The Relationship Between User Participation and the Management of Change Surrounding the Development of Information Systems: A European Perspective

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While much is known about the general process of user participation in information systems development, its impact on matters of organisational change has not been the subject of systematic, in-depth investigation. In addition, researchers have typically adopted variance, rather than process-based approaches to the study of these related phenomena. This paper addresses these deficiencies and makes several important contributions to the literature. First, it presents the results of a comprehensive, process-based study of the relationship between user participation and organisational change in the development and implementation of information systems in a large organisation. Second, it presents a theoretical model which captures the institutional and development-related contexts that shape and influence the processes of user participation and management of change. Third, using the model as a framework to guide the research effort, this study illustrates that an organisation's institutional context plays a dominant role in shaping and influencing the content and process of user participation and management of change in systems development. This particular finding has important implications for both research and practice. Finally, the model and its associated framework has been validated by the findings of this stud; it may, therefore, be used in future explorations of these important phenomena.

INTRODUCTION

Information systems development is a multi-dimensional change process that presents itself simultaneously within several related social environments—as a reality, it is socially constructed (Visala, 1991). The conventional wisdom within the information systems community argues that user participation is a core ingredient in this change process and is vital for successful outcomes in terms of both process and product (see Ives and Olson, 1984). However, two comprehensive reviews of research on the phenomenon of user participation revealed that the relationship between user participation and successful systems development is neither grounded in theory nor substantiated by research data (see Ives and Olson, 1984 and Cavaye, 1995). In addition, this paper argues that insufficient attention has been paid to the relationship that exists between user participation in systems development and the issue of organisational change surrounding the development and implementation of information systems: as a consequence, that relationship remains ill-defined and thus little understood. In order to address this deficiency, the study maintains that it is only by conceptualizing information systems development as a *change process* (Boland, 1978; Lyytinen, 1987), and by adopting a perspective that incorporates both user participation and management of change as being instrumental in determining the ultimate success of developed systems, can the relationship between these two concepts and their consequences be evaluated, explained, and understood. A conceptual model that incorpo-

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rates the institutional context or framework within which the IS development sub-processes of user participation and management of change are effected, and which attempts to capture the interrelationships between factors that are posited to constitute these sub-processes is presented. The model's core components are drawn from institutional theory (North, 1990; Rowlinson, 1997), Cavaye's (1995) analytic framework, which was extended and elaborated by Butler and Fitzgerald (1997), and from seminal contributions of previous research on the phenomena of user participation and systems implementation (see Boland, 1978; Ives and Olson, 1984; and Orlikowski, 1993). The model helped formulate appropriate research questions to guide and direct case description, report its findings, and make appropriate conclusions.

As Orlikowski's (1993; p. 310) seminal investigation of the relationship between CASE and organisational change revealed, a process-based approach incorporating grounded theory *"allows a focus on contextual and processual elements as well as the action of key players associated with organisational change."* The constructivist paradigm not only incorporates a grounded theory perspective, it also offers researchers added rigor by providing an ontological, epistemological and methodological framework from which to conduct qualitative research (Erlandson *et al.,* 1993; Guba and Lincoln, 1994). Mature disciplines within the social sciences have accepted the need for a philosophical as well as a methodological rationale to underpin research; hence, a constructivist approach to research was adopted in order to apprehend the socially constructed reality that is information systems development in organisations (Visala, 1991; cf. Berger and Luckmann, 1966; Guba and Lincoln, 1994). The primary objective of this study, then, is to identify the critical elements that shape and influence the relationship between user participation in the development and implementation of organisational information systems and the process of change management surrounding the successful implementation of such systems. The research data is drawn from a case study of the development and implementation of two operational support systems in a large telecommunications company. Prior to presenting an analysis of the case data, the model and its analytical perspectives are first discussed.

A MODEL OF USER PARTICIPATION AND MANAGEMENT OF CHANGE IN THE INFORMATION SYSTEMS DEVELOPMENT

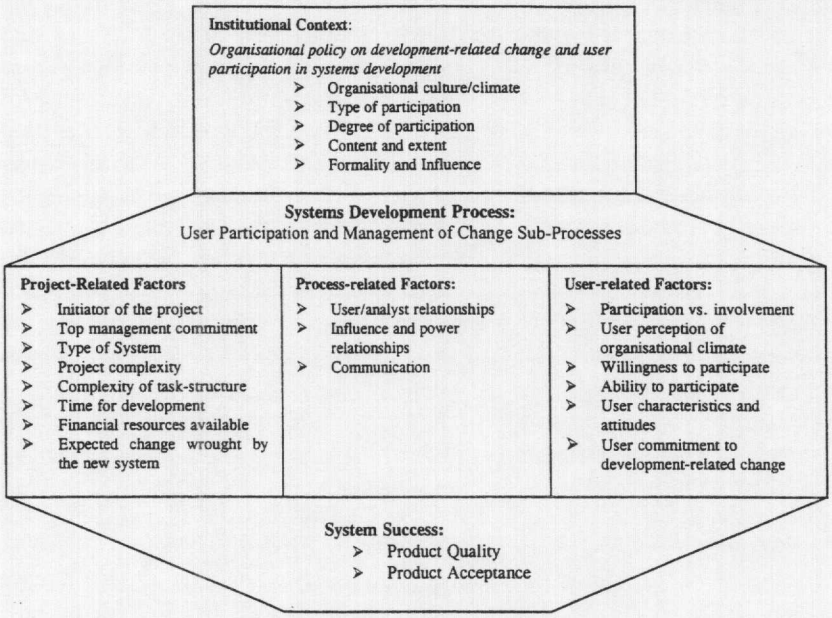
While IS researchers such as King *et al.* (1994) and Kling and Iacono (1989) both incorporate institutional theories into their work, Orlikowski (1993) provides a graphic example of the importance of institutional contexts—environmental, organisational, and IS—and their impact on organisational change associated with the introduction of CASE. The role played by institutional frameworks in shaping organisational behaviour has been the subject of study and debate for some time now by economists and organisational theorists (see Rowlinson, 1997). Drawing on insights provided by North (1990), it can be argued that an organization's policies on systems development, particularly those related to issues of change management and employee participation, constitute a set of formal and informal criteria, the so called 'rules of the game', that help to mold human interaction in the pursuance of organizational goals and objectives. North argues that such policies shape and influence the institutional framework or context within which an organization's business routines are formulated and executed. Aaen (1986) has underlined the importance of managerial policy making in shaping the trajectory of the development process and its outcomes (cf. Ives *et al.* 1980). Hence, this paper argues that an organisation's policies on user participation in systems development and development-related change shape its institutional context through their formative influence on: (a) organisational culture and climate (Robey and Azevedo, 1994); (b) the type of participation (Mumford, 1979); (c) the degree of participation (Ives and Olson, 1984); (d) content and extent of participation (Hirschheim, 1983); and, finally, (e) the formality and influence of participation (Mumford, 1979) in systems development. With these institutional contexts (or 'rules of the game') in place, the manner in which development proceeds is argued to be directed and effected by:

1. Project-related factors
2. Process-related factors
3. User-related factors.

The content and manner in which the project-, process, and user-related activities are carried out is argued to be shaped and influenced by their institutional context (see, for example, Orlikowski, 1993). The proposed dimensioned sets of factors are based on Cavaye's (1995) analysis and have been extended and elaborated by Butler and Fitzgerald (1997). The interaction of institutional contexts and these factors are argued to determine system success in terms of user perceptions of system quality and user acceptance of the system. User acceptance of the implemented system is argued to be particularly dependent on the manner in which change is managed. The model illustrated in Figure 1 will, therefore, help illuminate the relationship between an organisation's institutional framework, project-, process-, and user-related factors, and development outcomes such as product quality and acceptance.

Boland's (1978) seminal work illustrates that a *change approach* (a bottom-up, participative strategy as opposed to the top-down *traditional approach*) to systems development attempts to have developers and users participate in joint problem solving with the objective of arriving at a systems solution through consensus. Resistance to change surrounding the implementation of the new system is thereby negated (Zmud and Cox, 1979). However, with few exceptions (see, for example, Ginzberg, 1981; Tait and Vessey, 1988; Krovi, 1993), the relationship between user participation in

Figure 1 A Model of User Participation and Management of Change in the Systems Development Process



systems development and issues of organisational change does not appear to have been the subject of explicit, systematic investigation. Hence, the relationship between, and impact of user participation and management of change as separate constructs is often puzzling and difficult to interpret. This paucity in extant research begs to be addressed. The primary objective of this study, therefore, is to identify the critical elements that shape and influence the relationship between user participation in the development and implementation of organisational information systems and the process of change management surrounding the successful introduction and use of such systems.

Research Questions

Based on the foregoing description of the above model, the first two of four research questions that help achieve the stated research objective are now articulated:

RQ1: What impact, if any, does an organisation's institutional framework have on the type, degree, content, extent, formality and influence of user participation in systems development?

RQ2: What role does the organisation's institutional framework play in the resolution of change management difficulties?

Successful systems development is a nebulous term; hence, it eludes direct evaluation. Accordingly, IS researchers employ surrogate measures to measure the success of development outcomes: Ives and Olson (1984), for example, propose system quality and system acceptance as appropriate *'outcome variables'*. Nonetheless, user satisfaction with developed systems has been widely employed by researchers as a surrogate for system success (Gatian, 1994; Cavaye, 1995). The dominant focus on user satisfaction and system success seems to capture implicitly, rather than explicitly, the fact that significant change has often taken place once a system has been implemented. Unfortunately, change management problems that often arise due to user resistance are generally ignored. Nevertheless, it is difficult to ignore the obvious, and several studies have underpinned Ives and Olson's contention that user participation may lead to increased *user acceptance*, a conceptual analogue for users' attitudes to the degree of change wrought by the introduction of new systems by:

- Allowing users to develop realistic expectations about system capabilities (see Lawrence and Low, 1993)
- Providing an arena for bargaining and conflict resolution about design issues (see Euchner *et al.*, 1993)
- Leading to system ownership by users (see Kozar and Mahlum, 1987)
- Decreasing user resistance to change (see Kozar and Mahlum, 1987; Hirschheim and Newman, 1988; Krovi, 1993)
- Committing users to the system (see McKeen *et al.*, 1994; Barki and Hartwick, 1994).

The forgoing points underline Regan and O'Connor's (1994) assertion that user resistance (or acceptance) centres more social change surrounding the introduction of systems, rather than on technical (quality-based) factors. The third and fourth research question posed here are:

RQ3: What critical project, process and user-related factors act to shape and influence (a) product quality and (b) product acceptance?

RQ4: Which of these factors related specifically to user participation, management of change, or both?

These then are the research questions which help guide this study.

Research Philosophy and Strategy

A constructivist research approach, incorporating the hermeneutic method, was adopted for the qualitative, interpretive, case-based research strategy employed in this study (see Lincoln and Guba, 1985; Guba and Lincoln, 1994; and Butler 1998). This strategy involved an exploratory, single instrumental case study (Stake, 1994) with two embedded units of analysis (Yin, 1989)—that is, two systems development projects. Purposeful sampling was employed (Patton, 1990; Marshall and Rossman, 1989). The initial study was conducted in 1996, with a follow up study in 1998 to evaluate the outcomes of this organisation's approach to the development and implementation of corporate IS. The case design utilized has been described by Yin (1989) as both 'post-hoc longitudinal'—in respect of the original site-visits—and longitudinal—in respect of the overall study. Table 1 describes the study's research strategy in detail.

Case Description and Research Results

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 obtained a 15% stake in mid-1998 as part of Telecom's overall change management strategy, and two European telecommunication's operators—KPN (PTT Telecom BV) of Holland and Telia (AB) of Sweden—who jointly own 20% of the company. Telecom Éireann entered into a strategic alliance with these companies in January of 1997; Telecom's labor unions favored this alliance because both KPN and Telia possess institutional frameworks based on the tenets of industrial democracy, as indeed does Telecom Éireann. Telecom's institutional context underwent radical change in 1998 when employees acquired a share in the

Table 1 Research Strategy

Activity	Description
Site Selection	Telecom Éireann was purposefully selected for study because it provided a typical example of a European company that had institutionalized the practice of employee participation and involvement in decision making; particularly in the area of the introduction of new technology and in information systems development. Hyman and Mason (1995) provide a thorough analysis of current thought and practice on this topic, and their work is supportive of this paper's contention that Telecom fits the profile of a typical European company operating in the private as well as the public sector. (US and non-European readers may not be familiar with the level of employee participation and involvement in European companies. The high level of employee involvement results from the degree of influence exercised by European institutions such as the European Community and the governments of individual countries through legislation in matters of employee relationships.) However, Telecom is unique in that it is one of several major European telecommunications utilities that are presently undergoing a significant degree of IT-enabled organisational change centered on meeting the demands of market deregulation and increasing competitive pressures. As a practitioner, one of the authors is intimate with the telecommunications industry in both Europe and the US, and recognized that Telecom offered a uniquely accessible site where the phenomena of interest could be observed and investigated fully. The two systems development projects studied (the embedded units) were also purposely selected because of the type and degree of user participation and involvement in evidence, and because both encountered significant change management problems. It was hoped that because of this they would provide fertile examples of the phenomena being investigated.
Data sources	Research into the selected case and its embedded units was conducted through the use of individual interview and documentary sources. Because the development teams on both projects were relatively small, it was possible to select for interview all team members—developers and user representatives. The model presented previously indicated the contexts and processes of interest to this study; hence, in order to fully investigated these dimensions a total of twenty-one interviews took place with key social actors from: (a) both development projects (e.g. development project managers, systems analysts and programmers); (b) the development environment (e.g. as described by the IS executive and his senior management team); and (c) the organisational environment (e.g. user representatives and user project managers who were considered to be representative of 'world views' in the relevant user constituencies). This focus on multiple environments helped capture the institutional contexts and attributes indicated in the model. Each interview was tape-recorded and lasted up to 2 hours in length. The initial study was conducted over a period of one month in the company's head offices. The subsequent follow-up study was more general in nature and involved two formal interviews with senior business managers, multiple informal conversations with a cross-section of managers, union officers and users, and comprehensive documentary analysis.
Data Analysis	The qualitative data analysis techniques of content and constant comparative analysis provided the necessary mechanisms for the required structural analysis (Miles and Huberman, 1994; Patton, 1990). So as to provide structure for the comparative analysis a set of initial (general) seed categories were first drawn from the model's component dimensions and the preceding content analysis. These seed categories enabled a relatively holistic description of the phenomenon to emerge. However, as the analysis progressed these were refined into tighter categories as the thoughts, ideas, and statements of individual actors were compared, and conflicts and difficulties that arose in the categorization exercise were addressed . Triangulation techniques were also extensively employed to provide insights into events, relationships etc. between primary data sets (Erlandson *et al.*, 1993; Patton, 1990). Several of within-case analysis strategies described by Miles and Huberman (1994)—e.g. checklist matrices and network analyses etc.—were used to identify saturated categories and, hence, complete the structural analysis. Descriptive matrices adapted from the model were used also to present and analyse categories in a condensed format; extended narratives were employed to provide additional detail and context. Being a member of the organisation chosen for study, one of the authors was what Bødker and Pedersen (1991) have termed a *"cultural insider"*. Hence, as a member of the general business/user constituency, the company's largest labour union, and presiding officer of one of the company's participative forums, he was intimate with several of the sub-universes of reality that comprised the overall institutional reality (Berger and Luckmann, 1966). This provided the researchers with valuable insights into the organisation's culture and climate and greatly aided in the interpretation of the case.

ownership of the company in exchange for increased levels of participation and agreement on all change-related issues dealing with the introduction of new information systems.

There are ten companies in the Telecom Group, the majority of whom are wholly-owned subsidiaries. As of 1998, it employed in excess of 11,000 staff. Being a large company, operating in highly competitive national and international environments, it has dynamic information systems needs; these needs are fulfilled by its in-house information systems function—the Information Technology Directorate (ITD): the within-case unit of analysis in this case study. The ITD is a centralized functional unit whose chief responsibility is the development, integration, maintenance, and support of all corporate information systems. Based in Dublin, the ITD has a staff of over 280 spread among its eight divisions. In 1994, however, the IS function was an obscure department within the Finance Directorate. The appointment of a new CEO saw the IS function elevated to directorate status in 1995 in order to enable it to play a pivotal role in the planned IT-enabled transformation of the company. As a consequence of this change, the power asymmetry that existed between the then IS Department and its business clients within the organization was effectively mitigated. The advent of 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. Senior IS management were, for the first time, able to take full advantage of the company's participative policies and set about building new particpative processes and structures that employed a mixture of participatory design (PD) and joint application design (JAD) in order to maximize the benefits associated with user participation for systems development. The two development projects described herein were two of the first to be developed by the IS function using this novel approach. Certainly, other systems had or were currently being developed using a weak form of PD coupled with JAD. However, these systems had little impact on the underlying business processes or on the role-related responsibilities and remuneration of staff; in these projects, the process of user participation, although important, was not deemed to be critical.

Subsequently, the company drew on its experiences

Table 2 Telecom Éireann's Institutional Context for Systems Development

Institutional Context	**Case Findings**
Organisational policy on change	Since its inception in 1984, the organisation has maintained a participative approach to decision making and change. In terms of both structure and process, various participative fora exist to give them effect. The Joint Technology Committee (JTC) and the Computer Liaison Committee (CLC) are joined and oversee the introduction of new IT systems. In regard to systems development, user representatives are seconded to project teams, while user groups and individual users participate at JAD sessions.
Organisational policy on user participation	Telecom Éireann's policy on user participation reflects is commitment to participative decision making. Telecom's implementation of this policy lies in the manner in which it structures its development teams into user and IT project managers, developers, user representatives, and user groups for JAD sessions.
Type of user participation	All aspects of Mumford's (1979) typification of user participation e.g. consultative, representative, and consensual were in evidence in both projects. Individual users were by and large consulted on development issues; user representatives and user groups played a more active role that was both representative and consensual; overall consensus on development outcomes was obtained at the level of the CLC.
Degree of user participation	Ives and Olson (1984) argue that there are several degrees of participation. These range from no participation at all, to symbolic participation, participation by weak control, participation by doing, and participation by strong control. Both business managers (as users) and employees (through the CLC) exercised strong control, user representatives actively participated in both GAS and GIS, weak control was exercised by user groups, while the remaining users did not participate but, according to Barki and Hartwick (1989) were involved.
Content and extent of participation	User representatives were present throughout the development process. Individual users and user groups participated at key points in the development process: e.g. analysis and design, testing and implementation.
Formality & 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.
Organisational culture and climate	The organisation's culture emanates from its status as a state-sponsored organisation. This culture is changing as competitive pressures, market deregulation, and the move to privatization as a quoted company, all act to change process and structure. The climate is reflected in the partnership approach, with workers being well remunerated and with excellent terms and conditions of employment. There were no incidents of industrial unrest in Telecom since the 1970s. The shared organisational culture of developers and users ensured that the team subculture was receptive to user participation in systems development.

with IT development projects, such as those described in the case, to refine its participative strategies in the development of its present portfolio of corporate IS. Of particular note here is that these experiences highlighted the need to ensure that change associated with the introduction of IS was managed effectively. As of 1998, the organization has modified significantly the participative dimension of its institutional contexts in light of these experiences. While user participation as described in the case remains central to Telecom's approach, the company's employees, through the auspices of the labor unions, have agreed to accept changes to fundamental business processes facilitated by new IT systems in exchange for a 15% stake in the company's equity. The remainder of this paper describes the context and process of user participation and its relationship to issues of change management with reference to two systems development projects—the Generic Appointment System and the Geographic Information System—and the using the proposed model (see Figure 1) as a reporting mechanism and analytic framework.

TELECOM ÉIREANN'S INSTITUTIONAL CONTEXT

Table 1 summarizes the salient dimensions of this organisations institutional framework as it applies to systems development. Each of the following sub-sections describes the components in greater detail.

Organisational Policy on Change

Since its inception as a state-sponsored organization, Telecom has adopted a participative approach to the implementation of organizational policies and decisions. This was recently underlined when the company reiterated its position 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. Prior to the development of information systems in Telecom, the business owners/initiators submit and present their proposals to the CLC. At this joint forum a broad framework and terms of reference for the development and implementation of the new system are established. Here the labor unions arrange for user participation and involvement at various levels. Issues related to management of change may be highlighted at this stage. In the past, the level of importance attributed to such issues depended on union representatives' knowledge of the impact which the new system would have on their members' work and remuneration etc. and, also, on the willingness of business managers to provide an accurate impact assessment. There was also the matter of 'unintended consequences' surrounding the outcomes of development plans; these matters would be addressed at later meetings of the CLC at the behest of either the IS function, business owners, or labor unions.

Organisational Policies on the Type, Degree, Content, Extent, Formality and Influence of User Participation

In adherence to the company's chosen participative approach, 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. 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 etc. The development team normally consists of one or more user representatives from interested constituencies within the business 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. Because of the difficulty in involving all interested parties directly in the systems development, the company utilizes both PD and JAD approaches to the development process. The participatory mechanisms employed within the organization provided users with opportunities to express their 'world views', have political conflicts resolved, and helped negate potential power asymmetries between developer and user.

As Table 1 indicates, users participate directly and are consulted about design issues through project-based mechanisms such as JAD, the objective being to arrive at a consensus on such matters (see Mumford, 1979). User participation in the GAS and GIS development processes, for example, ranged from 'participation by advice' to 'participation by strong control' (Ives and Olson, 1984), depending on the organisational status of the end users participating. User representatives on the development teams participated as support for analysts in the requirements elicitation exercises with individual users and user groups. In both projects, user representatives were trained in the CASE tools and techniques, and participated in the use of these tools; Kozar and Mahlum (1987) comment on the importance of this aspect of user participation. User representatives also took an active role in the implementation of these systems. Users who did not participate on development teams did so at individual interviews and at group sessions with the systems analysts

Table 3 Project-Related Factors

Project-Related Factors	Case Findings
Initiator of the project	In both the GAS and GIS, the initiators of the projects were senior, but not executive-level, business managers in the Dublin operational area.
Top management commitment	In respect of the GAS, a high degree of support existed from organisation and IS function management. With the GIS, on the other hand, 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 for the GIS.
Time for development	Although there was a very tight schedule set in both projects, it did not impact negatively on the degree of user participation.
Financial resources available	Budgetary resources did not affect the degree or quality of user participation in either project.
Type of system under development	Both the GAS and GIS are operational support sub-systems.
Project complexity	The GAS was a complex project, several functional groups were involved. The GIS, on the other hand, was a highly complex project and several functional boundaries were crossed.
Complexity of task-structure	Both systems supported operational activities that exhibited medium-level task complexity, and which were part of moderately defined business processes.
Expected change brought about by the system	The implementation of both systems meant a high degree of change for particular user constituencies in the operational areas concerned as new business processes were supported.

and user representatives during the requirements analysis phase: in the GAS project these users also participated in prototyping activities. In both projects users participated in testing the systems once developed. Users from the management constituency also played an active role either as project managers or as project sponsors (cf. Land and Hirschheim, 1983).

PROJECT-RELATED FACTORS

As previously indicated, two systems development projects formed the embedded units of analysis in the study: the Generic Appointment System and the Geographic Information System development projects. Table 2 describes the project related-factors that the model in Figure 1 suggests as being relevant to the processes of user participation and change management. The following narrative discusses these issues and provides a description of important processual features in both projects.

General Project Characteristics: From Project Initiation to Implementation-Related Change

The Generic Appointment System (GAS) 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—more importantly, they recognised that there *was "a desperate need to radically transform [Telecom's] fundamental business processes, introducing the GAS was another step in that direction"* (senior middle-manager). A senior, non-executive business manager based in the company's Dublin HQ was this project's sponsor and initiator. However, according to a senior IS manager, the request for the system only received a response from and the support of the company's IS function when IS managers needed to choose *"a small, well bounded system, so that [they] could introduce and pilot-test [their] new application development environment (ADE), called IEF"*. Commitment from senior business and IS managers to this project was therefore quite high. 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 consisted of telecommunications technicians. The GAS also supports the operation of the company's ten fault-handling and repair centers and the telecommunications technicians employed there. These internal and external groups therefore had a keen interest in the development and implementation of this system as it impacted on a range of their basic functions.

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 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. The GAS project operated within fixed budgetary and time constraints; however, neither of these materially affected the process or content of user participation. As a distributed IS, the GAS is comprised of eight relational databases that serve up to 180 Windows-based PC

terminals in fault-handling centers around Ireland, and 400 additional terminals in operational depots nationwide. The GAS project came in on time and budget.

The Geographic Information System (GIS) 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 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. With the GIS a high degree of top management support existed in the first phase, but this waned in subsequent phases. As one business manager put it: *"This project became a political 'hot potato' because of the amount of hassle coming from the unions. I guess we should have foreseen it, you can't just do away with the draughtsmen, and expect them to go quietly... eventually [so and so] just wanted the whole thing to go away."* The complex technical, processual, and political factors were recognised from the outset by IS managers, and in an effort to avoid tying up scarce developer resources to a project that had all the potential to fail, they offered what the GIS project manager described as token developer resources to staff the project.

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 served 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. As with the GAS project, there appeared to be little or any constraint on user participation placed by time or financial considerations.

Dealing with Project and Task Complexity

While the previous sub-section has described several of the project-related factors outlined in Table 2, this subsection focuses on the impact of two in particular—project complexity and task structure/complexity—which have been posited as having particular influence on the process of user participation. Recent research questions the need for comprehensive levels user participation across the SDLC (Guimaraes and McKeen, 1995); instead, Guimaraes and McKeen argue that there is little need for user participation when task (business process) and project complexity is low (see also, Cavaye, 1995). In many respects, the GAS was characterised by a low to medium degree of complexity in relation to task structure and a moderate level of project complexity: in respect of the GAS system, task structure refers to the operational task of making appointments with customers for equipment repairs or installation and associated work scheduling. GAS 'system complexity' was low to medium from a user perspective, however developers found certain aspects of the physical detailed design–project-related problems with network interface protocols that the GAS was using to communicate with the existing Fault Handling System (FHS)—to be problematic. The GAS crossed several functional boundaries, and it therefore led to a high degree of social, rather than technical, complexity in relation to task and project factors. IS and business managers were of the opinion that this necessitated a high degree of user participation. Also, due to a scarcity of in-house developers, users were encouraged to become more actively involved in systems development, particularly at the design and implementation stages. The GIS is a highly complex system in terms of system functionality and the nature of the business tasks it supports. The IT project manager commented on this: *"Without user participation on this project, well we just couldn't have done it, the requirements were so complex; mapping the network to the level of detail required, and then representing it graphically, and then updating and using the maps to plan the network and provide customer service, grappling with this level of detail and trying to computerize it was a horrendous task."* A GIS developer also commented on the technical aspects of the project: *"Working with the GIS vendor's proprietary development approach and programming language was bad enough, but add the complex requirements and the technical headache of representing them, and you get some idea of the challenge this system posed for us...look, there's a telco in [the US] doing the same thing for the past couple of years with a project team ten times as big, and we are trying to do the same with five people, crazy."* The practice of comprehensive user participation across the SDLC in the GIS and GAS projects was of obvious help to developers in coping with both project and task complexity, and it was greatly facilitated through the policy of on-site development at the business users' offices. Prior to the development of the GIS and GAS, most systems development took place off-site, that is, within

the IS function's own business accommodation. Senior IS function management and development project managers recognized that there were significant benefits to be gained from on-site development at the users' place of business. For example, it was 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.

In each project, coordination and control of both developer and user activities was highlighted as being of particular importance in addressing issues of project complexity. Regular project meetings were considered by both developers and users in both GAS and GIS to be an important mechanism in the achievement of this goal. As expected, such fora helped developers to keep abreast of each others' progress and activities; however, 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. Nevertheless, developers commented that the informal grapevine was far more informative with respect to keeping up to date with user-related problems on both projects. User representatives felt that taking part in these project meeting made them feel part of the development team, as the user representative on the GAS protect commented: *"For me, the project meetings were the 'icing on the cake' when it came to being on his project. While I got on with the developers, it gave me an opportunity to air my views and discuss issues with all of the IT people at one sitting; I also took this as an opportunity to sort out problems with [the user project manager]."*

PROCESS-RELATED FACTORS

Table 3 presents the factors within the participation process that impact on the degree and effectiveness of user participation in systems development.

User/Analyst Relationships

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. Participating users were fully aware of the favorable attitude that developers had towards their contribution and responded accordingly: as the user representative on the GAS put it... *"the lads here really made me feel welcome and part of the team from the outset...I worked with John on the requirements elicitation in both the individual interviews and the user work groups... and was trained up on IEF, just like the rest of the development team."* Developers in both projects also articulated a need for more active participation by certain users, such as the draughtsmen on the GIS, and fault-handling centre technicians on the GAS, as it was felt that an increased level of participation by such users could have helped mitigate some of the contentious change management issues surrounding the implementation of the systems in the organisation.

Influence and Power Relationships

Developers on both the GAS and GIS occupied positions of relative seniority to the operational staff who acted as participating users in both projects. There was no evidence of the 'not invented here' syndrome among developers, certainly, if it did exist, users did not mention it. The climate and culture of the IS function appeared to be egalitarian in the main, and users' opinions were treated with respect by developers, the GAS user representative captured this succinctly: *"To be honest, I was surprised at being treated like an equal, people at that level on my side of the house tend to be standoffish at best...the lads outside [in the user groups etc.] feel the same and get on well[with developers]. I guess the reason is that John and Don came from the technical side [originally], and know the score."* One of the GIS user representative also commented on this: *"There is a lot of ill-feeling out there, but none of it is aimed at the IT guys, the staff on the ground know that they are just doing their jobs, and although it is a bit like 'turkeys voting for Christmas' with the draughtsmen, most of them will give all the help required...it's the unions job to sort out the problems with the company and get the best deal out of this [for all concerned]."*

Table 4 Process-Related Factors

Process-Related Factors	Case Findings
User/analyst relationships	Very good across both projects. Relationships were enhanced by the existence of a common organisational culture and favourable development climate in project teams.
Influence and 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 organisational policy by all the constituencies involved in systems development. Positive management attitude toward and acceptance of user input was also of help here.
Communication	High degree of user/analyst communication was in evidence across both projects. In the GAS project this was greatly enhanced by on-site development training the user representative in IS development method and tools, and the prototyping approach adopted; in the GIS project, however, only some improvement in communication brought about by user training in SSADM.

Communication

Because of the on-site development approach in both projects, the presence of full-time user project managers and representatives, including the data capture team of 10 planners and draughtsmen on the GIS project, and the regular project meetings, communication between developers and users was not an issue here. There was on-site access to both business managers and users at all levels, formal and informal communication mechanisms abounded as one developer on the GIS project attested: *"I can step outside there and call on any one of the user representatives, or get the data capture people in here any time during the day and have them clarify things for me, or I can waltz off down the corridor and speak to a planner or a draughtsman, no problem. If I feel lazy, I can always use e-mail, and if people are out or at a meeting, I know I can always catch them in the canteen upstairs."*
Both projects differed in the level of support for user/developer communication that their respective development approaches and CASE tools offered. In the GAS, the rapid application development (RAD) approach with its prototyping tools significantly enhanced user/developer communication at user representative level and at the JAD sessions. The GIS did not have the same RAD capability, and it was only during the testing and data capture that this type of helpful feedback occurred.

It is clear that the process-related factors mentioned in the model operated to produce systems that matched business needs, user requirements of a technical nature, and system preferences that did not impinge on the business objectives set for the GAS and GIS.

USER-RELATED FACTORS

Beynon-Davies *et al.* (1997) argue that choosing the 'right type of user' to participate in systems development is critical to both the development process and its product; Leonard-Barton (1995) has also commented on this aspect of participation within wider organisational contexts. 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. The other side to this coin was that given the potential for change management problems surrounding both systems, users' perception of the prevailing organisational climate, their ability and willingness to participate, their characteristics, attitudes, and commitment all proved pivotal to the eventual success of these development projects. As the unions had to be consulted on every issue, business managers could not appoint the individual user of their choice, particularly those favorably disposed, for whatever reason, to siding with management or who were not going to be impartial during development, as user representatives or members of user groups and test teams. Surprisingly enough the IT project teams ended up with user representatives and groups who collaborated wholeheartedly in the 'technical' development of the systems concerned as Table 4 illustrates.

In both projects, the development-related workshops normally consisted of developers from the relevant project team and end-users from only one of the user constituencies participating in the development process: the manner in which this participative mechanism was implemented possessed certain flaws, however. For example, group workshops on the GAS project tended to be used as a platform for political infighting between different user constituencies—internally-based fault handling centre technicians and externally-based repair team supervisors and team members—as certain users introduced arguments to oppose or alter system features favored by users from other operational areas who did not attend the sessions. User groups also tended to play on the stated objections of absent groups in order to influence the trajectory and outcome of the development process in their favor. For example, the user representative on the GAS project reported that: *"Staff at the fault handling centre felt that their jobs/roles 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 one user constituency, and strongly influenced the deliberations of the Computer Liaison Committee (CLC). Because of the high degree of political conflict between the various groups, the user representative on the GAS project observed there was a need in future *"to have all the user groups affected by the systems development present at each of the workshops; this avoided the emergence of a 'them and us' situation between users...both the unions and management are to blame here."*

CHANGE MANGEMENT IN THE GAS AND GIS

The issue of change management associated with the implementation of both the GAS and GIS was found to exert a critical influence on the trajectory and outcomes of the development process. Even though the development project

Table 5 User-related Factors

User-Related Factors	Case Findings
Participation vs. involvement	In each project, only a sample of users from affected constituencies actively participated in systems development, i.e. user representatives and user group members. These users had strong favorable attitudes toward the processual and technical features of the system they helped create. Following the distinction made by Barki and Hartwick (1989), the subjective psychological state that reflects the level of importance and personal relevance of the information system to users reflects their involvement in the development process. By this definition all users felt involved because of the high level of representation on the project team and user groups, but also through the auspices of the CLC.
User perceptions of organisational climate	In relation to the GAS project, users felt that a favorable development climate existed. However, users involved in the GIS project were generally of the opinion that the organisational climate was negative; however, they felt that a favorable development climate existed.
Willingness to participate	In both projects users were eager to participate for several reasons, viz. self-advancement, political power interests, and technical curiosity.
Ability to participate	The use of dual project development teams (user and developer), and the use of user groups in JAD workshops greatly facilitated users ability to participate.
User characteristics and attitudes	Users generally held positive attitudes toward the social and technical aspects of systems development. However, user computer literacy posed problems in relation to their ability to fully participate. It was clear that the shared organisational culture was of benefit in accommodating different 'world views'; however, users of both systems were clearly from different constituencies within the organisation, and therefore possessed different characteristics and attitudes, e.g. internal and external technicians in the GAS and planners and draughtsmen in the GIS.
User commitment to development-related change	Depending on the user constituency concerned, the level of commitment to change differed among users. In the GAS project the internal and external technicians exhibited varying levels of commitment and enthusiasm as both groups endeavored to steer system features in particular directions which favored one group over the other. In the GIS, the draughtsmen and planning technicians were polarized in their commitment, the latter were highly committed, due to the increase in status and power bestowed upon them by the change, the former were less than happy because their roles and remuneration were going to be significantly affected.

teams were embedded within the user community, and user groups were employed in the elicitation and verification of requirements, in what could be described as a fully participative development exercise, change management problems arose in both projects during development, and, in particular, during implementation. Previous findings indicate that the level of participation observed should have resulted in positive user attitudes to system quality and full acceptance of the developed system (see Ives and Olson, 1984 for example). Nevertheless, this paper reveals that other development-related aspects of an organisation's institutional framework come into play and exert considerable influence on the development process and its product.

Even before systems are developed in Telecom Éireann, formal negotiations are entered into with the unions at the level of Computer Liaison Committee (CLC) regarding the implications of the systems for users and the input required from user constituencies. Business managers who initiate and have ownership of the project approach the CLC to have the issue put on its agenda; the matter is discussed and union members of the CLC then report back to their executive committees, who then inform the local branch organisation affected. The union executive usually agrees in principle and delegates responsibility for the provision of particular users to participate in the project to the local branches. Once agreement is reached and user resources allocated, development can begin. This process is, however, dependent on two things: (a) business managers presenting a full description of the system and its implications on the business process it supports to the CLC, and (b) the absence of subsequent inter- and intra-union conflict and political infighting regarding changes to the user constituencies affected. Both of these factors came into play in the case described.

Although the GAS had been accepted as developed by all the constituencies of interest, the CLC over-rode decisions taken and agreed by the user group. This situation arose despite the fact that one individual on the CLC had been involved throughout the development process as a member of the user group. A developer provided an explanation for this and reported that influential users who did not participate in the development process—i.e. technicians at the fault handling centres—had voiced their *"unhappiness with system features (and that this) 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. The problem here was that while the CLC agreed up front to the need for such a system, it is an unfortunate aspect of systems development that detailed requirements only emerge as a project unfolds and changes to previously-agreed functionality may be is

required. If, as in the GAS project, the user representative and user groups settle on system functionality that is not agreeable to other users, and if the aggrieved parties possess or can apply enough political muscle to overturn such a decision, then perfectly legitimate user requirements can be discarded for what are essentially political reasons.

A very similar scenario existed in relation to change management issues that arose during the life of the GIS project: here, business management was aware of the potential for significant change management problems to develop when the system was implemented. 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 participated in and were satisfied with the system as developed, they were unhappy with the consequences of its introduction. The issues here were quite complex as two different unions were involved, members of one, the draughtsmen, were losing out to the planning technicians, represented by the larger of the two unions. The business manager involved had left it to the CLC to sort things out instead of dealing with the issue prior to the commencement of development. The absence of adequate managerial attention to these issues meant that although both systems were developed with the cooperation of users, both projects encountered user resistance at the implementation stage.

EPILOGUE

The problems described in the previous sub-section were not unique in Telecom Éireann. Such problems beset other instances of information systems development and implementation within the company. The weakness in Telecom's approach to change management at this time (1995/96) was commented on by the IT director who stated that: *"What we have been doing here at IT is just reacting to the business needs which up to now have been ad hoc and poorly articulated at best; this has been disastrous for us here. [The new CEO] has changed all that. One of my CSFs is to ensure that business process engineering gets off the ground in Telecom. I'm answerable to him on that. We all recognize the need to change the way we do business, if we don't we won't survive. It's as simple as that. Getting the business sponsors to sign up via a project charter is only part of the solution. We need then to take ownership...The unions are quite powerful, nothing gets done without their say so. That's the other challenge for us. I don't mean beating them over the head or anything...we need to get them on-side as well."* The results of a strategic business review conducted in the early part of 1995 helped chart future business strategy. As a direct result of this strategy, the CEO established a BPR unit in 1997, and since then the IT Directorate has been developing future methods of operation (FMO) based on reengineering operational business processes in concert with Bellcore (US) and the Business Process Design Directorate. In the first quarter of 1999, the fruits of this labour saw the introduction of several new information systems in the company, the component subsystems of which were associated with radical business process reengineering and change around IT. However, back in 1995, the CEO and the IT director admitted that this would be problematic. Hence the CEO set up a Joint Strategic Consultative Group (JSCG) with union involvement to give effect to a partnership approach to organisational change, particularly in relation to the implementation of information technologies, as it was intended to have IS enable Telecom's transformation. 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 company's 'Organizing to Compete (OTC)' strategy were fleshed out. In order to achieve commitment to change, reduction in operating costs and increased quality of service to the customer, the company introduced an Employee Share Ownership Agreement (ESOP) that would give employees a 15% stake in the company. In return for this, staff and its unions would commit totally to the company's transformation strategies in relation to all issues of organisational change around IT.

It is perhaps ironic that the implementation GAS system, which caused of so much controversy among different constituencies of users, has now been integrated with the FHS on a company intranet platform that would allow, by the end of 2000, all operational and repair staff full access, via a GSM-enabled laptop computer, to both the fault handling and appointment systems. The upshot of this piece of business process reengineering was that all but two of the company's regional fault handling centers were closed by April 1999, and the staff redeployed to other duties. This would not have been possible without the ESOP deal and the accompanying agreement to all IT-related change by the union. The political role that the CLC played in the past has thereby been eliminated, along with many of the other obstacles to change described herein.

DISCUSSION AND CONCLUSIONS

The previous section illustrated that Telecom Éireann's institutional context plays a pivotal role in shaping and influencing all aspects of the content and process of user participation in systems development (RQ1); it also provides ample evidence that it is institutional mechanisms that help resolve change management problems (RQ2). Clearly, as the section on change management and the Epilogue have illustrated, comprehensive organisational policies and structures are required to accommodate matters of organisational change surrounding the implementation of organisational IS. However, management in Telecom realized that even if organisational policies on user participation and change management are included as 'rules of the game' (in terms of institutional mechanisms and arrangements that structure organisational actors' roles and responsibilities in system development), they are no guarantee of actors' abilities or

intentions to either 'play' competently or fairly. We have seen in this case that even within an institutional framework that possesses a mechanism to manage and agree change prior to development, in addition to an infrastructural mechanism that addressed issues of user participation, the interplay of project-, process- and user-related factors coalesced to produce systems of high quality, and which would have been acceptable to users, if business managers and the unions had been competent and fair in their dealings from the outset, and properly addressed issues related to change in business processes and their effects on organisational actors. Additional institutional arrangements, described in the Epilogue to this case study, have been introduced by Telecom's management to address these deficiencies. What can be deduced from this is that if organisations are to ensure that management of change proceeds smoothly, and the benefits of user participation are to be maximized, then a combination of process redesign—to have business managers focus properly on and provide a detailed plan of their requirements prior to development—and stakeholder agreement—to have organisational actors to buy into change upfront—is required.

The third research question (RQ3) inquired as to which of the model's factors were critical in shaping and influencing user perceptions of product quality and user acceptance of the end product. As we have seen, an appropriate institutional foundation provides the bedrock on which the process of user participation is based. This paper's findings indicate that issues of: (a) project complexity and degree of task structure (project-based factors); (b) user/analyst relationships and communication (process-related factors); and (c) users willingness and ability to participate (user-related factors), are critical for system quality from a user's perspective. While these issues have a general effect on *user acceptance* of the implemented system, institutional arrangements that exert a primary influence and greatly affect the level of *user acceptance* of systems are: (a) the expected change wrought by the new system (a project-based factor); (b) user influence and power relationships (a process-related factor); and (c) user commitment to development-related change (a user-related factor). In respect of RQ4 it would, as this study's findings suggest, be difficult, and perhaps dangerous, to attempt to disentangle and isolate factors that relate specifically to user participation and management of change. For ultimate system success both are required. Nevertheless, an answer to RQ4 has been provided *en passant* when describing the answers to the other research questions, particularly RQ3.

The model presented herein and empirically tested in a constructivist study of the related processes of user participation and management of change presents a significant contribution to understanding what are complex phenomena. It provides holistic confirmation of what were fragmented conceptualizations and findings in previous studies. This paper's findings have laid bare one of the more common myths of the IS field, namely that user participation may lead to increased *user acceptance* of systems by reducing *user resistance* to change (Ives and Olson, 1984). As the findings of this study have illustrated, an organization's institutional context is of primary importance in this regard. Finally, while this paper provides a much-needed, empirically-based understanding of issues surrounding user participation and management of change in systems development and implementation, the conceptual model presented herein can be employed by future researchers as a framework for investigating what are complex phenomena in order to establish a body of cumulative research on these important topics.

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ENDNOTE

[1] Statement of Company Position on Current Industrial Relations Issues, October 1995.

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