mitigate the potential for conflict between different constituencies of users. Developers will still have to be aware of and sensitive to such issues, particularly in their potential to affect the product more so than the process of systems development. As of late 1998, business users are participating in development projects, very much as in the GAS and GIS, which will see their role-related responsibilities and remuneration altered significantly. In addition, many of the affected staff will have to transfer to new positions within the organization or will have to consider voluntary redundancy. The role that the unions play has also changed: for example, the CLC still exists, but it is more of a facilitator of change, rather than an participatory forum that has the potential to be a source of problems for the systems development process and its product. Once agreement had been reached on staff cooperation in the transformation of Telecom Éireann, the challenge facing the organization's managers was how to develop and integrate the proposed IT infrastructure with a limited developer resource? In order to address this challenge, the IT director and his associates in other corporate directorates adopted an innovative participatory strategy that builds on and extends that described in the case.

At present, the IT directorate is developing what it terms as its 'Future Methods of Operation'

(FMO); this approach is based on its experience in reengineering corporate business processes in conjunction with Bellcore (a US telecommunications company) and the Business Process Design directorate of Telecom Éireann. As part of its strategy, the ITD has instituted a 'buy versus build' policy that sees developers source 'off-the-shelf' or 'canned' application packages. The focus has therefore changed to the integration of custom-built, 'turnkey' solutions and 'off-the-shelf' third-party vendor applications. The practice of comprehensive user involvement in the development of organizational information systems is to be maintained and extended in new and innovative ways. It is clear, however, that quite apart from those systems that will be developed in-house in their entirety, the scope for user participation in systems will be developed externally and will be limited. This poses a challenge for the IT and business directorates to ensure that such systems meet user needs and requirements. However, potential problems here may be mitigated by a new user-centric initiative in the area of the provision of corporate IS. As part of the recent corporate restructuring a decision was taken to decentralize many systems development activities to IT sub-functions within each business directorate in the Telecom Éireann group, for example. The new IT sub-functions will consist of management and staff from user constituencies who will act as project managers, business analysts and systems implementers and who will liaise with project managers and developers from the IT directorate and with outside vendors in the planning, development and implementation of new information systems. The roles of user project managers who are seconded to the IT directorate to participate in systems development will remain as previously described in the case, however business users who will take up positions as project managers in the IT sub-functions of business directorates will have extra responsibilities viz.

- Preparing the business case for development
- Identifying user requirements
- Process mapping
- Preparing request for proposals (RFPs), evaluating responses and recommending solutions
- Developing and implementing project plans
- Communicating with the staff involved/affected by the project
- Liaison with the IT directorate and external suppliers
- Ensuring delivery of system components to agreed time scales
- Acceptance testing of system developments to specified requirements
- Co-ordination of IT training
- Managing risks and resolving implementation-related problems
- Preparing reports and presentations for key stakeholders
- Hand-over of live system.

In all cases, primary responsibility for systems development will still rest with the ITD.

In a new and innovative strategy that addresses the critical shortage of IS developers, and which provides business users with an opportunity to play a frontline role in the development of corporate information systems, satellite or decentralized IT development units are to be set up in specific geographical locations within the organization. Staff for these new units are to be recruited from the internal labor market and will consist of business users who have a predominantly technical background and whose present work areas are over-resourced. Once recruited, these individuals will complete a six-month long training program that will provide them with skills in systems analysis and programming. The IT director has stated that clear benefits will accrue from this strategy, as former business users will bring their technical and business knowledge to bear in their new roles as developers.

The foregoing then are some of the major issues being addressed by Telecom Éireann's IT directorate as it undertakes its task of planning, developing and implementing the information systems in its development portfolio. The pivotal role that participating business users play in the realization of these endeavors continues to be emphasized within the framework of industrial democracy.

Appendix

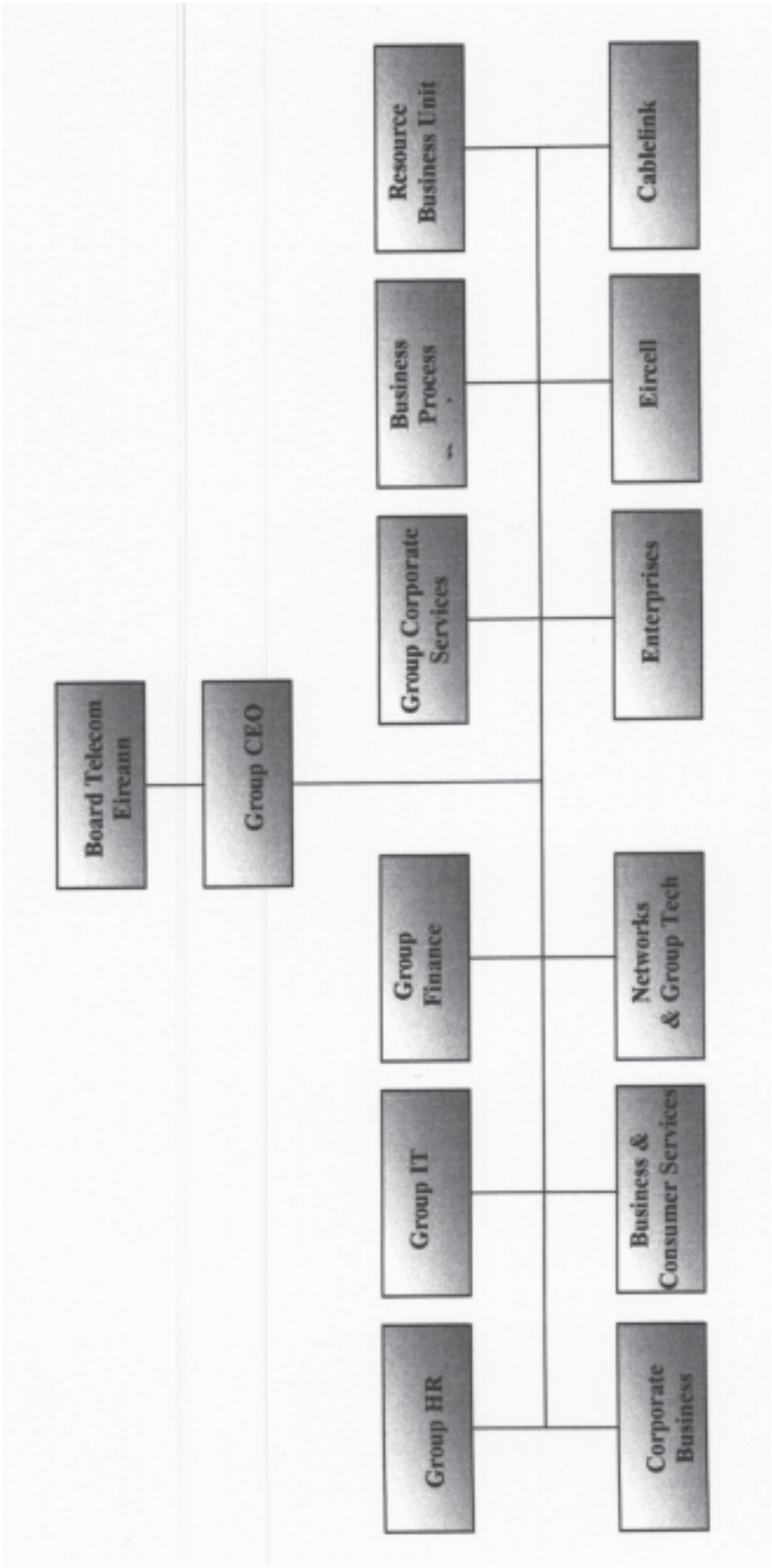


Exhibit 1: Organisational Chart for Telecom Eireann (as at 1998)

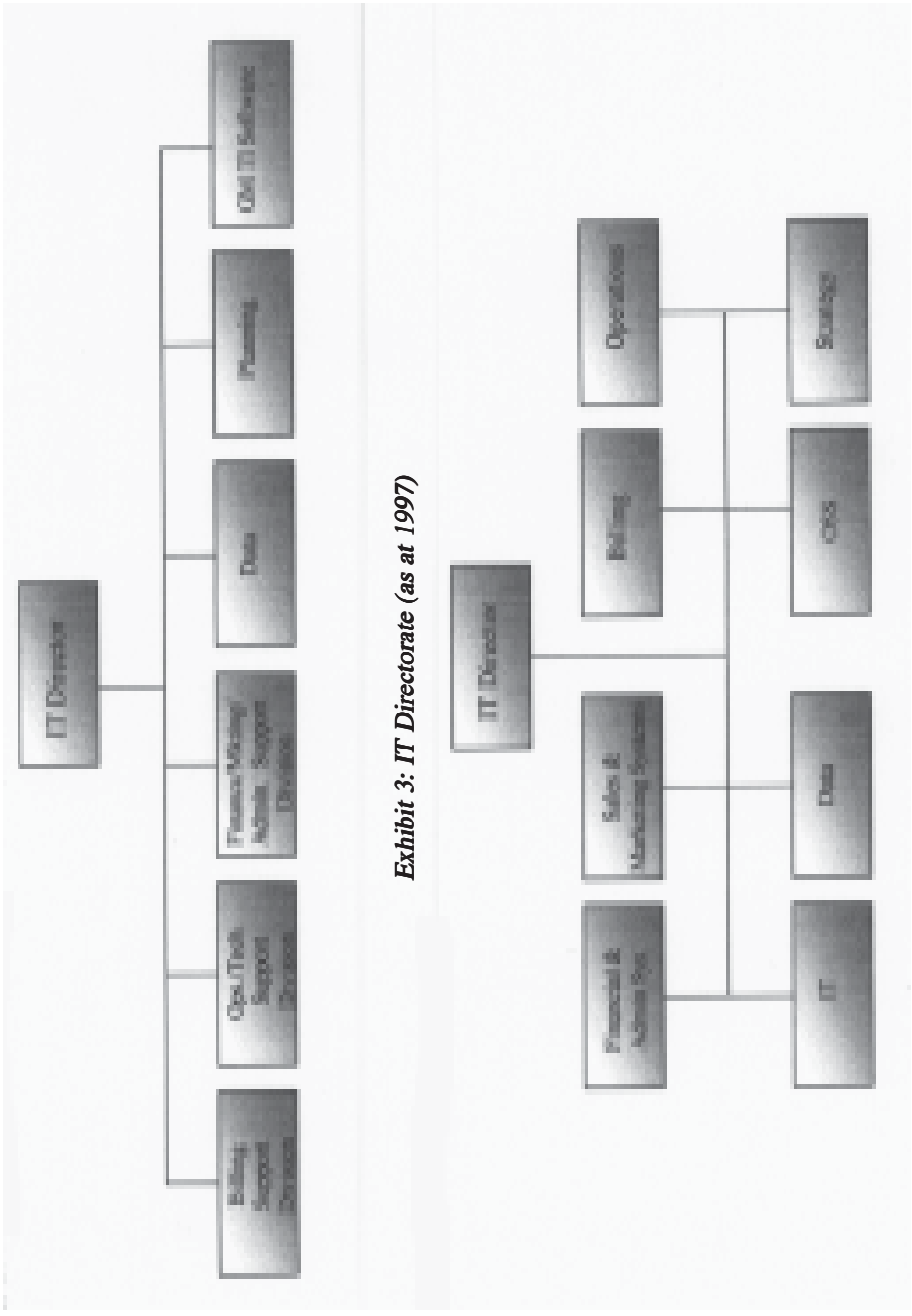


Exhibit 2: IT Directorate (as at 1995)

Exhibit 3: IT Directorate (as at 1997)