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Sociotechnical processes of organizational change and continuity

University of Warwick, Warwick Business School

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degree of Doctor of Philosophy in Management**

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Abstract:

This research combines the in-depth study of technical rationality and social practices with broader institutional influences that support or subvert the course of technology-led change in organizations. It contends that technology is socially shaped within the institutional and technical boundaries and that the choices made by individuals embedded in power relations shape the course of technological adoption in organizations. Two in-depth qualitative case studies are used to explore the sociotechnical processes of continuity and change.

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Chapter 1 Introduction:

Information and Communication Technology is an inseparable facet of organization. A complexity of connected and interconnected layers of database and information systems, using millions of microprocessors supports the data hungry needs of contemporary organizations. The processes, communications and daily functioning of any organization are in part dependent on an array of technologies. As such, the study of technology and organizations presents an exciting and necessary challenge to better understand their intertwined properties.

This research rejects the causal links conventionally reported between technology and performance or efficiency in technologically deterministic analysis on account of a wealth of studies that indicate unintended and unexpected outcomes from technology adoption.

This research contributes analysis of two empirical cases using multiple lenses to capture the intricacies of sociotechnical continuity and change.

Chapter 2 Literature Review:

Introduction

The relationship between technology and organization has been debated for several decades and across a number of academic fields. The work of Trist and Bamforth (1951) is often associated with the birth of the sociotechnical systems theory. Their thesis observed that the social arrangements of work and not the properties of technology were fundamental in increasing production by miners. This and other studies mark the general problematization of the relationship between technology and organization. In more recent years it is the impact of information technology, specifically the information processing capabilities of the 'desktop' computer and networked information systems are implicated in reforming organizations (Scarbrough and Corbett, 1992; Williams and Edge, 1996; Kallinikos, 2006b), or even societies (Castells, 2000). Indeed the development of academic arenas dedicated to the study of information systems and information communication technology (ICT) must be seen as reflecting the prevalence of ICT in society and its constituent organizations. While it is acknowledged here that technology encompasses an inordinate range of artifacts and infrastructural arrangements (Geels, 2004; Geels and

Schot, 2007), the focus of this research lies in the domain of computerization or the application of ICT in work organizations.

The computerization of organizations means that "...IT and its associated expertise comes closest to defying the conventional distinction between social structures and technical systems. Its lightning-fast streams of information and communication seem ready to displace the sluggish flows of bureaucracy and paper" (Scarbrough and Corbett, 1992; : 1-2). More recently the growth of network systems, 3G communications, wide area networks and a plethora of applications and platforms for use on the World Wide Web gives additional complexity to the intertwined relationship between technology and organization (Kallinikos, 2005; Kallinikos, 2006b). The enmeshed and rapid co-development of information technology within organizations presents the researcher with theoretical and empirical challenges in researching sociotechnical change in organizations; to paraphrase Scarbrough and Corbett (1992), how does one separate the dancer from the dance? In engaging with the relationship between technology and organization "...we require a schema which acknowledges all those institutions, artefacts and arrangements within which the adoption, configuration and use of those technologies takes place" (Williams and Edge, 1996: 875).

Chapter Outline

First, the theoretical status of technology is examined. This literature review reveals several different strands where markedly different perspectives have developed different understandings of technology and organizations. It is shown that there are fundamental differences across conceptual, empirical and philosophical domains. Drawing on the concept of the social construction of technology (Bijker, 1987; Bijker, Hughes et al., 1987; Bijker and Law, 1992; Bijker, 1995), the duality of technology (Orlikowski, 1992; 2000) underlies the theoretical lens for understanding technology in use.

Secondly, institutional theory is explored as a theoretical lens through which the relationship between technology and organizations can be understood. An institutional perspective of technology and organizations allows the examination of the interactions between the socially constructed nature of technologies and their host organizations. Viewed as institutions, the roles of technologies and organizations have both a historical and current position as part of their sociotechnical constituency.

This chapter explores the theoretical approaches for the study of information and communication technology and its impact on organizations. It concludes by establishing a set of research questions

that this research will address. Throughout this work the term *technology* is used as shorthand to capture computer and information technologies.

What is 'Technology'?

Bijker (1995) highlights some significant problems with *traditional* approaches to technological change. The first is a tendency to treat technological development as a linear process. This is especially problematic in the reconstruction of technological development. The danger lies in interpreting or tracing the material aspect of technology in a rational-linear course through history (e.g. Wills, 1972). An implicit linear teleology of this nature implies not only the smooth transition from technology to technology, but also each transition was *consciously directed* (Ferguson, 1974). A second problem concerns the *asymmetrical analysis of technology* (Bijker, 1995). This signals a common tendency to trace *successful* technologies. This asymmetry in analyses brings with it the tendency to attribute success to the innate physical qualities of a technology, which in turn leads to the misattribution of outcomes (e.g. the success of a technology) to 'good technology' (Bijker, 1995; Sawyer, Allen et al., 2003). The success or failure of technology is not reducible to the characteristics of technology as it is always interpreted, implemented and used in a social setting. Thus, any analysis of sociotechnical interaction needs to assemble these

features into a coherent framework that more adequately accommodates the interplay between social and technical forces than traditional approaches. For this research, if technology is to be examined in its role in relation to organizational change, the nature and qualities of technology need to be framed to draw an understanding from the research data. Bijker (1995) proposes four dimensions for the development of a framework for sociotechnical change:

Developing a framework for tracing technological change.

- **Examining both continuity and change**
- **The symmetrical analysis of technology**
- **The impact of structural constraints**
- **The principle of the 'seamless web'**

The first dimension concerns the accommodation for both change and continuity. As discussed later in this chapter, the relationship between technology and organizations is complex and often problematic as the rationale behind technological adoption can produce unintended or conflicting consequences (Robey and Boudreau, 1999; McAulay, 2007). Since ICTs have become valuable strategic currency in organizations (Scarbrough, 1996; Galliers, 2004; Doherty and King, 2005; Tidd, Bessant et al., 2005), the empirical project of technological change in organizations has to relate the rationality for change with its outcomes.

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Therefore a theory of sociotechnical change must accommodate stability as well as change. Since both continuity and change are functions of sociotechnical interaction it is crucial to identify factors that promote all outcomes, not just apparent changes. This places emphasis on the researcher to not simply locate and identify instances of change but to offer explanation for the sociotechnical qualities that support both continuity and change from their empirical work.

The second dimension was introduced earlier in this section. The symmetrical treatment of technology avoids the pitfall of the (mis)attribution of a technological outcome (e.g. 'working' or 'improved') to the intrinsic properties of an artefact. For example, the state of 'working technology' needs to be explained: why and how does it work? If this is abandoned or left as implicit, this does not in itself constitute any insight into technology or the nature of change involved, the technology is 'black boxed'. As technology is socially situated and shaped through its use and interpretation (Bijker, 1987; 1995; Orlikowski, Yates et al., 1995; Orlikowski and Iacono, 2001; Sawyer, Allen et al., 2003; Lin and Silva, 2005), the attributes 'working' and 'nonworking' are products of sociotechnical interaction. Symmetrical analysis of technology ensures that achievements such as 'working' and 'nonworking' are not reduced to innate technical phenomena; they are positions that need to be investigated as it is the sociotechnical

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alignment and not exclusively the material nature of the technology that leads to conditions of 'working' or 'nonworking'.

The third dimension also relates to an issue raised earlier, the issue of continuity and change (Bijker, 1995; 15; Avgerou and McGrath, 2007):

"A theory of technical development should combine the contingency of technical development with the fact that it is structurally constrained; ...it must combine the strategies of actors with structures by which they are bound."

The interaction between social actors and the structural modalities they encounter are the ingredients for both continuity and change. The outcomes of sociotechnical interaction are not infinitely malleable via the will of the human actor or, by proxy, through the conscious rational design of technological or structural systems of organization (McLoughlin and Clark, 1994; Kimble and McLoughlin, 1995). This theoretical schism is echoed in Pollock and Williams (2007) who argue that the acquisition of technology is often attributed to exclusively social relativism or rational determinism across different scholarly disciplines. This research argues that the significance of pre-existing technologies and structures is fundamental to the understanding of technological change as much as the innate qualities and designs of any technology itself. It is within, not

against, the spatiotemporal configurations of technology that agents interact and shape sociotechnical constituencies.

The fourth dimension engages the principle of placing analytically distinct components in a 'seamless web'. The aim here is to avoid reifying the analytical distinctions we make as observers and analysts of phenomena. Actors are never exclusively a technician, dealing exclusively in the realm of the technical. They are embedded and act upon a system of many, sometimes conflicting, rules, regimes, structures, groups and other actors (Geels, 2004). A technician is often a politician, an engineer, a manager and a negotiator; actors can be considered to be 'heterogeneous engineers' (Law, 1987). The importance of the 'seamless web' lies in guarding against social scientists' transposition of their, necessary and useful, analytic categories onto the phenomena they study. Secondly it sets the scene for understanding the relationships between the analytical distinctions made between actors, structures, rules and regimes. Acknowledging the interrelated position of the subjects and objects of study avoids the artificial separation of phenomena into elements and enables researchers to begin to locate subjects and objects in an 'ensemble' (Kling and Scaachi, 1982; Bijker, 1995; Orlikowski and Iacono, 2000).

Orlikowski and Iacono (2001) note the varied and sometimes absent treatment of technologies across the literature. While other authors

discussed so far have emphasised the absence of a social component in theories of technology, here Orlikowski and Iacono argue that the consequences of technology, intended and unintended, can better be understood through beginning with theories of technology into their analyses. Orlikowski and Iacono (2000) propose five premises for theories of technology:

- 1) Technological artefacts are not *natural, neutral, universal or given*.
- 2) Technological artefacts are always *embedded in some time, place, discourse and community*.
- 3) Technological artefacts are made up of interconnected components which require human action to assemble into a meaningful whole.
- 4) Technological artefacts are a function of social and economic practices. They co-exist with previous systems and technologies of the same or assimilated processes.
- 5) Technological artefacts are dynamic and are developed and shaped throughout their use.

What is Organization?

While it is beyond the scope of this thesis to trace the history of organization, or the study of organizations, this section briefly outlines the theory of organization (Reed, 2006) chosen for this thesis. Just as the theoretical status of technology is problematic in its relationship with organization, so too is the theory of organization that gives substance to

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the entities we study. As Spicer (2009) reminds us, theory involves the contemplation of an abstract representation of reality which allows the study or synthesis of relationships between concepts and how these relationships fit together as part of their broader context. In the context of this research, the theoretical position with regard to technology has started to outline the theoretical status of organization as mutually constitutive with technology. Through various empirical studies it is known that technology produces unintended consequences to those envisaged by managers and technicians. The debates above have indicated that technology cannot be perceived as a recalcitrant ally of organizational structure (a resource that can be wilfully employed and restructured to produce known effects) as reflected historically in contingency approaches (Orlikowski and Barley, 2001). In the theoretical discussion of technology above, the structural nature of technology (cf. Orlikowski, 1992) began to allude to the recursive relationship it has as part of organization. This is demonstrated, for example, in the *process of structuring technology-in-use* of electronic communications (Orlikowski, Yates et al., 1995) and the interplay of sociotechnical forces in firms' internal arrangement of expertise to design innovative multimedia products (Collinson and Molina, 1995). A common factor between these articles is that technologies are deployed within, and developed by, organizations which in turn are constituents of broader contextual arrangements. Spycbey illustrates the duality of

structure which implicates agents as not only subjects of structural arrangements, but also in a shaping capacity (Spybey, 1984; 311):

“...participants in organizations contribute to the structures and systems to which they also orientate their actions. Frames of meaning are, therefore, seen as conceptual frameworks for the collections of values, beliefs, norms, techniques and so on to which these participants refer. The reference process is taken to incorporate the ‘duality of structure’ and in the act of reproduction alongside the conscious parts are responses to unacknowledged conditions and contributions to unintended consequences.”

This has resonance with the project of institutional theory in organization studies. The project of aligning social studies of information systems and institutional theory was mooted by Orlikowski and Barley (2001). This was intended to appear in a special issue of *Management Information Systems Quarterly Journal* to engage learning between information systems and organization studies. The special issue was abandoned due to a lack of contributions and, as such, the possibilities from this cross-disciplinary endeavour have not yet been translated into empirical studies. The value of such a synthesis of conjoining these perspectives is developed throughout this chapter and underpins the logic for mapping the broad technological, organizational and contextual alignments in conjunction with micro-level sociotechnical change. This is also reviewed

later in this chapter using the concept of sociotechnical constituencies and the process of sociotechnical alignment (Molina, 1990; Molina, 1993; Collinson and Molina, 1995; Molina, 1999).

The Relationship Between Organization and Technology

There is broad agreement that technology is deeply enmeshed in organizations and their processes (Doherty and King, 2005). Indeed the increasing rate of transmission and proliferation of information through information and communication technology (ICT) is something that continues to impact upon the configuration of contemporary society (e.g. Castells, 2000). The capacity for new capabilities, efficiencies and other gains from the application, interconnection and integration of ICT are well-established themes in recent research.

Technology (especially, but not exclusively, ICT) then, is inextricably interwoven and a ubiquitous feature of organization and organizing. It is almost impossible to imagine modern organization without some element of computing or information technology capability. From spreadsheets for logging small business accounts through to globally distributed management information systems, the ever present ICT is deeply rooted in organizations and their processes. ICT is an omnipresent feature of a vast swathe of contemporary life, especially the world of work. There is little doubt that technological (particularly ICT) innovation is implicated

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in bringing about organizational change (Kallinikos, 2006b; 21):

"Information processing and storage currently represent the backbone of many organizational operations. Over the last fifty years or so, computer-based systems have been massively deployed to carry out a variety of computational tasks"

The idea that information and communication technologies have changed and will continue to affect change in organizations is almost incontestable. The relationship, dynamics and direction of change, however, represents contested terrain (Kallinikos, 2006b; 21):

"The positive outcomes of an interconnected world, manifested in the rapid and effective processing and transfer of information across organizational, institutional and geographical boundaries, are rather conspicuous... ...[however, the] encompassing processes of this sort hardly remain univocal in their organizing or disorganizing consequences."

These "organizing or disorganizing consequences" are problematic for managers' work to leverage benefits from the adoption of ICT and is reflected in Ciborra's discussion of management encounters with information systems (Ciborra, 2004; 17):

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“A key reason for managers’ bafflement and uncertainty lies in the ungrounded expectations created by widely-used managerial and consulting models. Leveraging on the belief that ICT is a powerful means to control processes, people, and resources, these business models and systems methodologies promise a variety of ways in which top managers can ‘align’ ICT with strategy by re-engineering processes and creating entirely new, competitive e-businesses. And that’s not all: even knowledge can now be formalized and managed; workflows centralized; transparency enhanced; and data mined wherever they hide within the enterprise’s procedures and the departmental files.”

Ciborra illustrates the discrepancy between our understanding of technological innovation and change in organizations. The notion of leveraging ICT as a strategic resource to produce a known outcome seems increasingly naïve as a bulk of empirical studies shows a range of unintended consequences following technological change in organizations (Ciborra and Lanzara, 1994; 62):

“...stories of technological and organizational innovation share a sort of deterministic explanation, which assumes a linear, straightforward consequentiality among the actors’ choices, actions, and outcomes of the innovation process, and attributes to systems a “closed,” purely instrumental character: systems are

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“designed” *ex ante*, embed pre-established and nonambiguous purposes, and provoke “impacts” accordingly. In other words, it is assumed that designers and implementers have a clear view and stance with respect to what a system should and should not do, and that the system itself will behave to the rule.”

This marks the point of departure for empirical investigation. First, organizations are increasingly computerised territories reliant on complex assemblies of information flows. Secondly, the organizational consequences of the introduction of new technologies are not unidirectional or predictable in their manifestation. The relationships between technology and organization are mutually constitutive (e.g. Orlikowski, 1992; 2000). Thirdly, organizational and technological change is institutionally mediated. It is proposed that organizational effects from technological adoption produce patterns of continuity or change through interaction between social and material actors across different levels of influence.

The following sections flow from a structurational concept of technology and organization by addressing institutional theory, sociotechnical change and using sociotechnical constituencies approach for mapping technical, socioeconomic, political and cultural factors (Molina, 1990).

Institutions, Institutional and Neo-Institutional Theory:

This research calls for attention to discourse and organizational practices to bridge the gap in understanding of the emergence, change and diffusion of institutions and their role in shaping patterns of technological adoption. This thesis draws on institutional theory, both as a theoretical underpinning of sociotechnical constituencies (Molina, 1990; Molina, 1993; Collinson and Molina, 1995; Molina, 1999) and as a theoretical complement to the sociotechnical study of organizational continuity and change (Avgerou and McGrath, 2007). This literature review has started to examine some of the characteristics of 'technology', 'organization' and previous studies of technological adoption within organizations. These indicated that a structural relationship exists between action and structure across different levels and that these were fundamental for examining the nature of continuity and change. The theoretical challenge (addressed in this thesis) is to accommodate this dualism of both technology and organization and allow for the analysis of their interactive combination in generating conditions of organizational continuity and change. First, I examine the reasons why current institutional theories fail to be able to adopt (and accommodate) such a perspective on the recursive nature of technology and organization.

Over the last quarter of a century, institutional theories have become a strong constituent of organization studies. For DiMaggio and Powell

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institutional pressures, rather than efficiency, create similar organizational forms: “Organizations are still becoming more homogenous, and bureaucracy remains the common organizational form. Today, however, structural change in organizations seems less and less driven by competition or by the need for efficiency” (1983; 147). The ‘decoupling’ of daily activity *in* the organization from the rational design of organization again mobilizes institutions as socially rationalized templates for organizational change (Meyer and Rowan, 1977). A parallel between the emergence of institutional theory and the social study of technology can be drawn in that both question the form of organization and technology as purely rational-efficient and deterministic designs.

These initial phases of institutional research were concerned with similarity within organizational fields, *the premise of isomorphism* (Suddaby and Greenwood, 2005). Generally, within these perspectives of institutional theory there are identifiable gaps in understanding the mechanisms that generate the conditions for the adaption or diffusion of institutional patterns (Hasselbladh and Kallinikos, 2000; Hayes, 2008). Field level analyses tend to address the aggregate product of change and not the processes and mechanisms that are involved in enacting these changes (Barley and Tolbert, 1997; Hasselbladh and Kallinikos, 2000; Hayes, 2008) and they give little attention to the influence and action of actors inside organizations (Reay and Hinings, 2009). The central notion

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in neo-institutional theory that individuals, organizational actions and structures, conform to institutional logics or templates neglects the social role of organizations in forming and distributing these institutional forms. The processes and mechanisms that produce conformity (or divergence) from institutions are seldom unpacked. This has fashioned a 'stimulus-response' mode of research, a largely unilateral institution-organization relationship. This research explores both the recursive nature of technology and organization and examines the social and material processes of technological adoption. First, I address in more detail the theoretical underpinnings of how institutions fit with this perspective, as Hasselbladh and Kallinikos (2000; 697-698) write:

"In this way, the social and cultural processes that make up the project of rationalization and shape the structure and functioning of work organizations have either been bypassed or given exogenous status, reified to 'reality', 'society' or 'environment' and treated as independent variables in cross-sectional or longitudinal empirical research."

To translate this problem to studies of technology, this means that the duality of technology and the socially constructed nature of the processes of creating institutional forms are often overlooked and hence, given a form of exogenous status in the analysis of organizations (Hasselbladh

and Kallinikos, 2000; 700):

“As currently practiced, neo-institutionalism bypasses the central issue of the social construction of rationalization, which it treats in terms of structural isomorphism, i.e. the diffusion of the same or similar structural patterns across populations of organizations.

...Understood as the outcome of social construction, institutionalization needs to abandon the bird’s eye view of the field, and come closer to the social and cognitive means and procedures underlying rationalized beliefs and schemes of action.”

The reification of institutions as exogenous forces at work upon organizations has presented this problem where institutions are no longer mutually constitutive with social action (Barley and Tolbert, 1997). Hasselbladh and Kallinikos write about the state of institutional literature on organizations (2000; 701):

“It instead concentrates, by and large, on investigating the patterns of diffusion. The adoption on the part of a particular, or a set of organizations of models, rationalized beliefs or practices is never related to what might be implied by adoption in terms of organizational objects, procedures and roles.”

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Furthermore, this mode of institutional analysis lays claim to socially mediated institutions while stripping them of supporting agents which sustain them. This is why the definition of institutions must transcend a single level of analysis (Barley and Tolbert, 1997). However, more recent work in institutional theory has attempted to capture the social mechanisms of institutionalization, broadly captured in the diverse field of institutional work (Lawrence and Suddaby, 2006).

The *adolescence* of institutional theory has produced multifaceted and diverse streams of research that attempt to address these criticisms using the concepts of institution and institutionalisation (Scott, 1987; Lawrence and Suddaby, 2006). Building upon its original premise of isomorphism, institutional theory has developed further "...emphasis in institutional studies on understanding the role of actors in the effecting, transforming and maintaining institutions and fields" (Lawrence and Suddaby, 2006; 215). Just as social studies of information technology had to 'recapture' the social aspects of technology, institutional work emphasises "the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions" (ibid; 215). Within institutional work, the study of institutional entrepreneurship (Garud, Jain et al., 2002; Dorado, 2005; Munir and Phillips, 2005; Greenwood and Suddaby, 2006; Perkmann and Spicer, 2007; 2008), power and the use of strategic resources as institutionalising forces (Clemens, 1993; Holm, 1995; Greenwood, Suddaby et al., 2002; Maguire, Hardy et al.,

2004; Levy and Scully, 2007) and deinstitutionalising forces (Oliver, 1992; Maguire, 2003; Maguire and Hardy, 2009), and institutional maintenance (Kondra and Hinings, 1998) have each extended the role of actors in the structuring of institutions.

Technology and Institutions:

Institutional theories have yet to include technology, particularly ICT, as a mainstay of institutions and the process of institutionalization. There are pervasive arguments that information technology is implicated in the constitution of institutions. This is not only through its ubiquitous application across almost every aspect of modern life (Castells, 1996; Avgerou, 2000; Castells, 2000; Kallinikos, 2005; Kallinikos, 2006b), but through processes involving the inscription of values (Spicer, 2005) and legitimating discourse (Maguire, 2003) involved in their use.

Although technology has been broadly absent in many of the studies subsumed under the banner of institutional theory, some authors have attempted institutional studies involving technology. Here, the contributions by Hargadon and Douglas (2001) and Munir and Phillips (2005) are discussed as two general ways which institutional theory examines technology. Both approaches extend accounts of technology adoption beyond functional explanations.

Hargadon and Douglas (2001) demonstrate, using the example of Thomas Edison's system of electric lighting *that the design of an innovation will shape its acceptance and ultimate impact* (476). Furthermore, it is through the design of technology that allows an entrepreneur to gain acceptance through exploiting established institutions whilst retaining the flexibility to displace them. Their argument holds that entrepreneurs operate and mediate between the social forces for continuity and change. On the one hand innovations must rely upon established institutions to make sense to potential users, on the other the technology must be able to overtake or reform these established patterns. Hargadon and Douglas provide compelling evidence that entrepreneurs face the double hurdles of continuity and change which their innovations must cross. Their study traces how Thomas Edison's innovative incandescent lighting, supported by centralised generation and distribution of electricity, found success through aligning the technology with the dominant institutions of gas utilities. Institutions are resistant to change through two mechanisms; 1) by setting accepted behavioural patterns through regulation, monitoring and sanctions, and 2) by providing a template for "the very understandings, interests and actions that constitute behaviour" (Hargadon and Douglas, 2001; 485). Through these aligning activities (mimicking and resembling gas infrastructure, becoming a legally

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legitimate utility firm and metering use by customers), Edison was able to begin to overcome the dominant institution of gas utilities.

In the second paper Munir and Phillips (2005) examine how institutional entrepreneurs transformed the institutional field of photography. Specifically the meanings carried, or inscribed, in technology are involved in the development of an institutional field. The authors describe the strategic actions of Kodak in transforming photography from a professional and technical activity into a popular activity. It is argued that the combination of roll-film camera technology (dismissed as limited in use for professionals and amateur enthusiasts) with the *strategic embodiment of the firms interests* brought about the popularisation of social photography. The technology enabled 'casual' photographers to capture memories – 'Kodak moments' – without the extensive knowledge (and equipment) required to process and develop photographic exposures. Kodak produced innovative texts which were aligned with and enhanced social institutions such as vacations, weddings and birthdays. The firm also began to influence the user groups who would use their technology by redefining social roles. Broadly this included laypersons, but became more targeted to frame women and children as regular users of the roll-film camera. By reducing the complexity of photography to the push of a button (developing and printing would be performed by the firm), the role of photographer was able to be fulfilled by a greater audience, particularly women. These new institutional roles

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were perpetuated by echoing the social change of the era and with the iconic 'Kodak girl', the roll-film camera was a symbol of modernity and feminine independence. These new roles were of course in stark contrast to that of the traditional, male role as professional photographer. Accompanying the changes in technology and roles were two further strategies of creating new institutions and modifying existing institutions at the field level. The creation of new institutions involved Kodak creating discourses espousing the 'fun' and spontaneous qualities of photography. The firm also engaged in the entrepreneurial modification of the existing institution of photography by emphasizing convenience over the quality (image resolution) of professional photography. From the initial position as a fun and convenient means to create 'snapshots', Kodak again sought to modify the institutional field by producing texts that highlight memories or moments rather than novelty and fun. This helped to entrench the roll-film camera as an essential technology for memorizing precious moments. Through these four strategies of embedding technology in existing practices, creating new roles, creating and modifying existing institutions, Kodak was able to act as an institutional entrepreneur in shaping photography.

These two studies indicate some important tenets for the study of technological adoption. The first overarching observation is that technological adoption is institutionally mediated. In neither case was Edison or Kodak able to simply apply their technologies to a perceived

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problem in a deterministic way. Secondly, the taken-for-granted patterns of behaving, acting and sense-making qualities of institutions give opportunity to entrepreneurial agents who can exploit possibilities through new technology and by attempting to re-define the nature of institutions to their benefit. Thirdly, it highlights the non-rational nature of technological adoption. Adopted technologies are not intrinsically the best possible technical solution, rather, they are subject to socially constructed legitimating and rationalizing forces that operate within and between institutional fields. These studies underline crucial mechanisms in technological adoption.

There is, however, a distinct difference in levels of analysis between institutional research and research that attends to change at the level of organization (Lawrence and Suddaby, 2006; Scott, 2008). Equally, the performance of institutional work and its effects do not conveniently reside in distinct levels of analysis. The challenge of 'action guided by institutions' and 'action aimed at manipulating institutions' (Holm, 1995) captures the contrast in levels of analysis used across institutional research. I should reiterate here that this research concerns organizational continuity and change following technological adoption and therefore much of the analysis is at the level of the organization. In the same breath, organizations are both constituent and constitutive of institutional forms. A nested systems perspective of institutions calls on the researcher to reappraise the substance of key analytical components.

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Such an approach draws linkages between what would conventionally be 'closed' analytical entities, as Lawrence and Suddaby (2006; 248) explain:

"From an institutional perspective, levels are not 'aggregate' phenomena. Fields are no more a collection of organizations as organizations are a collection of individuals; rather, higher-order social collectives are accomplishments of their members, socially constructed and discursively maintained."

Therefore, although this study concerns the impact of technological adoption on organizations, it recognises the contribution and complement of institutional theory to research of this nature. The sociotechnical framework (Avgerou and McGrath, 2007) draws on the notion of establishing legitimate courses of action in response to technological change. It is recognised that there are competing rationalities and logics within the organization, each competing for legitimacy. Legitimacy for rational courses of action and sense-making involves institutions across micro, meso and macro levels of analysis. In practical terms, legitimating forces can be traced across a range of group, organizational, field, societal and international levels. A sociotechnical constituencies approach bridges these levels by mapping a series of nested systems; such a 'nested' systems approach helps to

articulate institutional forces involved in each case study presented in this research.

Institutionalization and Technological Adoption:

From the review of the literature, a complement between structuralist theories of technology and institutional theory arguably exists. Crucially, institutional theories provide a crucial link between action and structure (Barley and Tolbert, 1997; 96-7):

“...[I]nstitutions are to social action as grammars are to speech. Speech allows for an infinite variety of expressions, yet to be comprehensible, every expression must conform to an underlying set of tacitly understood rules that specify relations between lexemes. Similarly, social actions may vary in their particulars, but to be interpretable, their contours must conform to taken-for-granted assumptions about the activities and interactions appropriate for different classes of actors.”

In this research it is argued that technological adoption involves processes of both legitimacy and institutionalisation (Avgerou, 2000):

“An innovation is first adopted and diffused partly for its technical merits (Zucker, 1983), and partly under the influence of powerful

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actors (Granovetter and Maguire, 1998). Subsequently, through institutionalization, an innovation is adopted and maintained because of its acquired legitimacy, irrespective of whether or not it produces its promised technical value, and without having to rely continuously on powerful personalities.”

For institutionalization to occur, the development and social embeddedness of rationalized beliefs and standardized schemes of action form the platform for stability or change. The work of Hasselbladh and Kallinikos (2000) is drawn upon to characterise the process of institutionalization as it unfolds through interrelated stages and involving social agents.

The conception and constitution of delimited domains of action (e.g. health), the development and organizational embeddedness of performance principles and rules and devices of control which combined enable organizational action to be conceived and carried out. Therefore there needs to be the means of stabilising the constituents of organization such as performance principles, rules and devices of control. This is achieved via socio-cognitive means that constitute *distinctive forms of actorhood*.

It is arguable that the neo-institutionalist perspective overlooks (or underplays) the three processes discussed above. Essentially, the

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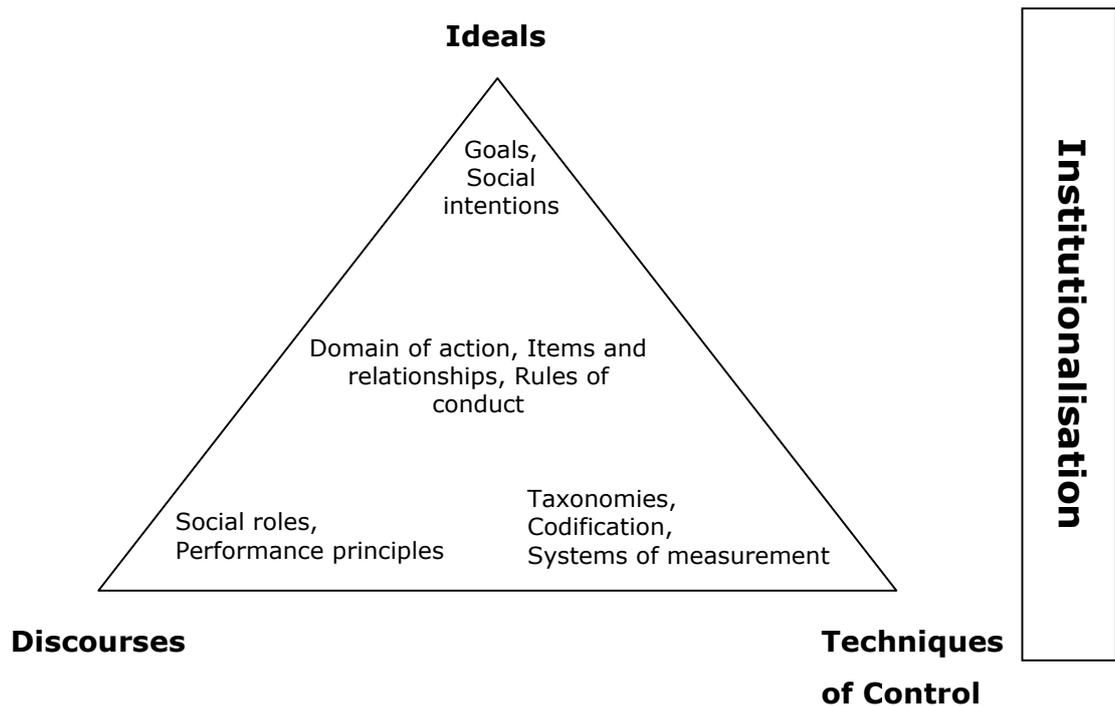
processes of formal and social iterations that constitute the build-up and maintenance of institutions in organizations are absent. The typical program of institutional literature on organizations is aligned to the study of the diffusion of aggregate trends and patterns in organizational structure or professional roles.

Hasselbladh and Kallinikos (2000) identify a gap in the existing literature which this research seeks to address. The authors note the tendency to identify similarities or differences in the broad properties of organizations related to their institutional context and not the dynamics and mechanisms that form and constitute these institutions at any given time. To draw a parallel with what was seen earlier in the call for information systems research to look inside the properties of technology (Kling and Scaachi, 1982; Orlikowski, 1992; Kimble and McLoughlin, 1995; Orlikowski, 2000; Orlikowski and Barley, 2001; Orlikowski and Iacono, 2001; McGrath, 2005), the work of Hasselbladh and Kallinikos (ibid.) examines the *constitution of institutions*.

The centrality of discourses and techniques of control are seen by the authors as being cognitive and social products. Institutions then are the result of agents, *institutional entrepreneurs* (Perkmann and Spicer, 2008) and their attempts to affect change upon their world. A system of *conceptual items, methods and relations as well as various practices, social roles and codified rules of conduct are enacted with the purpose of*

creating a particular world – the process of institutionalization. These factors are captured in figure 2.1 below:

Figure 2.1 The Process of Institutionalization



(Adapted from: Hasselbladh and Kallinikos, 2000; 707)

Information and communication technology can be implicated across many of the levels seen in the figure above. Through the processes of functional simplification and closure (Luhmann, 1993), software reproduces the institutionalized rationalities of its designers (Kallinikos, 2005). At the same time as helping stabilise institutional forms, through the process of institutionalization, ICTs become embedded in

organizations, regardless of their innate capabilities (Avgerou, 2000; 236):

“Institutionalization is the process through which a social order or pattern becomes accepted as a social “fact”. An innovation is first adopted and diffused partly for its technical merits (Zucker, 1983), and partly under the influence of powerful actors (Granovetter and McGuire, 1998). Subsequently, through institutionalization, an innovation is adopted and maintained because of its acquired legitimacy, irrespective of whether or not it produces its promised technical value, and without having to rely continuously on powerful personalities.”

This illustrates how institutional analysis complements accounts of technical adoption and underlines the complement between ‘micro’ studies of organizations and ‘macro’ conditions of the organizational field. In isolation both empirical projects embrace ‘structural’ dynamics, however in each instance there is a tendency to overlook the other. For example, as the following section identifies in the work of Hayes (2008), studies at the organizational level often mobilize institutional discourses predominantly as exogenous forces (Barley and Tolbert, 1997) acting as an environmental variable on the conditions of the case. In ‘macro’ institutional accounts of organizational change, technology is frequently

treated as a black box (Orlikowski and Iacono, 2001) or is absent (Orlikowski and Barley, 2001).

One of the few empirical examples that attempts to combine organization-level studies of technological change and which implicates technology in-use from an institutional perspective is Hayes (2008; 243):

“Conceptually we draw on social constructivist literature on institutional theory and argue that in addition to looking to the broad socio-economic context, institutional change needs to be understood by attending to the fine-grained practices that are undertaken by staff in organizations.”

Hayes examines the destabilisation of established patterns of control in a firm providing high-technology optronics products to a range of customers. The implementation of an in-house work flow system (SIMS2) saw a shift in control over the design and tendering process from sales personnel to engineers within the firm. The study elicits a series of social constructions by different organizational groups of the SIMS2 system. Through its design and adoption the system occasioned a change in the tendering process for optronics products which subjugated sales staff to a preordained set of calculations for selling their products to clients. Consequentially, sales personnel were stripped of their autonomy as they had to conform to the numerical processes dictated to them by SIMS2. The SIMS2 technology produced effects

similar to Avgerou's (2000) notion of organizational deinstitutionalisation and IT institutionalisation; the 'scientific' approach of completing bids for customers enforced by SIMS2 deinstitutionalised the former salesperson-led way of working. The system also had the effect of empowering 'engineering' groups over sales staff in cross-functional meetings. The IT system gained its own institutional status as the system for managing engineering projects in the firm.

Hayes' research presents a persuasive argument for "interpretive" case studies (Walsham, 1995) as it examines the fine-grained practices in relation to their broader institutional setting. This corresponds to the gap in understanding identified by Hasselbladh and Kallinikos (2000) that the broad field of neo-institutional research neglects the focus upon the very practices which create and maintain the patterns they observe. This gap indicates that both information systems research and institutional theory fail to go beyond their typical levels of analysis of cases and sectors respectively. Hayes' work, while signalling and illustrating this gap eloquently, is nevertheless arguably crude and relatively unspecific in mapping relations between the case level and its institutional context. The broad socio-economic accounts of Fligstein (1990; 2001) of the end of the cold war provide the "broad institutional fields of control" (Hayes, 2008; 263) for the case organization. This bypasses a range of institutional factors that lie beyond reduced military spending in a post-cold war era. These include, for example, changes in

Ministry of Defence procurement policies, the impact of government and military supplier scandals such-as Matrix Churchill (BBC News, 2004b), not to mention the numerous and ongoing theatres of engagement involving military and supporting institutions since the cold war. In an apparently rich and complex institutional setting, Hayes does little to demonstrate the influence of broader institutional forces beyond the decline in aggregate spending on the military. To a great degree the 'institutional fields of control' (Hayes, 2008) are treated as exogenous contingencies (Barley and Tolbert, 1997) to the events that unfold with the case study organization.

This frames two of the central concerns of this thesis. First, if technology is inseparable from its context, a framework that accommodates the complex and power-laden sociotechnical interactions in relation to its context is essential. Second, if broad institutional patterns shape and are shaped by the conditions of rationality and legitimacy, then a technique for incorporating this into the research is also necessary. What this perhaps indicates is the difficulty in successfully uniting theoretically and analytically different fields of research (e.g. information systems, organization studies and institutional research). However, theorists have made progress in capturing these fine-grained sociotechnical practices of technology in use. Others (e.g. Molina, 1990; Molina, 1993; Collinson and Molina, 1995; Molina, 1999) have proposed a sociotechnical constituencies technique for mapping broad institutional

effects on technological adoption in organizations. These approaches form both the theoretical foundation and justification for the current research. These are examined in the following sections.

Power, Rationality, and the Art of Living through Sociotechnical Change – A Framework for Understanding Sociotechnical Change.

The work of Avgerou and McGrath (2007) challenges the tendency in IS innovation research to locate perspectives in 'technically rational' (i.e. the traditional domain of information systems research) or in 'socially constructed' latitudes where the influence of rationality is both unquestioned and implicit or absent as the tenets of socio-political power relations that underlie sociotechnical change (Kimble and McLoughlin, 1995). This framework is presented in some detail as it responds to some of the gaps implied throughout the literature so far.

For the authors, IS innovation is "the development, deployment and use of ICTs and [the] concomitant organizational change." The dependence on either technically rational or socially constructed frameworks for analysis leaves a gap in IS research which can be addressed using a sociotechnical approach (2007; 296):

“This leaves a gap in IS research. On the one hand, we have the dominant tradition of the field, which continues to aspire to a view of IS innovation driven by the technical/rational knowledge of professionals. On the other hand, we have socio-political approaches that avoid commenting on the significance, and indeed the role, such technical/rational knowledge plays in their broader theoretical accounts.”

From this position the authors contend that research in the social-shaping mould should develop more extensive understanding of the role of technical rationality in IS innovation, as well as existential concerns and issues of power relations.

Avgerou and McGrath (ibid) argue against the dominant position that IS innovation is driven by rational capabilities of IS and user professionals to derive unambiguously the benefits and risks of IS innovation. From this 'rational' position, courses of action are developed towards specific goals. The authors typify this as part of functionalist or normative research paradigms. The paper also criticises the apolitical treatment of IS innovation and technical rationality: Instead of gauging the effects of IS innovation against social processes, the authors introduce a socio-political lens for their study of a Greek social security organization. It is argued that *the concerns of software construction, administrative control and economic gain*, IS innovation, is intertwined with technical

rationality. In other words the process of IS innovation is inextricably embedded in a complex network of power relations – its socio-political context.

Avgerou and McGrath (2007) develop a context-specific notion of rationality in IS innovation, through which interested parties judge the value of an innovation for their own lives and consequently support or subvert its course. Their Foucauldian perspective forms an analysis along five interrelated features:

- ✱ Technical rationality in IS innovation
- ✱ Regimes of Truth
- ✱ Care of the self
- ✱ Problematization
- ✱ Aesthetics of Existence.

Technical Rationality

Throughout the earlier sections of this thesis the debates about the nature, that is, the ontology of technology were discussed. A sociotechnical perspective was adopted which rejects the ambitions of technological determinism on the one hand, or social constructivism on the other. It was argued that neither of these positions captures adequately the process of technological change (Kimble and McLoughlin, 1995). However, technical reasons must not be brushed aside. A

technical/rational objective does not necessarily translate into rational-efficient gains and hence the consequences of technological adoption cannot be reduced to deterministic means-ends relations. In the generation of technical/rational objectives, the legitimacy of a strategy for change is institutionally mediated by regimes of truth. The legitimacy for technical change may contradict the rational-efficient needs of the organization through the conformation to institutionalized norms and consequently *"...institutional rules may have effects on organizational structures and their implementation in actual technical work which are very different from the effects generated by the networks of social behaviour and relationships which compose and surround a given organization"* (Meyer and Rowan, 1977; 341). Consequently, the technical rationalities that accompany the material elements of technology need to be viewed as part of the sociotechnical constituency. The interplay between competing and complementary rationalities are key components of institutional stability or change. Technical rationality in this research is considered to lie between the technological artefact and the organization; it is a conduit that links the mutually constitutive realms of social and technical. For example, the situated technical rationality in one organization will be enabled and constrained by the material capabilities of technology and will simultaneously have impact on the domains of adoption and patterns of use of technology. Here a politicized account of technical rationality is proposed, unlike that mobilised in technical determinist accounts of technological change

(Avgerou and McGrath, 2007). The technical rationalities involved in the case studies in this research do not harbour to a deterministic analysis, rather it is a rationale mobilised in the formation of strategies for technological and organizational change. Wajcman captures *why* technical rationalities are significant in the study of technological innovation (2002; 351):

“...[W]e need to ask why a technical reason was found to be compelling, when it could have been challenged, and what counts as technical superiority in specific circumstances.”

This underlies the importance of technical rationality in explaining organizational responses to IS innovation. It also redraws the relationship between the social and the technical. Neither technical reason nor the socially constructed realities of individuals are given primacy. Instead, under this framework, the role of technical rationality is appraised through the reflexive practice of care of the self and problematization. Thus, technology is not made infinitely malleable by the practice of social construction, yet nor does technology determine specific outcomes through its use Avgerou and McGrath argue that technical rationality concerns “...the objectives and action that constitute a strategy in the formation of truth about organizational change” (2007; 307).

Regimes of Truth

Avgerou and McGrath draw on the Foucauldian concept of 'regimes of truth'. These are *the power-constituted legitimations of the knowledge that supports a society's institutions*. Regimes of truth are embedded in power relations and evolve through in discourse among constituents of a sociotechnical constituency. Where there are dominant regimes of truth the authors also point to the presence of competing "knowledges", or in Foucault's terminology; "subjugated knowledge". The strategies of the dominant regime of truth will seek to sustain its dominance by *subjugating* these competing knowledges, dismissing them as "inadequate or naïve". The combination of discourses in a sociotechnical constituency produces knowledge and power and, in turn, shapes the regimes of truth in operation at that time. Because regimes of truth are embedded in power relations, the dominance of a regime of truth can be sustained or destabilized by changes in broader discourses in a sociotechnical system. For example, the concern and awareness of climate change and global warming has empowered a regime of truth that legitimates carbon neutral or carbon minimizing activities among people and organizations. Avgerou and McGrath use the example of IS innovation being part of a broader political vision of modernizing government agencies, in their case study a Greek Social Security organization. In their study competing regimes of truth are seen between the established bureaucratic order and the program of

modernization. Despite the bureaucratic regime becoming subjugated to the program of modernization, the process of IS innovation was regularly stifled by the rationality of the bureaucratic regime.

Regimes of truth should not be considered static entities. Just as power relations shift over time, the dominance of any regime of truth may also become destabilised. This can be brought about by changes in broader social discourses which can lead to discontinuities in the empowerment of a dominant regime. Secondly the *continuous care of self* (see below) of the constituent population of a sociotechnical contingency; people reflect and act upon their acceptance or rejection of regimes of truth. This has the effect of empowering or disempowering regimes of truth.

Care of the Self

So far the objectives of action (technical rationality) and processes of legitimation (regimes of truth) have been outlined as being embedded in power relations. Care of the self recognises the agency that human actors have within their socio-political context and as members of organizations. Broadly, the courses of action by individuals will produce institutionally sustaining, disrupting or modifying effects. These actions constitute the patterns of technical rationality and legitimate regimes of truth through practice. In their analysis, Avgerou and McGrath remark that individuals "*brought their own experiences and life conditions to*

bear on the modernisation strategies” (308). Through their self-aligned consideration of the life styles they desired, the individuals involved with the modernisation initiative shaped the modernisation discourse and its strategies. For example, individuals act (including taking no action) according to the life style they are trying to achieve as an employees, as politically active people, as family members and as citizens more generally. Care of the self begins to frame part of the process of social construction at the level of the individual, not as a free-reign of whimsical interpretation, but that of self-reflexive agency. Care of the self recognises that individuals often align themselves with particular regimes of truth and correspond to the measures delimited by a technical rationality without coercion. The process of the *care of self* is mediated by individuals’ appraisal of what surrounds them in contrast to the life style they seek. In their work the authors emphasise Foucault’s connection of the care of self with the activity of problematization.

Problematization

When individuals undertake care of the self, they *adopt various self-practices* to assess their views and actions in relation to their desired life style. Problematization is a critical and reflexive questioning of aspects of an individual’s socio-political context. It becomes particularly prominent where change affects the perceived relationship between *self* (i.e. desired life style state) and aspects of regimes of truth and technical

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rationalities. Problematization recognises individuals as conscious agents who are part of a broader system of values, technologies and power relations. This has been represented as a mechanism for individuals to appraise the balance between self-loss and self-preservation (Huijer, 1999; 74):

“Finding an equilibrium between self-loss and self preservation has turned out to be a complicated game with idealization, memory, fantasy , transience, sadness, self-control, intimacy and distance all playing a role. In this animated entirety – with the subject constantly at stake – it seeks a way to create itself that transcends the automatism of everyday reality.”

Avgerou and McGrath (2007) show how Greek civil servants engaged in problematization as their lives were affected by changes in the ruling political party over the course of a social security modernisation programme involving a large scale information system. The modernisation programme began as an exciting employment position, offering the perks and status given to civil servants in Greece. A change in the elected government led to the questioning and destabilising of the modernisation programme as it was first envisaged. The civil servants involved had reservations about the impact of the amended course of modernisation on their career-paths as civil servants. They aligned themselves with a localised, slow pace of change throughout the regional

organizational branches and distanced themselves from the now consultant-led master plan for the computerisation of the government organization. The support they subsequently provided became detached from any organizational change initiatives led by central government. The changes in the broader political arena brought an element of uncertainty to the privileged status of the Greek civil servants. The course of the IS innovation project was altered by the perceived implications for the working life of those working on the project.

Aesthetics of Existence

The final dimension in this framework seeks to situate problematization and care of the self as part of individual rationalities. The aesthetics of existence is a combination of the desired life style (as in the care of self) and the efforts of individuals to achieve this state. Individuals are pragmatic in their construction of their aesthetics of existence as they reflexively engage with their experiences and are *limited by their capacity to act within their particular social circumstances* (ibid.; 300). The authors note that the aesthetics of existence should not be used to judge or appraise the actions of individuals, the social construction by individuals of their desired and current lives does not translate into 'right' or 'wrong' judgements. Indeed, the behaviour of the employees involved in the modernisation of a Greek social security organization makes limited sense if judged solely against the technical rationality of

modernisation. However, the aesthetics of existence point to a preference for maintaining traditional civil servant roles even where this meant slowing or obstructing the progress of the modernising IS innovation.

This framework therefore responds to the call for 'fine-grained' analysis of practice of the processes associated with technological change in organizations. Additionally, the framework can be enhanced by introducing sociotechnical constituencies as a supporting mapping technique. By building on these two approaches it is possible to conduct a fine-grained analysis of change at the level of the firm while also observing the socio-cultural relations between more peripheral institutions. Avgerou and McGrath's framework captures the interplay of competing rationalities and power dynamics in an organization. The authors stress the importance of the intertwined nature of rationality, power dynamics and social context. Throughout their paper they refer to the *socio-political context* and examine the interplay between what is happening in their case organization and the wider political environment. For example, trade-union activity affected broader governmental action and the change in elected government affected the course of change in the IS innovation project. This research develops this idea of looking outside of the immediate case organization and to link case-level insights to the dynamics of the broader sociotechnical context. Here this is performed by using sociotechnical constituencies (STC) (Molina, 1990;

Molina, 1993; 1999) to locate the case organizations in their institutional context. The STC framework recognises that intra- and inter-organizational dynamics as social and technical configurations as well as mutually constitutive in their formation and evolution. This provides a more sophisticated exploration of 'context' than, for example, contingency theory where the environment is a constant force for organizations to reconfigure themselves towards.

Connecting Conceptual Elements of the Foucauldian Framework with the Processes of Institutionalisation

Earlier in the literature review, a gap in institutional accounts of organizational change was identified. The tendency to detach or bypass the processes that form, sustain or destabilize institutions from the consequences and manifestations of institutions (e.g. structural isomorphism) gives an incomplete picture, or, as Hayes (2008; 244) observes: "...the neo-institutionalist preoccupation with seeking to identify broad institutional characteristics and structures to explain the similarity of organizational forms rather than understanding their construction through a fine-grained analysis of their members' situated practices".

The concern of this research is not to identify broad patterns of change among or between organizations. Rather, it is recognized that the

relationship between technology and organization is institutionally mediated. Broadly, organizational members' situated practices are examined in their institutional setting to produce a sociotechnical analysis of change.

Examining the elements of institutionalization from Hasselbladh and Kallinikos (2000), the role of technical rationality can be located as part of the institutionalization process. Technical rationality is a key contributor in (re)producing institutional forms through its role in the *conception and constitution of delimited domains of action* for example, running a business and the measurement of profitability. Technical rationality is implicated in defining the activity of running a business and in delineating what the activities of an institution are. Second, the *development and organizational embeddedness of performance principles, rules and devices of control*.

The complements between Avgerou and McGrath's (2007) framework of sociotechnical change and institutional perspectives on organization and technology provide the theoretical framework for this research.

Sociotechnical Constituencies

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This chapter has identified a variety of literature on technology, specifically ICT, and organizations. It has revealed a broad array of perspectives; however it was evident that no overriding consensus on the conceptual treatment of *organizations, technology and organizations and technology* has developed. Several streams of research were identified and it was argued that a fine-grained sociotechnical analysis of organizational change responded to a gap in understanding relationships between technology and organizations (Orlikowski, 1992; Kimble and McLoughlin, 1995). For this reason, a sociotechnical framework of change in organizations (Avgerou and McGrath, 2007) will be combined with a sociotechnical constituencies (Molina, 1990; Molina, 1993; Collinson and Molina, 1995; Molina, 1999) approach for mapping intra- and inter-connected influences implicated in the adoption of new technology. Sociotechnical constituencies shares common elements with 'organizational fields' in so much as *the emergence of institutionalized structures of interorganizational domination and coalition, an increased information load and the development of a sense of common enterprise* between constituents will emerge in its stabilisation (DiMaggio and Powell, 1983; 148). However, the particular brand of institutional theory developed by DiMaggio and Powell was criticised earlier for its "endogenous" treatment of institutions (Barley and Tolbert, 1997). The theoretical approach proposed here combines micro and macro interrogation of technology, organization and its context brought together as a nested system of layers – a sociotechnical constituency.

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Sociotechnical constituencies bring together social and technical constituents in the formation of stabilised configurations that combine institutional and individual agency (Barley and Tolbert, 1997) in technological adoption (Molina, 1999; 8):

“The constituencies programme starts from the realization that the processes of innovation and technology development always entail the build-up of sociotechnical constituencies. STCs are briefly defined as dynamic ensembles of technical constituents (e.g. machines, instruments) and social constituents (e.g. institutions, interest groups) which interact and shape each other in the course of the creation, production and diffusion of specific technologies. This definition grants an intrinsic role to the technical in the emergence and evolution of specific constituencies.”

The empirical application of sociotechnical constituencies in research has typically been concerned with mapping the configurations of competing factors that are involved in forming stabilised regimes; e.g. Intel’s market dominance with the x86 microprocessor family (Molina, 1999). They have also been used to examine the organizational arrangement of expertise in the design of multimedia products (Collinson and Molina, 1995). These pieces of research demonstrate the application sociotechnical constituencies in both market and organizational levels of analysis.

Sociotechnical constituencies represent a technique for mapping the patterns of social and technical factors involved in the dynamics of change across a range of levels of analysis. It explicitly links intra- and inter-organizational factors in the process of "...the creation, production and diffusion (including implementation) of specific technologies" (Molina, 1990; Collinson and Molina, 1995; 11). This approach has been used to examine competing computer architectures (Molina, 1990), the competition between different firms in the production of microprocessors for the emerging computing constituency (Molina, 1993) and the processes of 'sociotechnical alignment' between organizational configurations and emerging hi-tech products (Collinson and Molina, 1995). These research projects have sought to examine the emergence and adoptions of particular innovations for example, the dominance of CISC, 80 x 86 microprocessors in general computing over competing RISC and CRISP architecture and, by implication, alternative microprocessor designs (Molina, 1993). The role of technology, Intel's x86 microprocessor family and the strategic response of firms (e.g. Intel, AMD, Cyrix) in the emergence and sustained position of a dominant producer in the ongoing process of sociotechnical alignment (Molina, 1999). The value of sociotechnical constituencies for this research is more attuned to that of Collinson and Molina's (1995) of 'sociotechnical alignment' because it explicitly links the interlinking 'social' and 'technological' facets of innovation across what would normally be

considered different levels of analysis. This endeavour does not set-out to conflate these different levels; the empirical study is at the level of the organization across two case study organizations. Sociotechnical constituencies illustrates that the instances of IS innovation studied in the case organizations occur as part of their constituencies rather than discreet episodes of change in and of themselves.

Using sociotechnical constituencies (Molina, 1990; Molina, 1993; 1999) to map the complementary and competing parties, the domain of technological change is removed from the sole charge of professional knowledge (Avgerou, 2000). Instead, it is proposed that social shaping of technology (Williams and Edge, 1996) and the construction of technical rationality (Avgerou and McGrath, 2007) interacts and occurs within a range of institutional interactions to produce a sociotechnical constituency.

The institutional logic underlying the notion of constituencies, the process of mapping the technologies in the case studies helps the observer to appreciate the history, culture and politics that are interwoven with organizations and the creation, adaption, adoption and use of technologies; their institutional setting. An institutional understanding of technological change in organizations spans the traditional subject boundaries of organization studies and information technology research (Orlikowski and Barley, 2001).

Within their respective sociotechnical constituencies, each case study follows two separate instances where new technologies are introduced. In the literature review the work of Avgerou and McGrath was introduced as a framework for guiding the fine-grained analysis of practice (Hayes, 2008) in the case studies. The five categories from their framework help to structure the analysis of each case-study organization through their episodes of change. Specifically, this guides the fine-grained analysis involved in unpacking the *ongoing negotiations and conflicts between employees in institutions* (Townley, 2002; Hayes, 2008). This kind of close-up research responds to the gap identified earlier in the literature review chapter by focusing on *the very architecture that constitutes the build-up of rationalized patterns and relationships: Institutions* (Hasselbladh and Kallinikos, 2000).

The quotation below captures the essence of this thesis (Avgerou, 2000; 240):

“The interaction between IT development and organizational change involves the continuing institutionalization of IT intertwined with the deinstitutionalization of the dominant organizational form of modernity. These two processes have always been closely interdependent. The institutionalization of IT has been fostered partly within organizations, initially assisting the bureaucracy to increase its efficiency and strengthen its coordination and control

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mechanisms. While the main impetus for the invention and building of the first computers was the working out of computations required in sciences and supporting military and space program logistics, their pervasive diffusion owes a great deal to their use as data processors in large hierarchical organizations. Within a period of 30 years IT acquired the legitimacy of an "enabler" for almost anything organizational actors could think as an improvement in their context, and became one of the most significant factors justifying and enacting organizational change."

The prevalence of (information) technology in assisting organizational work to carry out their operations is remarkable. The interconnected networks that supply and process the informational needs of organizations is supported by a plethora of technologies; computers, networks and the development of standards that create their interoperability. To dissect the above quotation, technology and organizations are part of broader institutional patterns; their properties, characteristics and actions occur within a series of rationalities that govern and supply meaning to them. The ongoing development and use of technology is guided both by its own institutional rationalities and those of work organizations; for example, information technology's status as an "enabler". The relationship between technology *justifying*

and enacting organizational change is well represented empirically, however the variation in theoretical perspectives employed is wide.

From the body of empirical studies of organizational change and technology it is apparent that with technological change comes organizational change (Doherty and King, 2005):

“[T]he implementation of information technology within organizations almost invariably results in a wide variety of, often very significant, impacts upon the design of the business, its economic performance and the working conditions of members of staff (Markus and Robey, 1983; Clegg, Axtell et al., 1997; Doherty and King, 1998; Robey and Boudreau, 1999); technical change is the catalyst for organizational change.”

As shown in Barley’s (1986) empirical study of the implementation of CT Scanners in two different hospitals, the implementation of new technology gives rise to *occasions for structuring*: The introduction of new technology provides a basis for organizational change and additionally, from the introduction of technology, unintended or unanticipated change can result (Doherty and King, 2005). Uncovering the mechanisms and characteristics of organizational change in relation to technology is contested theoretical terrain.

Developing the Framework for Analysis

The opening sections of this chapter began by exploring the domains of the social and the technical. This section will revisit these themes and will develop the theoretical lens through which the current research is viewed.

It must be stressed that the current research is not looking at the emergence or diffusion of broad institutional patterns, such as isomorphic shifts across sectors as earlier iterations of institutional research have addressed previously (e.g. DiMaggio and Powell, 1983). The current research argues that a combination of institutional theory and information systems research can be employed to better understand the relationship between organizations and technology. This theoretical stance is based upon the premise that social and cultural activities of organization occur within a system of rationalities - institutional context. Following Barley and Tolbert (1997) the current research argues that the broad institutional context of organization should not be reified as an exogenous factor brought to bear on the case organization. The dualistic relationship between institutional context and organizational change implies interaction between institutional levels. It is this interaction that constitutes how technologies develop and function in use. Therefore, to better understand technological change in organizations it is necessary to look beyond the local context (Davidson, 2006) in the analysis of locally

occurring phenomena. Sociotechnical Constituencies provides a means for mapping inter- and intra-organizational constituents associated with a technology which shapes the domain of use by guiding empirical work towards examining links between action and institution and it is this notion of sociotechnical constituencies that will underpin this thesis.

Technological Innovation and Accounts of Change

Technological adoption is often a component of strategic change. Within organizations new or novel technologies are implemented to achieve a desired future state, this might include cost savings, efficiency gains, lowered inventory, improved customer service, a new corporate way of operating and managing information or any number of technologically enabled goals. However, the literature reveals that the adoption of technology can produce unintended consequences. This section briefly outlines some of the characteristics of change. In particular it outlines how change is anchored in enduring social institutions.

Golding (2000; 181) argues that the central tenets of society, organization and technologies are maintained throughout wide reaching technological changes and hence the paradigmatic leaps to a utopian future from advances in technology are unlikely to destabilise central institutions for some time:

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“It is easy to construct a visionary epic from the impact of new ICTs, peopled by cyborgs and digitised into a utopian landscape of limitless expressive leisure, or alternatively a bleak wasteland of panoptic centralization and anomic screen-bound cultural dupes. Prediction is the snare of the social scientist, and a folly to be resisted. But the key lesson of our experience to date of the startling and rapid innovations in communications technologies is the enduring centrality of the key analytical elements of modernity, explored here as identity, inequality, power and change. The sociology of the future is ineluctably the sociology of the present.”

For example, the combinations of technologies that provide “the internet” have created a world-changing innovation. While the degree of change has been massive, some predictions now seem farfetched or ridiculous; bureaucracy as a mode of organizing work and the daily commute into the office have not been supplanted by flat, distributed hierarchies of cyberworkers. As Golding argues, the pervasive institutions (e.g. government, healthcare, education, commerce) that are the fabric of today’s society are mostly maintained or modified rather than consumed and replaced by radically new ways of living. Concomitantly, the influence of institutions within organizations reflects this (Oliver, 1992; 563):

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“...the force of habit, history and tradition within the organization creates value congruence among organizational members around the propriety of re-enacted activities, causing these activities to acquire a rule-like status that renders them highly resistant to change”

Just as institutions provide a relatively stable back-drop to societal and organizational order, institutional order permeates the nature of technological development. As Kallinikos argues, technology is a socially constructed entity and through its institutional and social embeddedness is bounded by history (2004; 141):

“Technology is certainly socially constructed (what else could it really be?). However, the historic conditions under which particular technologies emerge and develop, and the forms by which they have become institutionally and socially embedded, often coalesce in ways that can make technology a recalcitrant ally. Human inventions solidify over time, as layers of technical, organizational and social developments get superimposed one upon another to create complex systems that impose their ways of operating.”

Change therefore cannot be viewed as taking part in a vacuum. The contextually situated conditions of change are of as much importance in

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understanding change processes as the results of change itself. This reinforces the rejection of technological determinism, but also signals the need for a range of lenses through which to examine sociotechnical change.

These 'meta' conditions are the broad facets of change of which organizations and technologies are constituent parts. This section has suggested that a combination of sociotechnical and (macro) institutional factors is involved in shaping patterns of technological adoption giving rise to organizational continuity and change. Suddaby and Greenwood (2005; 36-7) make two observations that capture the conditions of change:

“New organizational forms do not routinely emerge to fill latent resource opportunities. They have to acquire legitimacy (Aldrich and Fiol, 1994). Second, the criterion for legitimacy is encoded within institutional logics. Therefore, legitimating an organizational form that does not fit a prevailing logic involves modifying or displacing that logic in order to establish new legitimacy criteria.”

Suddaby and Greenwood (2005) argue that rhetoric is a primary technique in establishing new legitimacy criteria in institutional change. This contrasts with the structural relationship between technology

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and organization outlined above. However, their observations regarding change in organizational forms provides a unifying framework for combining institutional, sociotechnical and sociotechnical constituencies approaches as nested systems of analysis. First, they observe that organizations and their survival depend upon their legitimacy, rather than pure economic or resource opportunities. Therefore, technological adoption at the organizational level will be institutionally mediated. This includes the possibility that technological adoption conforms to pressures of legitimacy rather than rational efficacy. Their second observation invokes the structural qualities of institutions whereby, “[t]hrough choice and action, individuals and organizations can deliberately modify, and even eliminate, institutions” (Barley and Tolbert, 1997; 94). The dynamic between institutions and ongoing and recursive social action (individuals, organizations) can produce change in institutional logics, or provide conditions where institutional entrepreneurs (e.g. Maguire, Hardy et al., 2004; Munir and Phillips, 2005; Perkmann and Spicer, 2008) can deliberately instigate changes that legitimate organizational forms (Suddaby and Greenwood, 2005). Institutional work (including institutional entrepreneurship) and exogenous shocks are both considered to affect change in institutions. The sociotechnical interaction at the organizational level studied in this research is institutionally mediated. Simultaneously, as institutions are formed, maintained, modified and destroyed by action, it is expected that patterns of technological adoption are constitutive of future institutional forms.

Although the authors present these observations as a prelude to rhetorical strategies for change in institutions, their initial observations have underlined important tenets for this research. The embeddedness in institutional arrangements of society, organization and technology means that analysts must seek to review these arrangements in relation to the individual cases they observe; hence the nested view developed using sociotechnical constituencies to guide the empirical component of this research.

Research Aims and Research Questions

To summarise the theoretical arguments so far:

- First, from the massive dependencies of contemporary organization on ICT and its global connectivity, it is argued that technology is a crucial and influential proponent of change in organizations.
- Secondly, this research adopts a theory of technology in organizations that takes a social shaping of technology perspective (e.g. Williams and Edge, 1996).
- Thirdly, technology is viewed as being recursively involved and situated within organizational and institutional power dynamics. Technology shapes and is shaped through its use as part of various applications to organizational life and thus this research

broadly rejects technologically deterministic accounts of organizational change.

- Finally, it is argued that technological adoption in organizations is a concomitant of change and often has unintended or unexpected implications.

The current research, therefore, proposes a multi-level examination of sociotechnical change. Two very broad research questions capture the essence of this research:

- 1. What are the roles of internal and broader institutional dynamics in shaping the patterns of technology adoption and organizational change?**
- 2. Are there significant differences in patterns of technological adoption between organizational contexts?**

The two case studies in this thesis are of markedly different types of organization from different sectors. In each case it is proposed that a contribution can be made by broadening the understanding of the processes of sociotechnical change in 1) an international airport and 2) a local government organization. From this theoretical background comes the challenge of distilling these ideas into a methodological framework and to translate these theoretical positions bringing together technology

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and organization into the empirical domain. The following methodology chapter presents a research design to capture the dynamics of sociotechnical change in the case organizations and their sociotechnical constituencies.

Chapter 3 Methodology and Research Design:

This chapter provides a roadmap of the journey which connects the essential stages of conducting qualitative research into sociotechnical change in organizations. From the first principle of '*what is this research about?*' to the concluding phases of analysis using the empirical body of work, there are many technicalities and assumptions that must first be addressed. The very processes of *how* conclusions and observations are drawn from the research process are arguably as significant as *what* those conclusions and observations claim. That is to say there is only limited contribution to be made from discussing any conclusions without first addressing and reflecting upon the steps taken to get there. Therefore this chapter pays particular attention to the research design and within that the methodological approaches employed for data collection to link the theoretical and empirical tenets underlying this research.

Research Aims and Questions:

The research aims discussed here range from more general aims pertaining to theoretical and empirical gaps identified in extant literature to more specific endeavours relating to the nuances of specific case studies.

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As discussed in the literature review, the theoretical treatment of the relationship between technology and organization has, historically, been limited or even flawed by a tendency to treat technology as a known, predictable and calculable extension of management. Across a range of academic disciplines, there is broad agreement that both the design and use of technology involves both a combination of social and structural considerations (Kimble and McLoughlin, 1995; Williams and Edge, 1996). Fundamentally, neither the notion that technology is infinitely malleable through the unimpaired constructions of agents, nor that it is a structural contingent with predictable properties are tenable theoretical positions (Kimble and McLoughlin, 1995; Grint and Woolgar, 1997). Consequentially there is extensive debate about the precise relationship between the social and the technical. The literature review signalled that an institutionally embedded, structurational (Orlikowski, 1992) perspective would provide the theoretical underpinnings for this research. This position argues the dualistic relationship between human agents and the technologies they encounter, both agents and technologies are simultaneously structural and socially constructed (Orlikowski, 1992; : 403). Chapter 2 presented the work of Avgerou and McGrath (2007) as a framework for the analysis of sociotechnical change and the role of technical rationality in shaping the nature of organizational change. It was suggested that the author's framework could be enhanced by clarifying the inter- and intra-organizational institutional relationships by using sociotechnical constituencies (Molina,

1990; Molina, 1993; Collinson and Molina, 1995; Molina, 1999) as a mapping technique.

The first broad methodological challenge is, therefore, to respond to these gaps and the various critiques. It is therefore necessary to conduct research that accommodates and acknowledges that technology does not behave in predictable and deterministic ways (c.f. Grint and Woolgar, 1997). A first requirement is to take a sociotechnical analysis rather than the more widely employed structural or technologically deterministic approaches to this subject. This means the research design must try to capture the characteristics and changes in social and technical aspects of each case. Further, the perspective that technologies are also interpreted and appropriated by various actors throughout its development and its use (Orlikowski, Yates et al., 1995) creates the need for the methodological framework to be capable of capturing these interpretive aspects.

Developing a Research Design:

At the outset of any research project the researcher faces a myriad of choices as to how to capture the phenomena they wish to study. The term 'research design' is used here to capture the interacting elements of philosophy, research methods and analysis which constitute the research process. The selection of these elements and the strategy of their

combination are therefore formative in producing research capable of providing a contribution to knowledge. Producing a coherent and manageable research structure to guide the research process must therefore be considered an essential stage. This means that the researcher should give very clear indication as to the philosophical, methodological and analytical choices made; recursively and reflexively examining the justification for each methodological step.

Within the literature review, several epistemological and methodological approaches were seen to be connected with subject disciplines, theoretical assumptions or particular areas of empirical investigation. Inextricably linked to the production of knowledge are the theoretical assumptions about the constitution of reality. 'Technological imperative' studies of technology treat technology as an *independent influence* on organizations that *exerts unidirectional and causal influence* on people and organization (Orlikowski, 1992). The discipline of information systems research has traditionally been to draw causal means-ends relationships between technology and organizational contingencies, for example *software construction, administrative control and economic gain* (Avgerou and McGrath, 2007; 296). This ultimately is an ontological position that this research (and others) brings into question. What has been described is a caricatured outline of traditional approaches to researching the relationship between technology and organization. The

proceeding sections outline a research design that accommodates the in-depth study of sociotechnical change in organizations.

Issues of Ontology and Epistemology:

Issues of epistemology relate to: “the question of what is (or should be) regarded as acceptable knowledge in a discipline. ...[W]hether the social world can and should be studied according to the same principles, procedures, and ethos” (Bryman and Bell, 2003; 13). It follows that every philosophical paradigm contains an epistemological position to the extent that certain forms of knowledge are privileged or rejected as more or less valid. Consequently, many epistemological issues confront the social scientist; for example the question of the possibility of knowledge – to what extent is genuine or pure form of knowledge achievable? The origin of knowledge impacts upon its very substance; whether it is derived from the senses, the conscious mind, experiences or some other origin (Delanty and Strydom, 2003). Hence it is possible to distinguish between the nature of knowledge and what constitutes truth.

Ontological issues within social science can be regarded as conceptualising how relationships between social phenomena are regarded in relation to social actors. The contrast in ontological positions is traditionally typified by objectivist and constructionist paradigms. These offer contrasting views as to the nature of social phenomena;

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objectivists lay claim to the externally real social entity (e.g. the organization etc.) and constructionists argue that social phenomena are constructed by individuals' action and constantly undergo revision and re-revision by social actors (Bryman and Bell, 2003). There is much debate over these issues and the objectivist - constructionist distinction is far from categorical. Hence, many authors, although not necessarily in direct agreement, would regard the ontological distinctions as a continuum (Burrell and Morgan, 1979; Alvesson and Deetz, 1996; Burrell, 1996). The acknowledgment of epistemological and ontological assumptions is critical for the design, mode of analysis and dissemination of research findings as they will affect the type of organization analysis produced (Burrell and Morgan, 1979). The framework for understanding sociotechnical change adopts a Foucauldian perspective for understanding the intertwined dynamics between knowledge and power, the context specific nature of technical rationality within which individuals appraise technological change. To accommodate the theoretical dualism that both organization and technology are both socially and structurally constituted, the position of critical realism provides a 'stratified ontology' where discourse is has a mediating role in a pre-structured reality, this is taken up in more detail in the following section.

Critical Realism

Critical realism (Bhaskar, 1989; Collier, 1994) is employed as a philosophical position as it affords the conceptualisation of the various processes of social construction at the level of 'empirical reality' within a realm of structural parameters manifest in the 'actual' and 'deep' levels of reality. Fairclough translates the levels of reality into empirical layers from a critical realist position (2005; 916):

"I shall argue instead for a critical realist position which is moderately socially constructivist but rejects the tendency for the study of organization to be reduced to the study of discourse, locating the analysis of discourse instead within an analytically dualist epistemology which gives primacy to researching relations between agency (process, and events) and structure on the basis of a realist social ontology."

It is the interactions between these three levels that constitute our interface with reality. The philosophy of critical realism is commensurate with the Giddenseian concept of structuration where the levels of structure and agency are mutually constitutive and interact to form the basis of society. The processes of discourse produce and reproduce texts that are both mediated by and formative of 'real' structures. This

simultaneously problematizes the empirical and epistemological foundations of studies in the area of organization and information systems and presents a different epistemological challenge; if we are not working with rigid technological entities interacting with concrete organizational phenomena then research goals such as generalisability become unattainable. Critical realism offers a philosophical approach that accommodates the interpretation of technology and organizations as both social and structural phenomena. This is a fundamental starting point in reconciling the polarised debates between technological determinism on the one hand and social constructivism on the other. The philosophical position of critical realism underpins the research design and choice of research methods which are outlined over the remaining sections of this chapter.

Research Design – Case Study

Case study research is particularly useful where the terrain and particularities of a research area are relatively unknown. Crucially, “a case study is not a methodological choice, but rather a choice of object to be studied” (Ghauri, 2004; 109), a case study is a research design that demarcates the boundaries of study. Case study research design locates the phenomena under investigation in their spatiotemporal context; the ‘case’ is necessarily defined by its own characteristics. In this thesis, two instances of technological change in two very different

organizations each undergoing technological change provides the case studies.

Using Eisenhardt's (1989) framework, it is proposed that this research will use a case study design to build theory. A case study approach represents a "*continuous comparison of data and theory beginning with data collection... [and] ...focuses on understanding the dynamics within single settings*" (ibid; 534). The proposed methodological approach enables the study of complex and dynamic iterations in the interrelation between sociotechnical factors of change (or continuity) in organizations brought about by the introduction of new technology. Significant to the research design is the intended 'output', from this research the intention is to make a theoretical contribution by situating the data collected relative to extant literature. Table 3.1 (overleaf) maps the design of the case-study approach used in this research. It illustrates the intended linkages between the research problem, the choice of cases and the intended output from the research process.

Table 3.1: Cross-Section of Intended Case Study Design.

Description of Cases	Research Problem	Data Sources	Investigators	Output
Nottingham East Midlands Airport. (Common Use Self Service Kiosks)	Organizational impact of the introduction of new technology.	Semi-structured interviews, non-participant observation and documentary data.	Single Investigator.	Theory Building from empirical work which combines and tests existing literatures. An understanding of the relationship between technological adoption and organizational continuity and change.
Hawkwindshire County Council. (Intranet based content management system)				

(Adapted From Eisenhardt, 1989; 535)

Eisenhardt advocates developing *a priori* specifications of the constructs to be used for guiding data collection. This is not entirely compatible with the phenomenological approach taken in this research. The nature of the concepts in the analytical framework are abstract and situated in patterns of discourse, and are not therefore amenable to quantification or replication within each case study. As such, the constructs derived from supporting literature are treated as tentative. Deviating from Eisenhardt's framework, the constructs identified in the literature review will inform rather than govern the research as this would compromise

any inductive value. This is a subtle, yet crucial, feature of this research as it influences how data gathered are analysed.

Use of case study research designs is well established across the various disciplines of the social sciences (Hartley, 2004). This kind of research strategy is not without limitations or criticism, Simon (1969; 276) highlights a criticism levelled at case-study research designs:

"...the specific method of the case study depends upon the mother wit, commonsense, and imagination of the person doing the case study. The investigator makes up his procedure as he goes along, because he purposefully refuses to work within any set categories or classifications."

This is a valid concern and arguably, without active consideration by the researcher, case studies can quickly become overly idiosyncratic. However, case study research is not an exercise in producing a generalizable and universal account, it is an exercise in generating theory from particular settings (Yin, 1994). Hence the crucial factor is how well the researcher converts data into theory (Bryman and Bell, 2003). For this purpose, phenomenological in-depth case studies are the most appropriate research design.

Qualitative and Quantitative Methods

Within the broad framework of research design is the issue of what kind of data is required to prove or disprove a theory, or in this case, to add greater depth of understanding to the processes of sociotechnical change. A fundamental distinction is the choice between quantitative and qualitative research. Of course, the two are not incommensurable with one another. It is the case that certain phenomena are more amenable to study using quantitative or qualitative methods. For example, a study comparing the levels of income between low-fare airline passengers and flag carrier airlines would best be captured using quantitative techniques. Broadly, the distinction between the relevance of qualitative and quantitative methods can be assessed in relation to the objects of study. The former provides insight into the nature of objects and events and the latter traces generalizable relationships between them (Phillips and Hardy, 2002). Qualitative research provides the necessary focus for where research phenomena are less well understood. Qualitative methods and analysis are appropriate when:

“(a) contextualisation, (b) vivid description, (c) dynamic (and possibly causal) structuring of the external world, and (d) the world views of the people under study [are important]”

(Lee, 1999; cited in: Maguire and Phillips, 2008; 380)

The four interrelated factors cited above dissect the pillars of qualitative research and shows the contribution of qualitative methods.

The literature review highlighted and critiqued a variety of academic work to produce a framework for understanding the process of sociotechnical change in organizations. A significant part of this research is based on examining and refining the theoretical constitution of technology, bringing to the fore the social and material forces that impact on organizations. Because of this it is fairly meaningless to talk about technological change in isolation of its context and for this reason a qualitative research design provides the means for capturing the effects of new technology in context.

Developing a Multiple Method Framework.

The previous sections have indicated from the review of the literature that a qualitative research design using case studies is appropriate. Within case study research there is the choice of whether single or multiple research methods should be incorporated into the research design. Because of the interpretive, social constructivist stance of this research to generate rich, in-depth description of the case organizations a multiple method research design is advocated. Through the combined analysis (the process of triangulation, discussed later in this chapter) of data from different methods, a more encompassing picture can be

developed. Through the use of multiple methods, certain weaknesses of individual methods for data collection can be partially alleviated.

“...fundamental for research methodology is the reliance on the personal descriptions of the respondents, who may either intentionally conceal or mislead the researcher, or unintentionally mislead them. In studying someone’s life world, it is unlikely that the respondent will be able to comprehensively and thoroughly describe not only their opinions and thoughts, but the details of everyday activities and relationships, and the context in which they conduct them, especially in the space of a relatively short interview.”

(Stewart, 2002; 102)

For the reasons illustrated by Stewart (2002), a multiple method research design is appropriate for partially compensating for weaknesses or limitations of single methods used in isolation. A multiple method approach is also essential in collecting data at the micro-organizational level, to facilitate the fine-grained analysis which Hayes (2008) advocates, and additional means of enquiry to elucidate the types and nature of relationships between inter-organizational constituents.

Sample

The sample for each case includes a range, if not all informants involved on a particular project. I use the term 'informant' in preference to 'respondent' as the nature of this research requires that responses are of those who were centrally involved in (or had expert knowledge of) the project – hence they are 'informed'.

As both the case organizations were likely to be at different stages in the implementation of new technologies, an additional consideration was whether the project in question would be taking place during the period of data collection or whether it would be necessary to ask informants to reconstruct a recently completed project. It was decided where possible, data collection would be in real-time to lessen partial recall and post-hoc rationalization of events by informants (Golden, 1997).

Method: Direct Observation

An additional source of data will come from unstructured non-participant observation. This method will complement the data collected from semi-structured interviews through *holistic description* (Jick, 1979) to provide *stronger substantiation of constructs* (Eisenhardt, 1989). This is one of the strengths of multi-method research design

As Bryman and Bell write on the practice of observation in research, “the aim is to record in as much detail as possible the behaviour of participants with the aim of developing a narrative account of that behaviour” (2003; 178).

This captures the purpose and relevance of using observation as part of a multi-method research design in the study of sociotechnical change in organizations. Data will be collected on-site which affords unique access to events in the place of work. Second, it allows the capture of data which would not otherwise be recorded by semi-structured interviews alone. Third, if data collection is real-time – that is in synchronisation with project work (e.g. stages of planning, implementation, adaptation and use of new technology) – observation of behaviour is readily available.

Again, problems might arise if a project is being reconstructed, although this doesn't exclude the use of observation as a method of data collection. However, the mode of interpretation must be sensitive to the relevance of observable events as to how salient they are to theory building from the project in question. Hence the strategy to be used for data collection from observation relies on *incidents* (Bryman and Bell, 2003; 181). This involves recording significant incidents and the results that follow from it. To accommodate observation as a research method,

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more time on-site with the organization and the process of codifying events (incidents) so they are intelligible for analysis will need to be accommodated. The heightened value of being present for 'incidents' and recording them becomes apparent in Hodgson et al. (1965; 20):

"It was fortunate that we held our anxieties in abeyance and remained open to unfolding events. Many of the data that proved to be analytically most useful were gathered unexpectedly, almost despite our attempts at systematizing the data collection. Unconscious forces would suddenly open expression... They were open only to an observer on the spot".

This emphasises the value of observation in qualitative research, even if not used as the primary method of data collection. Observation is a mainstay of qualitative research to the extent it can be argued that non-observation based research designs are reliant on some degree of observational technique. To understand and to substantiate meaning, gestures or intentions researchers turn to observation in settings such as a traditional interview (Angrosino, 2005). However, to state simply that *'as a qualitative researcher, I will be using observation'* is not sufficient. A more critical consideration of the role of observation needs to take place before useful analysis can result.

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Historically in the social sciences, it was assumed that the observer must not interfere with the observed; i.e. the observer is a neutral entity in the process of observation (Angrosino, 2005). This is typically the domain of positivist epistemological positions (Burrell and Morgan, 1979; Alvesson and Deetz, 1996; Deetz, 1996). For the purposes of this analysis this is problematic on two levels; first in *being* a neutral observer and second in the type of analysis afforded by such a perspective. Researchers developing *postmodern* perspectives have taken issue with the neglect of context in conventional research. This raises two central questions about the application to research of observational methods; first, what is being observed and who and what are given 'voice' through observation.

Second, what is the role of the researcher? Is it desirable, or indeed possible, to have an *invisible* observer? That is, the ideal of 'pure' observation where the researcher is able to observe discrete facts without altering what is observed by their presence (Adler and Adler, 1987; Angrosino, 2005). If the role of the observer is not fully external and independent of the observed then some level of re-conceptualisation of the relative location of the observer requires attention. Moving away from the ideal state of 'pure observation', Adler and Adler (*ibid.*) develop the notion of 'membership roles' to express the relationship between observer and observed:

Table 3.3 Membership Roles in Observation Methods.

Level of Membership	Role
Peripheral	Research is conducted observing a group to which they are not affiliated. The expectation is that the researcher is able to develop an insider's perspective without being an integrated member of the group(s) being observed.
Active	Research is conducted as a group participant. The researcher becomes involved in the core-activities without necessarily being a fully integrated group member.
Complete	Research is conducted in a group within which the researcher is a fully integrated member.

(Adapted from Adler and Adler, 1987)

Table 3.3 shows observation as a qualitative research method that has various modes of execution as shown by the levels of membership in the observation process. Similar to interview methods, the relationship between observed and observer warrants some attention.

Method: Documentary Data

Documentary data represents a vast realm of information available to the researcher performing qualitative investigation. To illustrate, sources of documentary data might be found in sources as diverse as personal documents (diaries, letters, and autobiographies), visual objects such as photographs, public documents (government white papers, Acts of Parliament and other state publications), organizational documents, the

mass media or virtual sources (websites) (Bryman and Bell, 2003). Indeed, in his ethnographic study of a major gas pipe explosion Gephart uses a range of documentary or “textual” sources to gathering research data (Gephart, 1993):

“A variety of documents and texts, ranging from newspaper articles to government inquiry transcripts and reports, describe organizational events at a level of detail not otherwise available.”

Scott (1990) reminds us that integrity of documents or “texts” should not be taken for granted. The production of texts might be a component of political, reactionary or even propagandist agendas. As a measure against overlooking the limitations of documentary data, Scott (1990; 6 Cited in; Bryman and Bell, 2003) suggests four criteria to guide the use of documentary sources:

- Authenticity
- Credibility
- Representativeness
- Meaning

As texts, sources of documentary data allow the researcher to interpret the meaning of events and to generate understanding of both the document and the event as contextually mediated. The production of documents involves the input of contextually situated agents who, as

well as interpreting meaning through the production of texts, are embedded in systems of meaning (Gephart, 1993; 1468-9):

“The textual approach is based on the assumption that texts have the interpretations of their creators embedded in them (Knorr-Cetina, 1981). A second assumption is that meaning is actually “inter-textual” (Culler, 1982; 103): a given text is constructed from, and acquires meaning through, its embeddedness in a multiplicity of discourses and texts. Discourse is a conversational or textual presentation or narration of events.”

The intrinsic properties of embedded interpretations of the creators or authors of texts and their inter-textual nature are used to provide substantiation and clarification of data elicited from interview and observational methods. The interpretations of authors and the inter-textual nature of documents are illustrated by McPhee (2004), using the example of organizational charts as texts and the relationship of the text to its source (ibid. 361):

“...the organization is a system of relations among its members, and these relations have some properties that I can discuss as a bundle. Organizational membership and relations are prototypically (a) stable, (b) artificially constructed, and (c) power laden. All of these properties are exemplified in the hierarchical

organization chart (which is a good example of a text). Of course, the organization chart is a prescribed snapshot that cannot prevent or control the emergence of relationships of solidarity and resistance, as well as practical routine and informal power. But the formal structure is a prescribed context that occasions and is constantly relevant to such organizational processes.”

Provided the authenticity, credibility, representativeness and meaning are critically appraised, the inclusion of documentary data provides an opportunity to both expand the empirical depth and robustness of the research. The techniques of combining research methods into a multi-method research design are covered in the following section which addresses the triangulation of research data.

Method: Semi-structured Interviews

The selection of appropriate methods to gather data is a fundamental component of a competent research design. With this in mind, this and the following sections unpack the choices available to researchers and which direction this research will take. Within-method choices require some attention; there is much scope for *interviews* to be used in a variety of ways. A logical point of departure is *what is an interview?*

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Interviews are the staple of most qualitative research projects. The interview technique for gathering qualitative data can be varied in its application and execution, often depending on the research context. To offer a working definition of the purpose of using qualitative interview methods (King, 2004; 11):

“...[it is] to see the research topic from the perspective of the interviewee, and to understand how and why they come to have this particular perspective”

At this juncture it is sensible to remind ourselves that this is a qualitative piece of research. While this may seem an obvious statement, it underlies precisely what is, and crucially what is not being investigated by each method (Kvale, 1983; 175):

“The qualitative research interview aims at obtaining as many nuanced descriptions from the different qualitative aspects of the interviewee’s life-world as possible. Neither in the interview phase nor in the later analysis phase is the purpose primarily to obtain quantifiable responses, here it contrasts with the usual questionnaire and content analysis approaches. Precision in description and stringency in meaning interpretation in qualitative interviews corresponds to exactness in quantitative measurements.”

Qualitative interviews are appropriate for this research in order to interrogate the way social constructions of new technology influence or initiate shifts in power in the organization. Naturally, the number or frequency of similar socially constructed mechanisms is important, but it is the essence, the fabric, of these social workings of organization that will illuminate the processes involved.

Using this as a foundation, the term 'interview' herein refers to "an interview, whose purpose is to gather descriptions of the life-world of the interviewee with respect to interpretation of the meaning of the described phenomena" (Kvale, 1983; 174). Further to being the activity of uncovering details of phenomena, interviews are viewed here as being a collaborative activity between researcher and interviewees (Fontana and Frey, 2005). Having established a view to what an interview *does* – *its performance* – there is still substantial room for manoeuvre by the researcher in two further stages of using interview based data collection.

The first concerns how the researcher perceives the responses of interviewees and secondly how the quantity of data gathered is analysed. I will attend to the latter when discussing the analysis of data gathered later in this chapter. More immediately I shall address where the responses of interviewees sit in the context of this research. Much of this pertains to the ontological and epistemological choices discussed

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earlier. Building on these, it seems prudent to account for how such philosophical assertions translate into methodological process. To begin to make sense of this, King (2004) differentiates between different epistemological positions and the implications for interview based methods. Table 3.2 below outlines the core distinctions made:

Table 3.2: Aligning Epistemology and Method – Implications for Interviews.

	Realist Interviews	Phenomenological Interviews	Social Constructionist Interviews
Position/Role of researcher	<i>Neutral:</i> The interviewer is an 'invisible' agent in the gathering of information from interviewees.	<i>Aware:</i> The interviewer is alert to the impact of their own presuppositions which could influence the research process.	<i>Involved:</i> The researcher is positioned to pursue and follow links and developments throughout the research process. The direction of the research hinges on the reflexivity of the researcher.
Phenomena	The responses of interviewees mirror the external world. Phenomena and experiences stand on a one to one relationship with the responses of interviewees.	Awareness that the context of an interview can influence responses.	The construction of phenomena is not bound by their physical existence; the relationship between discourse and context actively construct the material of research.
Typical Methodological Approach	Structured Interviews to accommodate comparisons.	Semi-structured to pursue salient themes and to seek clarity where required.	Semi-structured or un-structured; lending flexibility for interviewees to interpret and explain their experiences in an overt interview context.

(Author)

Table 3.2 gives a generalised cross-section of the relationships between research epistemology and within-method research choices. The

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objective here is not to neatly categorize each epistemological position into the appropriate methodological box, far from it. As King (2004; 12) writes:

“[this] can only provide an outline of some of the main types [of qualitative research interview], highlighting their key methodological features and epistemological assumptions.”

This exercise in general categories enables a degree of situating this piece of research relative to the research methods and perspectives available.

Realist interviews were deemed inappropriate for this research given the lack of depth they were able to produce in the anticipated time-frame for data collection and that the social processes of technology and organization are being investigated. A realist epistemological position would assume that the responses of interviewees all refer to the same phenomena and thus enable direct comparison without any difficulty. For example, if asked “does the introduction of new technology make your job easier?” it is maintained that the constructs ‘new technology’, ‘job’ and ‘easier’ are all equivocal for interviewer, interviewee and everyone concerned with the organization.

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Phenomenological interviews lend a different perspective on this qualitative method of data collection. The central tenet to this perspective is "...for the researcher to consciously set aside his or her presuppositions about the phenomenon under investigation – a process sometimes referred to as 'bracketing'. This, of course, means that the researcher must reflect on the presuppositions he or she holds, and remains alert to how they may colour every stage of the research process" (King, 2004; 13). This perspective goes beyond that of the realist interview by making the interviewer 'visible' in the research process; it is acknowledged that the data produced from interviews is contingent not only on the responses given, but also the interviewer and 'artificial' context of the interview itself. The interviewer is required to be reflexive and conscious of the influence they possess to translate responses according to their own definitions and assumptions. In addition to this, the interviewer must be sensitive to the fact that interviewees are being asked to discuss concepts that are outside of their point of origin.

Social constructionist interviews are predicated on the *constructive nature of language*, where phenomena are constituted through the process of discourse (King, 2004). The process of conducting an interview within this perspective yields insight not into the direct relationship between interviewee and phenomena as in realist research, but produces a text from which interpretations can be made. Generally,

semi- and un-structured interview methods are used for data collection as these afford the greatest flexibility for the researcher to probe themes where more depth or explanation is needed. One of the disadvantages of more unstructured interviews is the sheer quantity of data produced (Dick, 2004) this would need to be accommodated for in the analysis of such data. The typologies presented in table 3.2 above also indicate that it is useful for the researcher to be involved with the subject of study to fully appreciate the nuances and particularities that can only be reached through direct involvement. This makes social constructionist interviews less practical, for pragmatic rather than methodological reasons. In a fixed-term research project it is extremely difficult for the researcher to establish the involvement and embedded status within a case organization. In addition to the constraint of time, the constraint of not being in a position to join an organization and achieve a position where research could be conducted from is also unlikely. For these reasons an approach based on 'phenomenological interviews' will be used in this research, as this accommodates empirical investigation of the research questions from a critical realist philosophical position, and contributes towards a multi-method qualitative case study research design.

For this research semi-structured interviews, similar to King's (2004) outline of 'phenomenological interviews', have been selected as an appropriate method for generating the necessary quality of data required. This study is predicated on the collection of rich qualitative

data. At the same time the data needs to be directed towards the concepts and themes developed in the theoretical framework. Towards this balance of investigative flexibility and empirical focus, semi-structured interviews provide the necessary avenue to collecting this kind of research data.

The use of an interview guide to specify topics helps to furnish the researcher with a broad structure whilst at the same time provide scope for response on the part of the interviewee (Bryman and Bell, 2003). The authors also point to the in-built flexibility of changing the order of questions and also adding questions as the interview progresses. Themes can be pursued by the interviewer allowing greater probing of events and phenomena than would otherwise be afforded by more structured collection methods.

The use of themes in interviews is designed to prompt relevant data and allow for sufficient flexibility for informants to respond; the themes will be in place as a means of focus not a means of bounding discussion or information. The use of semi-structured interview is appropriate as it affords a good level of flexibility needed in generating in-depth qualitative data. Simultaneously the use of a research guide assists the researcher to gain "*a loose pattern of agreement with the interviewee about the context of enquiry*" (Spender, 1989; 79).

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In the case of Hawkwindshire County Council, the interview guide was divided up into three main thematic sections in relation to the technology in question; the informant, the organization and the technology. The division into these three themes is only an analytical distinction which is designed to encourage informants to reflect on themselves, their organization and the technologies they use. The themes provide scope for each informant to explore and detail their experiences in a more focused way than asking even broader questions where responses are likely to become confused where themes are not anchored sufficiently to their experiences.

In the case of Nottingham East Midlands Airport, a similar but simpler interview guide was used. Because the informants interviewed were not all from the same organization (parent or subsidiary firm), greater emphasis needed to be placed upon the choice, development and implementation of the CUSS technology. Table 2 in the appendix section lists the range of informants and the organizations they work for. The themes used in the guide started with the informant, then CUSS kiosk technology and then concluded with examining organizational and inter-organizational facets of implementing the new kiosks.

Triangulation

The choice of data collection lends itself to triangulation as multiple data collection methods are employed. The value of triangulation is derived either within-method to verify reliability or between-method to test external validity (Jick, 1979). Triangulation in the context of this research concerns what Jick (*ibid*; 603) terms “holistic”. As the literature review indicated, the effects of technological change are understood both as events within organizations and as part of their broader institutional arrangements as part of sociotechnical constituencies. To capture this kind of change involves eliciting data which would otherwise be left unobserved through single method research design and within-method triangulation. Through ‘holistic’ triangulation “...elements of the context are illuminated. In this sense, triangulation may be used not only to examine the same phenomenon from multiple perspectives but also to enrich our understanding by allowing for new or deeper dimensions to emerge” (Jick, 1979; 603-4).

By using a combination of observational, interview and documentary data collection methods, the weaknesses of each are partly countered by the comparison of data from the other. For example, the researcher-centric nature of observational accounts is partly countered by interview data as its origins lie outside of the immediate control of the researcher.

Equally, data from observation and documentary sources can be employed to substantiate meaning during the interview process.

Data and Analysis

The analysis of research data collected using interview, observation and documentary collection methods was assisted by the qualitative software package, NVivo 7. The software was used to help identify emergent themes across both data sets through the thematic coding of the data collected. Wherever possible the coding of data was performed during the process of data collection to enable clarification and exploration on areas of uncertainty on return visits to informants in each case study.

Wherever possible, interviews were recorded using a digital voice recorder and were transcribed into electronic text documents that were imported into the NVivo software for analysis. Field notes from periods of observation were transcribed to produce electronic documents and equally, sources of documentary data were often made available in an electronic format. All these documents were imported for analysis into NVivo using thematic coding alongside interview data. To conclude this chapter, tables 3.3 and 3.4 provide overviews of the empirical work conducted to produce the two cases studies of sociotechnical change:

Case 1: Nottingham East Midlands Airport		
Semi-Structured Interviews	8 in-depth, one-to-one interviews 10 out of case one-to-one interviews	Each lasting between 1 and 3 hours
Observation	5 days of non-participant observation: - Between 6 and 15 'CUSS-Enabled' flights per day of 150 and 250 passengers per flight	
Documentary Data	Airport DfT White Paper Trade Association Literature	Master Plan

Case 2: Hawkwindshire County Council		
Semi-Structured Interviews	17 in-depth one-to-one interviews	Each lasting between 1 and 3 hours
Observation	<ul style="list-style-type: none"> • Participant Observation of Intranet Training Sessions • Non-Participant observation of intranet system in-use and of intranet team meetings 	
Documentary Data	Corporate Change Strategy Documents Intranet Strategy Documents Training Manuals Project Progress Reports	

Chapter 4 The Context of Airports and the Airport Industry in the UK.

This chapter explores the context of the first case study organization in this research. This provides a review of the development of the airport industry in the UK and the current position of the case study firm, Nottingham East Midlands Airport (NEMA), in its competitive sector. Several landmark events in the development of the airport industry have been formative to the way the industry works and is likely to evolve. In addition to industry level developments, individual airports have evolved in contrasting ways to one another. Therefore, tracing the lineage of the case study organization provides a foundation to each case study and outlines the context in which new technologies are being introduced.

Once the domain of the rich, air travel has become affordable and accessible to most of the developed world. The 'jet age' of the 1960's established passenger air travel as an enduring institution for both business and leisure that remains dominant to this day. The emergence of airports into the large-scale commercial ventures seen today is symptomatic of the demand for foreign travel, tourism and international business. Their rapid development into 'small cities' (Pitt, 2001) reflects the scale of demand for air travel, in 2007 there were 240 million passenger movements at UK airports (Civil Aviation Authority, 2009).

This chapter gives a brief history of UK airports and their development into privately owned commercial enterprises. From nationalisation to deregulation, the air transport sector has undergone some significant developments that have shaped the current state of UK airports as commercial operations. The size and ownership of airport operations is then examined and patterns of industry growth show the escalation of passenger numbers and aircraft movements over the past twenty-five years. The final sections turn to the context of the case organization and its investment in common-use self-service check-in (CUSS) technology. The mapping of inter-organizational sociotechnical constituencies highlights the influence of government regulation and powerful trade association drives for integrating new technology into airport operations. This provides the backdrop to the case study of Nottingham East Midlands Airport that follows in Chapter 5.

Industry Analysis: The UK Airport Industry. History of Ownership: From Public to Private.

The airport industry has developed in response to the continued increase in demand for air travel. From the advent of charter flights in the 1960's and 1970's, the package holidays of the 1980's and the low-fare airlines of the late 1990's there have been year on year increases in passenger numbers. During this time airports have passed from state ownership into private ownership.

The rapid increase in both passenger numbers and uptake of new technologies (particularly advances in pressurized aircraft cabins and jet engine technology) has meant that airports have had to develop as an effective interface between airlines and their customers. The relatively brief history of airports following the Second World War reveals the shifts in ownership up to today's industry structure.

The 1960's saw complete government ownership and control of all civilian airports. All aspects of running and development of UK airports were centrally handled by the Ministry of Civil Aviation. Substantial growth in passenger numbers meant that airports became considerably more complex organizations co-ordinating and delivering the facilities and infrastructure required. To cope with the increased complexity of running large commercial airports that would supplant existing airfield operations, the British Airport Authority was established in 1966. In response to the increasing demand for air transport, recommendations for the need for flexibility and profitability while under government ownership were made in the 1965 Airports Authority bill (www.baa.com). The British Airport Authority was created as an overarching organization for building and operating airports in the UK with control over Heathrow, Gatwick, Stansted and Prestwick airports.

The first major step towards private ownership in the industry came in 1986 with the Airports Act. This outlined the transfer of British Airports Authority (*its property, rights and liabilities*) to the private sector. The following year BAA was floated on the stock exchange creating BAA plc. This paved the way for subsequent deregulation and private ownership of commercial airports in the UK. In 1993 National Express Group purchased East Midlands Airport from a consortium of Local Authorities, this was the first 'regional airport' to transfer into private ownership.

Ownership and Industry Structure:

Table 4.1 overleaf identifies the top UK airports (handling more than two million passengers per annum), ranked by passenger numbers (2005) and the owner/operator of each airport:

Table 4.1: UK Airport Size and Ownership 2005.

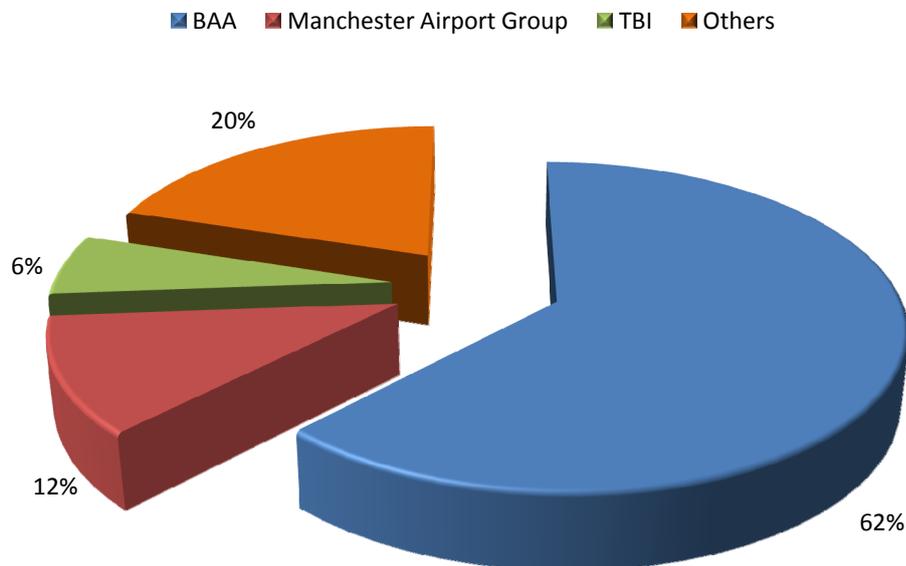
	Airport	Owner	Annual Passengers (000's)
1	Heathrow	BAA plc	67,683
2	Gatwick	BAA plc	32,693
3	Manchester International	Manchester Airport Group	22,083
4	Stansted	BAA plc	21,992
5	Birmingham International	Macquarie/Aer Rianta	9,311
6	Luton	TBI plc	9,135
7	Glasgow	BAA plc	8,775
8	Edinburgh	BAA plc	8,449
9	Bristol	Macquarie Airports	5,199
10	Newcastle	Copenhagen Airports	5,187
11	Belfast International	TBI plc	4,820
12	Liverpool	Peel Holdings Ltd	4,409
13	Nottingham Midlands East	Manchester Airport Group	4,182
14	Aberdeen	BAA plc	2,852
15	Leeds Bradford	LBIA Ltd	2,609
16	Prestwick	Infratil	2,405
17	Belfast City	Ferrovial	2,237

Based on CAA figures for 2005 (Civil Aviation Authority, 2005b)

The UK market is dominated by BAA plc who cater for nearly two-thirds (62.3%) of all UK airport passengers.

Figure 4.1 shows a breakdown of the sector by percentage of passengers handled by the major groups of firms:

Figure 4.1 Share of Passenger Handling in the UK by Airport Group.



The figure above identifies three significant players in the UK airport sector: BAA plc (62%), Manchester Airport Group (20%) and TBI Ltd (12%). BAA plc dominates the sector and controls three of the UK's five largest airports. Owning three of busiest airports in the South East, and with its regional airports, BAA plc serves 62.3% of passenger traffic in the UK air transport sector. In an attempt to limit monopoly power, the Civil Aviation Authority has set price caps on the charges made to airlines using the three busiest airports, Heathrow, Gatwick and Manchester airports.

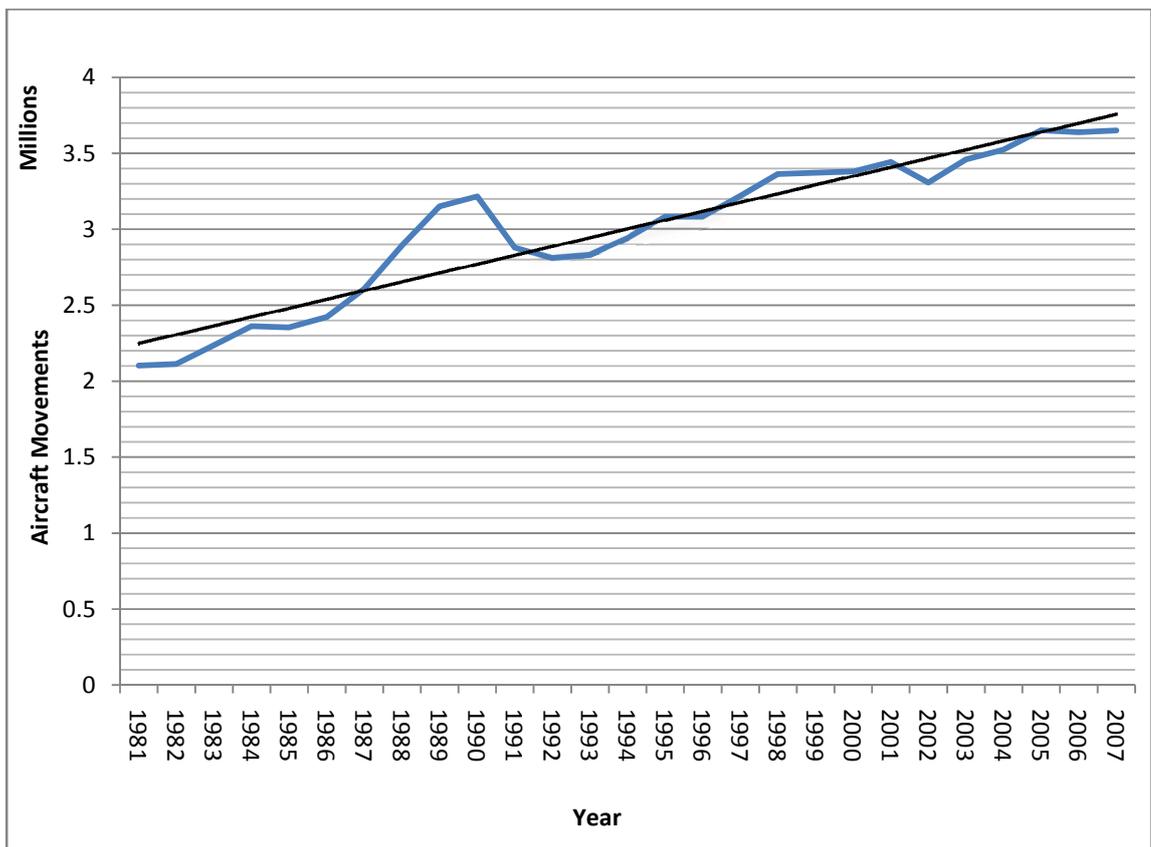
Passenger numbers are not the only indicator of dominance in the airport market. Airports are inherently complex and contain a myriad of other ventures for example; airfreight, retail (on-site shopping etc), catering, aircraft maintenance and passenger handling services. At each airport it can be the case that there is a different structure of ownership and sub-contracting for each of these services. Where airports own the retail establishments in their terminal buildings there is the chance to access and grow additional revenue in addition to landing charges from airlines alone. For example, in addition to their core business, BAA has invested in retail operations in foreign airports they do not own or operate themselves. Manchester Airport Group runs a property development group connected to its airport operations with planned investment of around £1bn over the next 10 years (Manchester Airport Group, 2009b). Thus, while passenger numbers are indicative of the position of an airport in the sector, there are other aspects to the business to be accounted for.

Industry Growth:

It is important to recognise the persistent growth of the air transport sector over the last twenty-six years. The number of aircraft movements has increased in all but five years over this period. This has presented airports both the opportunity and now a requirement to develop handling capacity at their operations to handle the 3.6 million movements in

2005. Figure 4.2 below shows the upward trend in aircraft movements at UK airports from 1981 to 2007:

Figure 4.2 UK Aircraft Movements 1981-2007



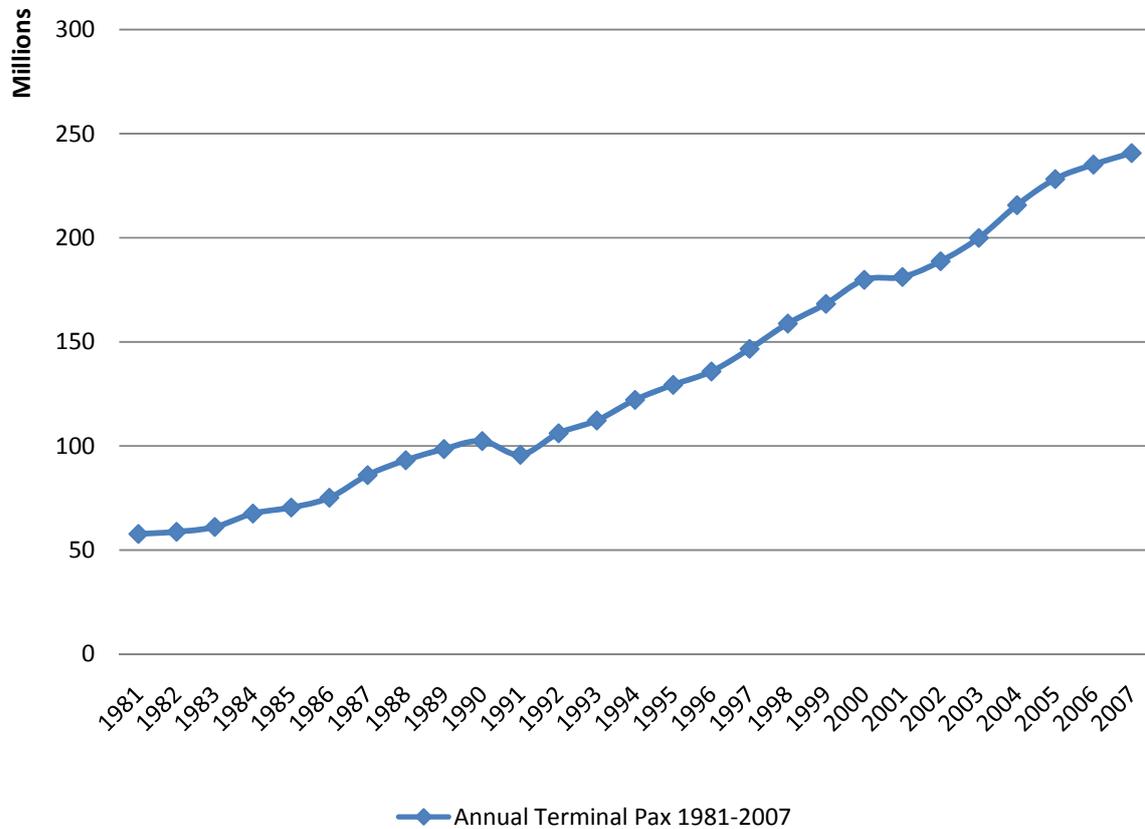
(Source: Civil Aviation Authority, 2005a; 2009)

Airports face rising numbers of aircraft movements at their sites around the UK. The landing and parking charges for each aircraft are one source of revenue for airports. In addition to this is the handling charge for the passengers or cargo of each aircraft. This raises the issue of how airlines are going to operate in the future, either by increasing the capacity of each

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flight (i.e. larger or more densely configured aircraft) versus more frequent aircraft movements. Both of these strategies could lead to different responses by airports because of the kinds of infrastructure needed for each instance. The former requires a greater dependency on infrastructure such as runways, taxiways and apron space for aircraft. The latter, involving the intensification of aircraft operations, is primarily dependent on the ability to handle a greater volume of passengers or cargo through the airport premises at any given time.

The air transport sector continues to expand and as such the Government has launched a consultation document (White Paper) requesting that UK airports develop a master plan to deal with the anticipated demand for capacity. The increase in passengers through UK airport terminals is shown overleaf in figure 4.3. This shows the high level of growth seen in the last twenty-six years.

Figure 4.3 Passenger Throughput at UK Airports 1981-2007

(Civil Aviation Authority, 2005a; 2009)

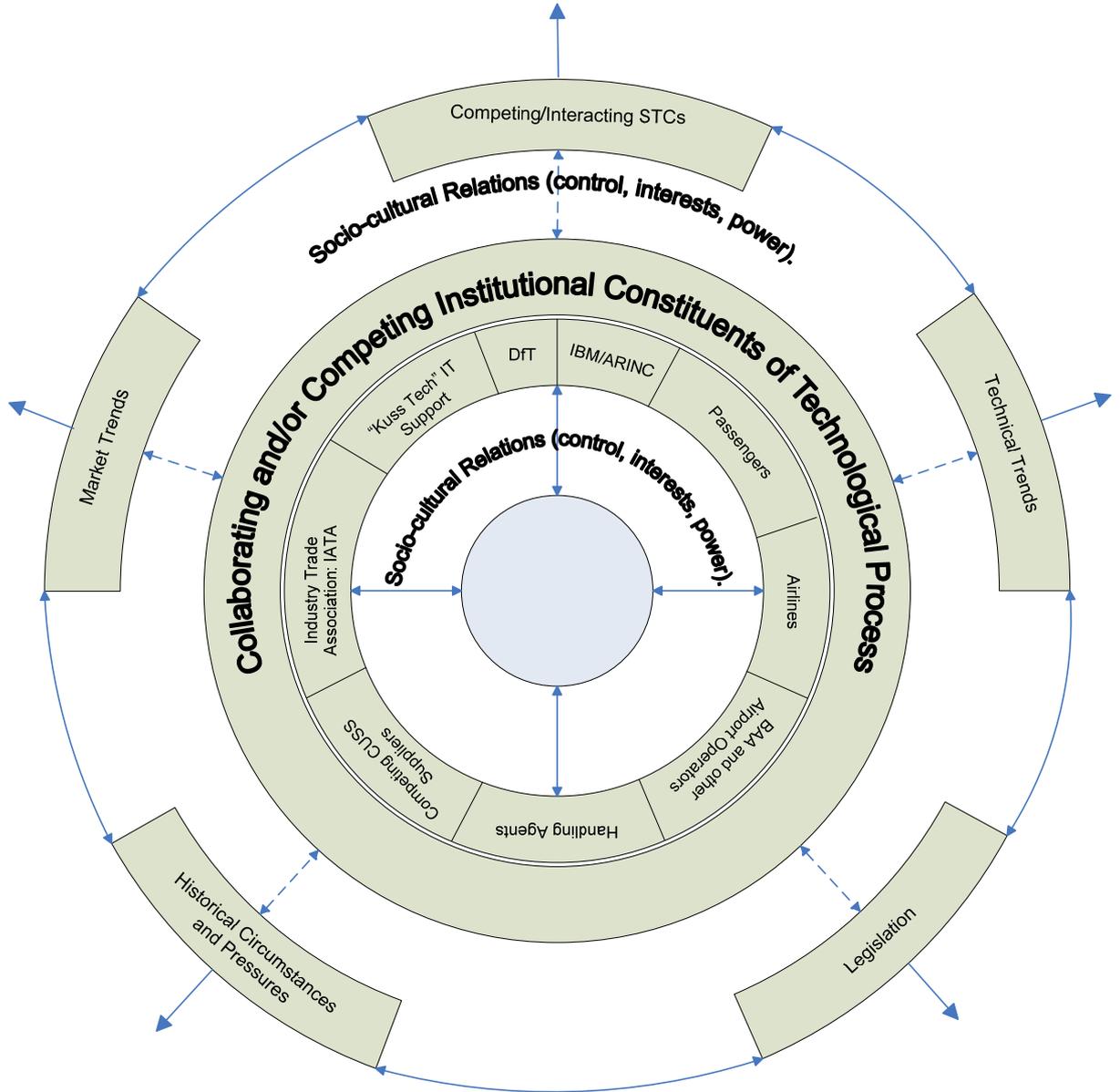
The period 1981 to 2007 has seen passenger numbers at UK airports grow from 57 million to 240 million (Civil Aviation Authority, 2005a; 2009). In this twenty-six year period, year-on-year passenger numbers have decreased on only one occasion, 1991. This emphasises the pressures airports face to make best use of their infrastructure and to plan expansion accordingly. In a period of increased regulation, with restrictions placed upon airport expansion over the next thirty years, airport operators are turning to intensifying the use of their

infrastructure where expansion may have been an option in the past. The industry association IATA has pushed technology to the fore as a source of increasing productivity of airports using a variety of technological solutions.

Structural Features of the UK Airport Sector, Mapping the Inter-Organizational Sociotechnical Constituents

This section begins to trace the relationships between the inter-organizational constituents that are connected with the Common-Use Check-in Kiosk technology featured in the case study of Nottingham East Midlands Airport (NEMA). It reveals that a variety of agents and institutions are involved in the implementation of automated check-in technologies for managing capacity constraints in the face of rising demand for passenger air travel. Rather than a conventional stakeholder analysis, the mapping of inter-organizational sociotechnical constituents maintains a focus on the technology in question; the CUSS kiosk. These constituents were identified from a combination of out of case interviews and documentary data undertaken before conducting the case study of organizational change at NEMA.

Figure 4.4 The Inter-Organizational Sociotechnical Constituencies of CUSS Technology



The constituents identified in figure 4.4 above are integral in producing the conditions under which CUSS kiosks were adopted and in which the technology has developed. The role of constituents in shaping the context of CUSS Kiosks at NEMA is examined.

Government

The Government is a highly influential agent in the air transport sector. The term 'Government' is used here to capture central or national level policy and the remit of central government departments for example, the Department for Transport (DfT). Despite the privatisation of the airport sector and the 'arms-length' approach taken towards regulation in the nineteen eighties, the government is an arbiter of change. The recent government White Paper 'The Future of Air Transport' (Department for Transport, 2003) identifies the need for a development strategy to increase the capacity of UK airports. This policy document develops a framework for expanding capacity across the UK in line with the policies of sustainable aviation and the protection of passenger interests. The government's White Paper comes in response to rising demand for air transport and growing concerns about the future capacity of UK airports. The sustainable development of the sector is also at the heart of government policy. The White Paper represents a consultation between the stakeholders in the air transportation industry; although there is speculation about the maturity of the industry (i.e. for how long will it

continue to grow at its current rate?); there is consensus that operational capacity needs to be increased by 2015 and 2030. This is hugely significant for airports as an 'increase in capacity' in the White Paper amounts to the ability to increase infrastructure; specifically additional runways, terminal buildings, aprons and taxiways.

The provision of new facilities at airports is seen as key to developing the air transport sector and the related and supporting industries (Department for Transport, 2003; : Chapter 1; 1):

“The provision of adequate infrastructure and capacity is important for national competitiveness, for regional development, and for people’s ability to travel quickly, easily and affordably to where they want to go.”

The White Paper takes a regional approach to identifying and forecasting demand for air transport. This is designed to inform and involve airport operators in meeting the needs of the sector in 2015 and formulating longer term plans for development up to 2030.

In response to the White Paper, the government expects airports to produce and update 'master plan documents' (Department for Transport, 2003; Chapter 12; 2). These documents will outline development plans at the level of individual airports and is based upon meeting the long term regional and national needs. It is against this national policy that

MAG group has produced its own strategies for the group and the three individual airports it operates, including Nottingham East Midlands airport.

Local Authorities

Local authorities are also influential parties in the running of airports. At the most distant level, Local Authorities serve as arbiter between the economic benefits an airport may bring and the constituents affected by its operation. In many cases Local Authorities are shareholders in airports. This is a relic from the evolution of the sector. Airports that were not incorporated into British Airports Authority plc were turned into 'arms-length' operations. These Public Airport Companies (PACs) were formative in the process towards privatisation. Today there is no distinct model of airport ownership outside of BAA. A range of ownership structures exist with varying levels of public ownership and involvement. For example, Birmingham International Ltd is owned by Aer Rianta and Macquarie Airports Group with seven West Midlands' District Councils retaining 49% ownership of the airport. Luton Airport remains publicly owned by Luton Borough Council but is operated and developed under a Private Finance Initiative (PFI) deal. Manchester and Nottingham East Midlands Airports are both owned and operated by Manchester Airport Group which is wholly owned by the ten local authorities of Greater Manchester (Manchester Airport Group, 2009a):

- The Council of the City of Manchester - 55%
- The Borough Council of Bolton - 5%
- The Borough Council of Bury - 5%
- The Oldham Borough Council - 5%
- The Rochdale Borough Council - 5%
- The Council of the City of Salford - 5%
- The Metropolitan Borough Council of Stockport - 5%
- The Tameside Metropolitan Borough Council - 5%
- The Trafford Borough Council - 5%
- The Wigan Borough Council - 5%

International Air Transport Association, Simplifying the Business Initiative and CUSS Technology.

Common Use Self Service kiosk technology is an IT solution brought about to simplify and speed-up the passenger check-in process at airports. The International Air Transport Association (IATA) is a global trade association that represents 240 airlines, around 94% of scheduled international air traffic. Their mission statement is to *represent, lead and serve for the benefit of their members* (IATA, 2004). CUSS features as one of the target technologies behind the IATA's 'Simplifying the Business' initiative. The industry-wide project was launched in 2004 to provide technological solutions to specific areas in the air transport sector highlighted for improving efficiency and lowering operational costs (IATA, 2004):

"The Simplifying the Business (StB) program leverages technology, automates and streamlines processes to reduce

complexity and cost, whilst making the transportation of passengers and freight more convenient... .. StB projects bring a WIN-WIN situation to all stakeholders involved delivering annual industry savings of US\$ 6.5 billion.”

The initiative was based upon initially five, as of 2007 six, discrete areas which were envisaged as technological platforms for ‘*simplifying the business.*’ The overriding theme of StB is to reduce costs across the industry in a way that benefits all stakeholders. The specific areas identified for change are:

1. **E-ticketing**

Represents a project to transfer all paper-based ticketing to computerised (electronic) ticketing, IATA have set the target of 100% E-Ticketing by the end of May 2008 saving the industry an estimated \$3bn (US) annually.

2. **Bar Coded Boarding Passes**

In-line with the E-Ticketing initiative, bar coded boarding passes replace boarding cards with magnetic strips. The 2D barcode standard allows unique barcodes to be printed securely on conventional, domestic printers. This compliments e-ticketing technologies and facilitates home or online check-in. Airlines are expected to be compliant with the technology by the end of 2008 and for 100% uptake of the technology by 2010.

3. **IATA E-freight**

This project is effectively a move to an electronic supply chain

management system eliminating the paper trail connected with each airfreight movement. The efficiency and cost savings are expected to come from reducing errors, fines from customs and other government agencies and increasing timeliness of goods in transit.

4. **Common Use Self Service (CUSS) Check-in**

is identified as a significant platform for increasing the capacity for passenger handling and reducing costs in airports, this is discussed in detail in this case.

5. **Radio Frequency ID**

The use of silicon microchips emitting a unique ID are to be implemented in tagging baggage to reduce the level of mishandled baggage (each mishandled bag carries a substantial cost for airlines). Long-term projections are for the technology to be extended for use in the management of parts and aircraft turn-around.

6. **BIP and Fast Travel (added 2007)**

The 'baggage management improvement programme' (BIP) was added to the key areas in response to the rising level and time taken to reclaim mishandled baggage. The technological solutions include further systems integration, process improvements (i.e. early check-in by passengers) and improvements in existing technologies (i.e. 'read rates' of checked baggage to reduce handling errors).

The Fast Travel initiative is fundamentally an extension of some of the areas outlined above. The aims and objectives of the endeavour are to push more self-processing by passengers via particular technologies, including extending the use of CUSS platforms to other areas such as baggage tracking and reclaim.

As the major industry association, IATA is championing these related technologies under the Simplifying the Business initiative, creating linkages, competition and dependencies between the related sociotechnical constituencies. CUSS Kiosk technology is a favoured platform for delivering efficiency and cost savings across the industry. IATA estimate a per-passenger transaction cost saving of \$2.5 (IATA, 2004; 2008b). As part of the Simplifying the Business initiative, IATA have set targets for the uptake of CUSS technology. Within the first year, ten airports worldwide were selected to become CUSS compliant by the end of 2004. The uptake was pushed further by setting target dates for airports and airlines to invest in the technology; by the end of 2006 thirty-five, and by the end of 2007 seventy airports worldwide were expected to have adopted the technology. A combination of existing technology suppliers and new entrants has emerged to provide the kiosks.

A kiosk consists of a metal outer floor or desk-standing case with a touch screen to display the user-interface. The system runs on a standard Windows or Unix PC which runs kiosk management software and client software that communicates with the Departure Control System (DCS, see following section). The PC is connected to the airport's LAN via a standard network interface card or more recently by WiFi. Attached to the PC are a series of peripheral components; a credit card reader, a passport reader and a boarding card printer. Additional optional

attachments include a security camera (similar to a web-cam) and biometric sensory equipment for airports that have biometric security facilities.

This illustrates part of the sociotechnical constituency within which CUSS is embedded; simultaneously, there are related constituencies that lie outside of IATA's institutional support and direction such as whole-bag scanning for hold baggage, in-flight entertainment, in-flight communications, aircraft turnaround management tools, baggage tracking and the broad development of aircraft technologies.

Airlines and Airports

Airlines, rather than passengers, are the main customers of airports. They buy landing slots from the airport and pay charges to the airport and handling agents for using the facilities and services. Airlines are also represented by IATA and were involved in the formulation of the StB programme. Airlines that are CUSS-enabled (their own IT systems support CUSS systems architecture) have begun promoting the use of 'express check-in', emphasising the shorter check-in time that is supposed to be delivered using CUSS, in their advertising campaigns. Traditionally, commercial passenger airlines correspond to either scheduled or charter operations. Scheduled airlines include 'flag carrier'

airlines such as British Airways and operate a timetabled of routes. Charter airlines, such as Airtours, rely on seasonal demand, typically holiday periods (summer and ski seasons), and operate flights on behalf of tour operators and travel firms who purchase seats on aircraft. The last ten years have seen a third type of airline operation emerge in the air transport sector. Low-fare airlines, based on the business model pioneered by Freddie Laker and latterly Southwest Airlines, offer short-medium haul at low-fares on the premise of operating at full-capacity. In Europe two low-fare operators, EasyJet and Ryanair, dominate this market. The low-fare airlines operate on a 'no frills' basis to keep operating costs as low as possible. At NEMA, EasyJet financed an extension on the existing terminal building and opted not to join the CUSS programme. Instead the airline operates a series of dedicated self-service kiosks. Continuing this behaviour, competitor Ryanair announced their intention to abolish check-in desks (BBC News, 2009) in preference to kiosks and online check-in methods.

Handling Agents

Handling agents perform various ground handling services on behalf of airlines at airport sites. For example, check-in, baggage transfer and loading, maintenance, refuelling, load-control and catering are typically carried out by handling agents. Very few airlines employ their own staff

for the checking-in of passengers; an exception is typically the 'home' base of operations for airlines (e.g. British Airways at London Heathrow) where an airline employs ground handling staff directly. Accordingly there are several organizations that specialise in the ground handling aspects of preparing commercial flights, ServisAir, Menzies and Swissport are the three largest examples of handling agents and have operations worldwide. Usually the first contact a passenger has with the airline they are flying with is with the aircraft cabin crew. This was reinforced anecdotally at various points during the research; when you travel by plane, the first contact you usually have with the airline is when you step onto the plane. It is common that one or a range of handling agents, airport staff and security staff provide the customer interface with air passengers at airports.

Handling agents are implicated in the introduction of technologies such as CUSS, as it is effectively the automation of parts of their operations (e.g. check-in, Figure 5.3). As providers of check-in services to airlines, handling agents have been involved in either the purchase of CUSS kiosks or the 'hosting' of kiosks at airport sites. At NEMA, the airport both owns and hosts the CUSS kiosks, however handling agents continue to provide conventional check-in and also provide the bag-drop desks that accompany kiosk and online passenger check-in. A combination of scheduled, charter and low-fare airlines operate from NEMA, however the low-fare airlines are not involved in the use of CUSS kiosks.

Passengers

The CUSS Kiosk project, as well as providing a source of cost savings for airlines, is designed to reduce check-in times for passengers. Passengers are expected to check themselves in using the touch screen interface on the kiosk, reducing the need for paid check-in staff under traditional arrangements. IATA has conducted research into the best spatial arrangements for positioning and identifying the kiosks to passengers. They recommend placing the kiosks between the entrance to a passenger terminal building and conventional check-in desks and for the kiosks to be brightly decorated in a brand-neutral colour. To this effect, the kiosks at all of MAG sites are luminous green and at NEMA occupy the space between the terminal entrance and the rows of check-in desks towards the rear of the building.

Nottingham East Midlands Airport

This section provides a brief history of Nottingham East Midlands Airport. It provides a background to the setting and location of the Common User Self Service Check-In (CUSS) technology being implemented at the airport. The development of the organization is fundamental to the way technology is conceived, designed, tendered for, implemented and its

eventual use (Grimshaw, Cooke et al., 2002). The evolution of an organization provides significant cues towards understanding and validating actions and assertions observed in the individual case studies.

Nottingham East Midlands Airport (NEMA) began commercial operation on the site of a former Royal Air Force base in 1965. In its first year 118,305 passengers flew from the airport (NEMA, 2005). The 1970's saw the development of a freight handling centre and a runway extension increasing the capacity of the airport. Located close to the, then, recently extended M1 motorway freight carriers in the seventies began to use the airport more intensively. The growth in freight was significant; the amount of freight handled in 1970 was 1,586 tonnes by the end of the decade 6,283 tonnes (1979) was handled by the airport (Walker, 2005).

By 1985 one million passengers were using the airport each year and in response to the growth in passenger air traffic a £3.8m (at 1986 prices) terminal extension was opened in December 1986. At this time the first steps toward privatisation were made. The airport was owned and operated by four local authorities; Nottinghamshire, Derbyshire, Leicestershire and Nottingham City Council would become a Public Airport Company (PAC). This allowed the airport autonomy as an organization in its own right, compared with the series of committees who steered the airport. While the four local authorities still owned the

airport, it would be run more like a company than public sector infrastructure. However, this change in structure was opposed by the airport committee who saw this move as taking away the rewards from the local authorities who funded the airport's development and at the same time bore its financial risk for many years (Walker, 2005). The Airports Act (1986) enforced the change in structure; on the 1st of April 1987 the airport became a PAC.

The early nineties saw passenger terminal capacity reached and proposals for further extending the facilities were considered. Amidst a recession and increased pressure for local authorities to reduce spending the decision was made in 1993 by the four local authority shareholders to sell the airport making East Midlands Airport the first regional airport in the UK to enter the private sector (Walker, 2005). The airport was purchased by the National Express Group in August 1993 for the price of £24.3m and saw investment of £77m over the course of their eight year ownership (NEMA, 2006). The investment program was designed to increase the capacity of both passenger and freight movements. The runway was extended to 2,893 metres and a new control tower constructed. During 1994 the throughput of freight at the airport grew by 75% and saw the arrival of United Parcel Services locating their UK hub on site and the expansion of DHL into its own dedicated terminal. East Midlands Airport entered the top 100 world cargo airports and is currently the UK's top pure-freight airport (dedicated cargo aircraft) with

three of the four largest cargo handlers in the world located at the airport; DHL, TNT and United Parcel Service (NEMA, 2005; Walker, 2005; Civil Aviation Authority, 2006; NEMA, 2006).

The year 2000 saw Nottingham East Midlands Airport put up for sale by the National Express Group having taken the strategic decision to focus on their land-based activities. The airport was sold to Manchester Airport Group in March 2001 for £241m (Walker, 2005; NEMA, 2006). This placed NEMA as part of the second largest airport group in the UK (after BAA) alongside sister airports Manchester, Humberside and Bournemouth. The beginning of this period saw continued growth with passenger movements totalling 2.38m people during 2001 (Civil Aviation Authority, 2001). In the next five years a new business model for airline operations would see the airport need to adjust to both a dramatic rise in passenger numbers and the kinds of passenger using Nottingham East Midlands Airport. The advent of low-fare airlines has placed new demands on UK airports, both in terms of capacity for handling passengers and the ways in which airports provide services to their customers; passengers and airlines. This 'new' approach to airline operation generated new demand for airports, especially outside of the congested major airports in the South East of England. Regional airports became the choice of low-fare operators; NEMA with its location and capacity was attractive to low-fare operators. GO (now easyJet) and bmiBaby both established bases at NEMA and Ryanair commenced flights

in 2004. Historically, NEMA had established a customer base of both business passengers and seasonal charter/package passengers. With this passenger profile the airport had continued to grow over forty years. The advent of low-fare airlines operating from the airport helped passenger numbers to reach 4.3m in 2004 (Civil Aviation Authority, 2004). To put this in perspective, this represents growth of 97% on 1999 passenger numbers (Civil Aviation Authority, 2004), the low-fare airline model has stimulated demand in the airline sector creating new and significant challenges for airport managers.

In the face of limited expansion opportunities in the current climate of regulation indicated in the Government White Paper (Department for Transport, 2003) and trade association IATA's initiative to join up the operations of airports, airport organizations are re-appraising how to meet rising passenger demand for air travel. One of the responses by airport organizations is to implement technologies to improve the handling capacity of their terminals; the common-use self service check-in kiosk (CUSS) is one of Manchester Airport Group's responses to increasing passenger numbers, saving costs and delaying the physical expansion of terminal buildings. Across the Manchester Airport Group 90 CUSS Kiosks have been implemented; 78 at Manchester (Ringway International), 10 at Nottingham East Midlands Airport and 2 at Humberside. At the Manchester Site the 78 kiosks will be 'hosted' by handling agents on behalf of airlines, at NEMA the kiosks will be hosted

by their own customer services staff and at Humberside the kiosks will receive no dedicated hosts. For this reason NEMA represented a good example of technological change within an organization. The case study in Chapter 5 looks at the process of sociotechnical change in Nottingham East Midlands Airport following the introduction of CUSS kiosks.

Airports as Complex and Changing Organizations

The organizational functions of a present-day international airport are vast, numerous and complex (Pitt, 2001; 150):

“Essentially an airport is itself a small city with all of the associated functions from receiving aircraft to providing chapels.”

The airport, as an organization, therefore offers an eclectic and rich site for research. Although the focus in the case study is concerned with the impacts of technology on one organization, it should be acknowledged that ‘the organization’ is itself both complex and embedded in a complex network of other organizations and customers (Knox, O’Doherty et al., 2007; 2008). From fairly humble, functional beginnings as no more than tents in a field (Adey, 2004), airports as we recognise them today are a fairly recent phenomena of the last 40 years or so. The huge international hubs we see today are even more recent a development following the deregulation by the US government of airline and air-route

competition rules in the late 1970's (Adey, 2007). With the exception of Knox et al. (2007, 2008) airports as organizations have received only limited attention in organization studies literature, however, airports feature in other disciplinary areas, particularly sociology and social geography. For example, they feature in broader accounts of societies; airports are nodes connecting the flows of people, capital, information, social and organizational interactions and symbols and images that are constitutive of the 'network society' (Castells, 1996; Knox, O'Doherty et al., 2008). The disciplines of social geography, architecture and cultural studies also have produced bodies of literature that investigate the spaces that airports occupy and create. These spaces are artificial, human-engineered arenas designed to mediate the flows of passengers by producing mobility and immobility (Adey, 2007). Flows of passengers are influenced by protocol, security and commercial interests. Check-in is both a necessary protocol and a primary security measure in the flow of passengers. It is at this point that a ticket-holder becomes a passenger; they are checked against the airline's booking system and are registered as having arrived at the airport. During the check-in process, they are asked security questions about the contents of their luggage and ground staff ensure that luggage is 'reconciled' with its accompanying owner on that flight. Other areas of the airport produce what Gottdiener (2000) calls *the merger of the mall with the terminal*. This is not exclusively the domain of shopping in passenger terminals, but the combined configuration of shops, restaurants, bars, cafes,

seating, shower facilities, crèches, lounges, video game arcades and various information points. There is a purposeful combination of facilities and their spatial arrangement in the terminal produces different flows of mobility and immobility (Adey, 2007) in passengers' journey to the aircraft.

While these literatures are pertinent to developing an understanding of airports as empirical sites, they often do not pertain to the organizational dynamics that are under investigation in this case study. Knox et al.'s (2008) work begins to unravel the organizational complexities of an airport site. As their paper and the socio-technical mapping of inter-organizational constituents (fig 4.4) reveals, the airport is a complicated network of organizations and organizational co-dependencies. A poignant example from the authors' work is in the study of customer services staff at Fulchester airport. The customer services staff work "to maintain a seamless 'flow' by eliminating or displacing the complex fractures of organizational boundaries" (873). In one example the customer services agents are dealing with a delay in the handling of baggage from an incoming flight. The agents have no influence over the baggage handling company contracted to the airline to offload the bags, and hence, they are implicated in spanning the fractures of organizational boundaries (Knox, O'Doherty et al., 2008).

Chapter 4

The literatures reveal that a large, commercial airport is typically an ensemble of different organizations that produce the systemic possibility for air transportation. Inevitably, as with almost any modern organization, or cluster of organizations, numerous ICTs are entrenched in organizational design and function. Knox et al. produce an insightful account of the organizational complexity of an airport and illustrate vividly the implications of ICT for the day-to-day running and routines of an airport. Crucially, the authors emphasise the complex and interwoven characteristics of organization and technology in sustaining the 'nervous system' that keeps the airport alive. This strengthens the case for the micro/macro perspective taken in this thesis by using sociotechnical constituencies as a technique for mapping the terrain where analogue and digital 'flows' sustain a system greater than the technology itself.

Chapter 5 The Case of Common Use Self-Service Check-In Kiosks at Nottingham East Midlands Airport:

This chapter examines the industry changes seen in the air transport sector before presenting the case study of the introduction of CUSS Check-in Kiosks at Nottingham East Midlands Airport.

Industry Changes and Strategic Challenges:

The air transport sector has started to experience some fairly substantial changes over recent years. In chapter 4 a profile of the air transport sector signalled several factors that have created conditions for change amongst constituent organizations. The most significant driver for change is the sustained growth in passenger numbers; the only exceptions are small declines in the early nineties and following the terrorist attacks of 9/11 2001 in the US. The average year-on-year increase in passenger numbers the UK is around 6%. In the period following privatization, the airport sector has become increasingly consolidated with just three firms controlling nearly 80% of all passenger movement in the UK: BAA, Manchester Airport Group (MAG) and TBI Ltd (see figure 4.1).

From the overview of the air transport sector the consistent responses from airport operators has been that maintaining and increasing passenger numbers is crucial to success in the industry. The logical imperative for airport operators from this dependence on passenger numbers is that airports must remain on top of their capacity to handle increasing numbers of aircraft. In the UK there have been no new airports built in over 20 years, producing significant differences in strategic response to the increased demand for air travel by different airports. The three typical responses that have been seen across the industry are:

1) Concentration on a particular market e.g. low-fare carriers. To re-model airport operations around a particular market. Luton airport is a leading example of this business model:

The commercial pressures facing airport operators have evolved beyond those of providing the necessary infrastructure to operate flights. The advent and subsequent growth of 'low-fare' airlines have altered the industry significantly (Doganis, 2006). The impact upon airport operators from 'low-fare' operations ranges from the increase in aircraft movements, the type of retail and catering through to the design of departure gate areas. The CEO of Luton Airport explained to me how the physical design of areas around departure gates at his airport were altered in response to increased EasyJet operations. The changes were

made to reflect the operational requirements of the low-fare business model. Reduced seating and the addition of a queuing system was introduced, first to enable the most rapid loading time of each aircraft (unlike scheduled flights, seats on the aircraft are unallocated) and second to encourage increased passenger spending on retail and catering made available in the area ('low-fare' operations do not have in-flight catering inclusive of the ticket price, so passengers are able to buy food pre-flight at the airport or in-flight). Although he went on to explain that the recent expansion of Luton airport was unpopular with their largest customer, easyJet, because of the inherited cost of expanding terminal buildings. Essentially, the airline wanted "minimum airport at minimum cost", a purely functional transaction where costs and aircraft turn-around speed are paramount.

2) The extension of runway, apron and terminal infrastructure to allow more, and greater capacity aircraft to operate:

The government is reviewing the future of air transportation and will allocate additional runway capacity. The government review of the air transport sector has prompted "strategic master plans" from all airports as part of developing policy to cope with the increase in demand for air travel and reconciling this with pervasive dialogues of health, the environment and security. The resulting White Paper implies that airport

operators must make optimal use of their capacity before additional airport expansion is approved (Department for Transport, 2003; 24):

“The availability of sufficient airport capacity is an important constraint on future growth. Our starting point is that we should make the best use of existing airports before supporting the provision of additional capacity. A sustainable approach entails first making better use of existing infrastructure, wherever possible, and this has been a primary consideration in developing our conclusions...

... However, even at current levels of use, many airports in the UK are becoming increasingly congested as they attempt to cope with rising passenger numbers. In some cases, the capacity of terminals and runways is at, or near, saturation point.”

The availability of runway capacity at key UK airports is crucial to their continued expansion; the problem of operating near-full capacity is compounded by the lack of viable space for adding new runways at existing airports (Doganis, 2006), not to mention the political sensitivity and financial cost of building new runways. It is the availability of capacity in the future that allows airports to compete for more business (flights) from airlines. This was illustrated in an interview with Airports Standards manager for, the now disbanded, XL Airways. Our discussion was focused on the issues of capacity and competitiveness of UK

airports. Here he is discussing the problem of lack of capacity at Gatwick airport because of its single runway design:

“And of course you’ve got the restriction of one runway. Because it’s the busiest single runway in the World, and to be truthful they’ve got it fantastically weighed off with two-minute slots, but with the uncertainty of a new runway and nothing going to happen until 2019 at the earliest, then who’s going to invest in growth in this airport until you find out what’s going to happen? That’s the problem.”

This example highlights the importance of runway capacity in order to sustain and attract airline customers, the speculation and slow process of deciding where and when new runways are to be constructed has triggered hesitancy among airlines in expanding routes to certain UK airports.

However, as the construction of new runways is a highly regulated and slow process, major airports in the UK have opted to either construct new terminal buildings or extend and enhanced existing building infrastructure to increase passenger handling capacity. This is shown in table 5.1 overleaf where all but one of the top 15 largest UK airports has expanded their passenger terminal capacity:

Table 5.1: Top Fifteen UK Airports by Passenger Numbers and Recent Passenger Handling Capacity Expansion.

Rank in Pax Numbers	Airport	Terminal Building Development
1	Heathrow	T4: 1986 T5: 2008
2	Gatwick	North Terminal: 1988, extended in 1991, 1994, 2001, 2005. South Terminal Extensions: 1994, 2000, 2005
3	Manchester International	Terminal 2: 1991
4	Stansted	Extension: Late 2008 New Terminal: 1991
5	Birmingham International	Eurohub (T2): 1991, Terminal 1 & 2 Link Extension: 2000 Extension: 2005
6	Luton	New Terminal: 1999 Extension: 2005
7	Glasgow	Second Terminal Building: 2004
8	Edinburgh	Extension: 2006
9	Bristol	New Terminal: 2000 Extension: 2005
10	Newcastle	Terminal Extensions: 1994, 2000, 2004
11	Belfast International	-
12	Liverpool	New Terminal Building: 2002 Extension: 2005
13	Nottingham East Midlands	Extension: 1996
14	Aberdeen	New Terminal Building: 1998
15	Leeds Bradford	Extensions: 1996, 2006

(Based on: Civil Aviation Authority, 2005b)

Any extension work to existing terminal buildings is expensive and disruptive to operations. New terminal buildings are also under

increasing scrutiny in the form of government regulation, local residents around airport sites and environmental groups (BBC News, 2004a). The government White Paper on 'The Future of Air Transport' (Department for Transport, 2003) has set out a finite level of expansion which will be re-appraised following the submission of 'master-plan' documents from each airport. The master-plan document would outline the case for expansion and permission for expansion would be granted against the range of considerations outlined in the white paper. In summary, airport expansion was deemed necessary but would be capped and had to be judged against local considerations, regional demand for air travel and transport alternatives (e.g. rail). This has made expansion in terms of infrastructure an uncertain option for UK airport operators leading to some firms to investigate alternative solutions. The introduction of Common-use Self-service Check-in Kiosks by the Manchester Airport Group is one such alternative response; looking toward investing in operational technologies to improve aircraft and passenger capacity across their sites.

3) Investment in operational technologies to improve aircraft and passenger capacity at airports.

This is a strategic response by airports that have capacity to expand operations with current runway/apron facilities. This is generally achieved through improving 'landside' facilities and producing operational

efficiencies to reduce costs and attract new business. The implementation of CUSS kiosks by Manchester Airport Group across its airports, including NEMA, is an example of this strategy.

From a review of the literature and my own data, several characteristics of the air transport sector emerge. First is the complexity of the sector generally, and additionally, airport organizations as complex operations in their own right (Knox, O'Doherty et al., 2008). Secondly, in the UK it has been signalled that there is insufficient airport capacity to meet passenger demand in the future (Department for Transport, 2003; Doganis, 2006). There are particular concerns among airport operators and airlines about runway capacity especially around London and the Southeast. Furthermore, any expansion will be part of a prolonged review and consultation process. This has prompted airports and airlines to reconsider their competitive positions. For airport organizations, the various strategies of market specialisation (e.g. low-fare airlines), physical expansion or investment in operational technologies (e.g. CUSS) are alternatives for strengthening their competitive position. Likewise, airlines are looking to cut-costs using IT, retaining the best landing slots, strategic alliances and investing in infrastructure to remain competitive (Doganis, 2006). It is under these conditions that Manchester Airport Group decided to add CUSS as a technology to increase efficient use of terminal space while reducing transaction costs on each check-in transaction.

An Introduction to CUSS at NEMA:

This case explores the impact on the organization of the introduction of Common-use Self-Service Check-in kiosks (CUSS Kiosks) at Nottingham East Midlands Airport (NEMA), a large regional airport in the UK.

In the review of the literature I highlighted the apparent gap between technological determinist and social constructivist frameworks often used to try to understand the impact of technological change in organizations. It was argued that neither of these accounts is entirely equipped to deal with the complex interplay that engages organizations and their interaction with technologies (Kimble and McLoughlin, 1994; Molina, 1999; Kallinikos, 2006b; Kallinikos, 2006a; Avgerou and McGrath, 2007). One of the contributions of this research is to respond to this gap by adopting a sociotechnical framework, recognising the mutually constitutive relationship between social actors and technological artefacts. This case study develops a sociotechnical analysis to investigate the social domain and 'the technology' that lies behind CUSS check-in kiosks and to examine the effects of introducing this technology into NEMA organization, for example (Molina, 1999; 1):

"Many studies show explicitly or implicitly that the term 'technology' merely black-boxes the true complexity of an enormous population of 'specific technologies', each with its own

practical implications for innovation strategies or technological processes.”

The following case concerns the introduction of the new CUSS Kiosk technology within the specific context of NEMA. As outlined in the research methods and literature review sections, the empirical component of this thesis examines case data in the context of its sociotechnical constituency (Molina, 1990; Molina, 1993; Collinson and Molina, 1995; Molina, 1999) and then employs a fine-grained sociotechnical analysis of the implementation of new technology using the framework developed by Avgerou and McGrath (2007). A combination of semi-structured interviews, non-participant observation and documentary sources were used to collect data for this case-study.

Background: CUSS Technology and the Check-in Process

This section compares examines the background, constituent technologies and systems that are associated with the development of CUSS kiosk technology. Passenger check-in for commercial airline travel is a fairly standardised and regulated activity; there are very strict regulatory requirements upon airlines and handling agents about how the process is performed. Simultaneously, the booking, ticketing and departure planning aspect of information systems have each evolved on nearly an airline-by-airline basis. Because of the airline-by-airline

development of discrete technologies to perform equivalent transactions (e.g. reservation or check-in) there “is significant scope to join things up” (Head of UK operations, SITA). The use of computer technology for passenger check in began in the 1960’s, however it is the availability of the microprocessor that has really brought about massive changes in air transport operations since the early 1980’s, as Doganis (2006; 197) writes:

“IT has underpinned and affected every aspect of airline operations from aircraft maintenance to crew rostering and from revenue accounting to gate allocation at airports. But most airlines, in response to pressures to implement IT across their different operations, ended up with a series of IT silos. That is to say that each of many functional areas within each airline was running its own IT platform, which could not integrate or communicate with most of the others”

These “IT silos” are what created the necessity to “join things up” and what lies behind the rationale for IATA’s StB initiative. Since the early 1980’s, airlines have downsized the number of ground staff meaning that handling agents and airports undertake many of the tasks previously handled ‘in-house’. A non-technical consequence of this is that airlines frequently had large amounts of back-office space in valuable terminal building space to accommodate the hardware and personnel needed to run these systems. Additionally, the trend for strategic alliances within

the airline industry also provides impetus for inter-operability between separate airline information systems. It is hard to emphasise enough the difficulties created by these legacy systems. Here we are starting to peel-back the technological underpinnings of the airport organization. On visits to other UK airports I was invited to look at some of the server rooms that occupy large, air-conditioned, offices within the terminal buildings. For the purpose of check-in computers, strictly lineated racks of network switches and servers are stacked from floor to ceiling, arranged by which airline and type of DCS the machine was serving. The representative from SITA draws my attention to a pair of ISDN modems located in the server rooms. He explains that these are “emulating older systems” to enable the desktop PCs used by check-in staff to communicate with elderly legacy airline reservation systems. This is not unusual. The data collected from representatives at 5 major UK airports all signalled that some of the “silos” (Doganis, 2006) had disappeared due to upgrades and replacements, while the vast majority remained intact leaving airports and handling agents in the position of having to innovate the means to bridge an eclectic ensemble of technologies. This tells a quite a different story from, as Knox et al. have described (2008), the ‘liquid modernity of airports’ where people, organization and objects constantly fluctuate from the virtual and real in their passage through the airport. The authors seem to have been seduced by a digital gloss which papers over the cracks created by the lengthy evolution of what were functionally distinct information systems. This is not to undermine

the valuable insights the authors make to illuminate the organizational complexities of airport operations. However, the TOBIAS airport management system in their paper provides the links between what may have been “silos” in the past, and in this sense it is the *informatization* (Kallinikos, 2006b) of airport operations that enables this system to bridge the many complex functions in the airport. For this reason, TOBIAS forms a ‘digital gloss’ as the information content it processes by the layers of technologies that bridge, emulate and translate from older legacy systems operational on the front-line (e.g. check-in) of airport life. To treat the airport as the threshold of ‘light’ and ‘liquid’ modernity, part of a ‘post-human’ ontology and where “the boundaries, content and definition of subjects and objects become increasingly fissiparous and uncertain as they pass through what are multi-dimensional spaces of an airport” (2008; 884), neglects the significance of the legacy of information systems technology in airports. The bigger picture is that the technology of airports today is still heavily dependent on the technology of the past, and check-in is no exception.

Since the 1960’s the ticketing and reservation side of airline operations have developed information systems that allowed agents (either the airline itself or travel agents) to make ticket bookings. These were stored on a central database, often physically situated at an airline’s ‘base’ airport. Upon arrival at the airport passengers are checked against this central database and terminal equipment was used to:

1. signal the arrival of a passenger
2. allocate them a seat on the aircraft (some years ago, to indicate smoking or non-smoking seating)
3. log the number and weight of bags
4. issue a boarding card to the passenger
5. on some check-in systems there are features to communicate other requirements such as dietary requirements, elderly or disabled passengers requiring assistance, children travelling without parents or guardians.

Terminal equipment was originally an airline-specific technology, a dedicated computer terminal which would connect via telex relay to the main database; this was eventually superseded by desktop computers running software that would emulate the terminal equipment for each airline. In the early eras of the computerisation of check-in, every airline would employ its own dedicated check-in staff who would be trained in using the airline's own check-in system, a consequence of the information system "silos" that developed within airlines (Doganis, 2006). Today it is very rare for airlines to directly employ their own check-in staff, only a few of the major 'flag-carrier' airlines still do this and this is usually at their home base or major hub airports around the world. It is the norm for handling agents (e.g. Servisair, Menzies, Swissport, SAS Ground Services) to provide check-in services on behalf

of their airline customers, just some of the organizational actors who constitute 'the airport' (Knox, O'Doherty et al., 2008). This indicates the state of airline information systems and their implications for the functions that need to be contained within the organizational bounds of an airport. It also illustrates the scope for "joining-up" the disparate and fragmented pockets of various systems that make up airline and airport information systems. Of course, CUSS is only one of many possibilities for streamlining and improving airport operations using ICT as the IATA-led, StB program shows (IATA, 2004; 2008a).

From the check-in process, a number of crucial pieces of information are collected for the airline to prepare the flight. The number of passengers and the weight of their baggage are used to calculate the amount of fuel needed for the flight alongside various other contingencies including in-flight meals and load-factors (the weight and distribution of baggage throughout an aircraft affects its take-off and in-flight characteristics; pilots adjust the aerodynamic characteristics of the aircraft according to the load of the aircraft).

The technological history and regulated information requirements have created the opportunity for the development of technologies such as CUSS and online check-in to provide alternative ways of processing passengers. Figure 5.3 illustrates the operational differences between three technological solutions to passenger check-in; conventional, CUSS

and online modes of check-in. However, these technological systems must also perform within the defined rules of the industry. A familiar example is the security questions that are, by law, asked at check-in and so where a human check-in agent must ask these questions, so must the technology.

The concern of this case study is the implementation of CUSS check-in kiosks at a large regional airport. Common Use Self Service check-in kiosks provide an automated service which allows airline passengers to check-in for their flight via the use of a touch screen computerized kiosk, without the need for a member of staff. The *common use* component of the technology constitutes a major advance in the self-service kiosk technology. Proprietary kiosks i.e. kiosks dedicated to a single airline have been in operation for several years. *Common use* means that a single kiosk can serve many airlines by switching between the various software packages that communicate with the information systems each airline uses to manage their flights – a departure control system (DCS).

There is a range of DCS's that have evolved as silos over many years and are generally specific to each airline or strategic alliance. The current range of departure control systems operated by airlines vary greatly in the complexity of their software and thus place different requirements upon hardware and their software operating environment. This is the major development that CUSS represents; the ability to

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rapidly switch between DCS applications per passenger transaction. A systems manager from one of the leading global providers of air transport ICT contrasts the sophistication of airline DCS's:

"Some departure control systems are, or the software for it is, a lot simpler than others. I mean some systems are very basic, old DOS applications; some are very advanced, heavy Windows applications which can take about 5-10 minutes to actually load up for check-in."

The variety of DCS's in operation at any airport site is yet another demonstration of the silo effect from systems development over 50 years by individual airlines.

Figure 5.1 Typical Systems Topology for ‘Conventional Check-In’ and ‘fit’ with other airport information systems

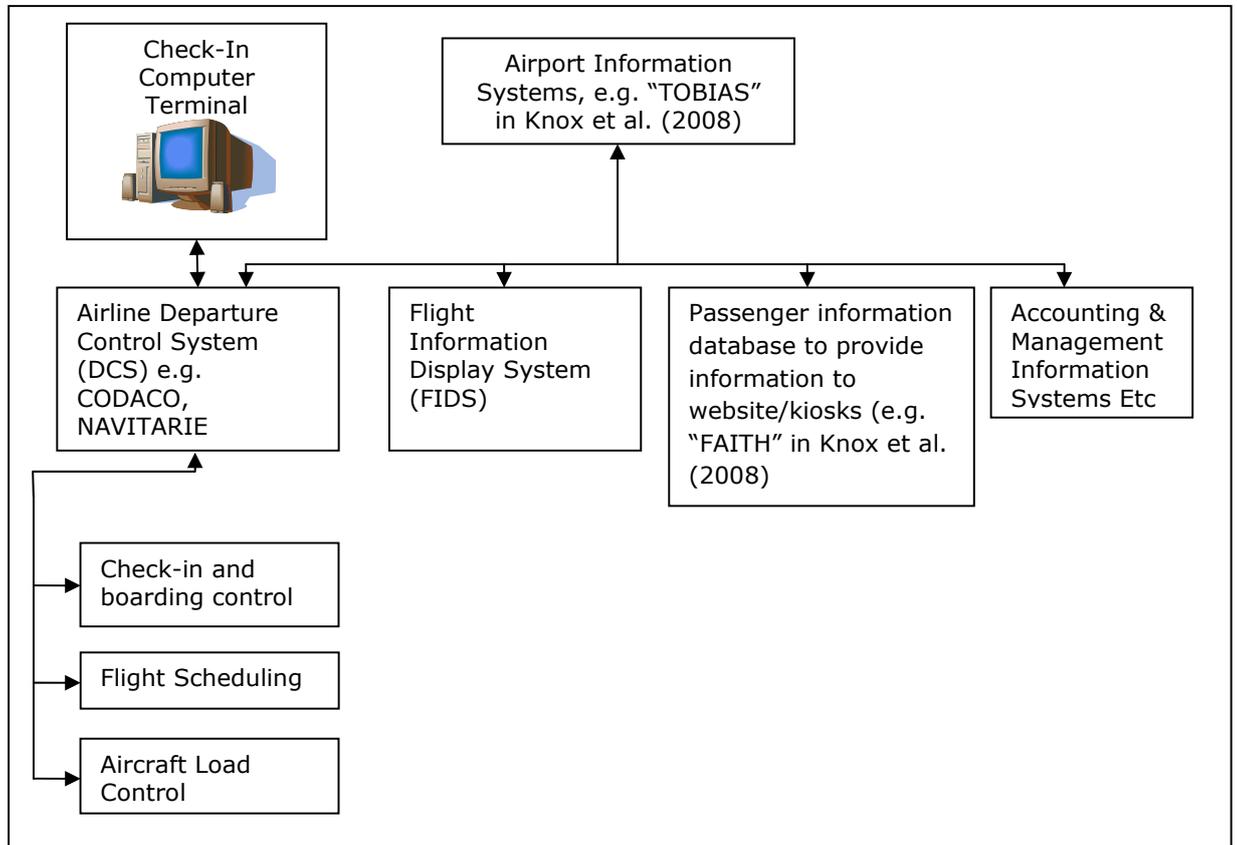
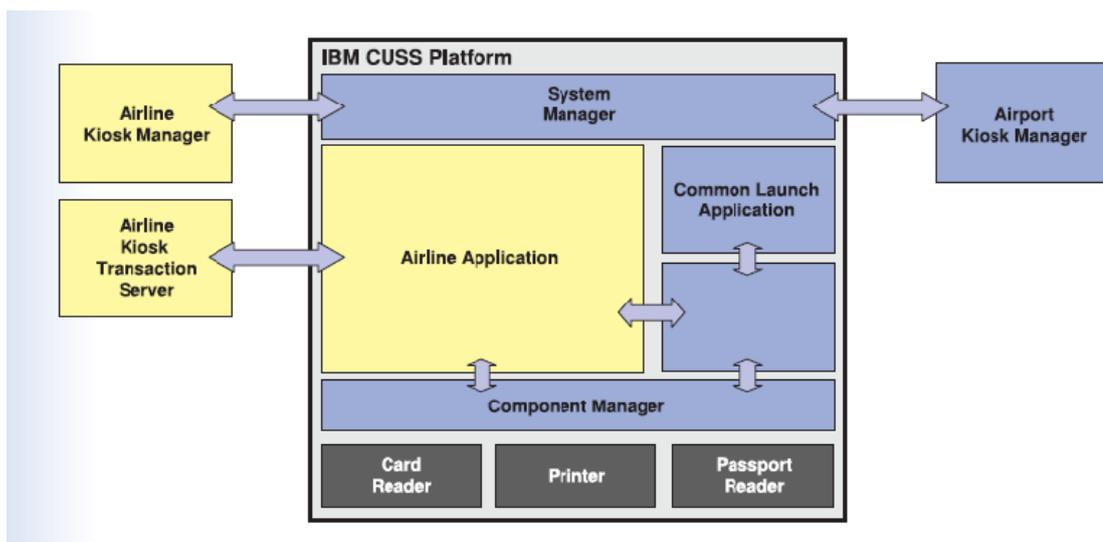


Figure 5.1 maps the typical configuration of a standard check-in information system and its connections. A computer terminal located at a desk in the airport terminal is used to process passenger information which is then communicated to a DCS and other airport and airline systems. From here boarding cards are printed and baggage is tagged and weighed. It also starts to show the complex interdependencies between various information systems and actors to produce the events that are necessary for an airport to function.

For CUSS to function, it has had to overcome the barrier of compatibility with multiple types of DCS. CUSS therefore brings a standard interface – which passengers use – and enables this to work with a multitude of airline systems. This is generally achieved by modifying the existing DCS to accept information from kiosks via a kiosk server which translates passenger information into an acceptable form for the relevant DCS. The kiosk itself runs an application that enables the retrieval of information from a DCS and the transfer of the necessary information back to it (e.g. reconciling a credit card read by the kiosk with a passenger booking held on an airline information system). The kiosk will launch the relevant application when the passenger selects the airline with which they are flying. Figure 5.2 shows the IBM CUSS system architecture in place at NEMA (Source: IBM, 2006):

Figure 5.2: Example of CUSS Systems Architecture.



The CUSS systems architecture is a significant development in computerised check-in technology. The figure above clearly illustrates how the kiosks sit in between airline and airport information systems. The technology has been designed to work alongside long-established systems but enables common-use by the ability to switch between airline check-in systems on a passenger-by-passenger basis. The development of kiosk technology for airline check-in has occurred in an area not only of different airline DCS technology, but one of strict process and protocol. For example, every passenger has to be asked security questions about their baggage. In addition they must also be identified as the passenger, or a representative of a group of passengers on the flight. These are international and legal requirements of passenger check-in.

Figure 5.3: Comparison of different modes of passenger check-in

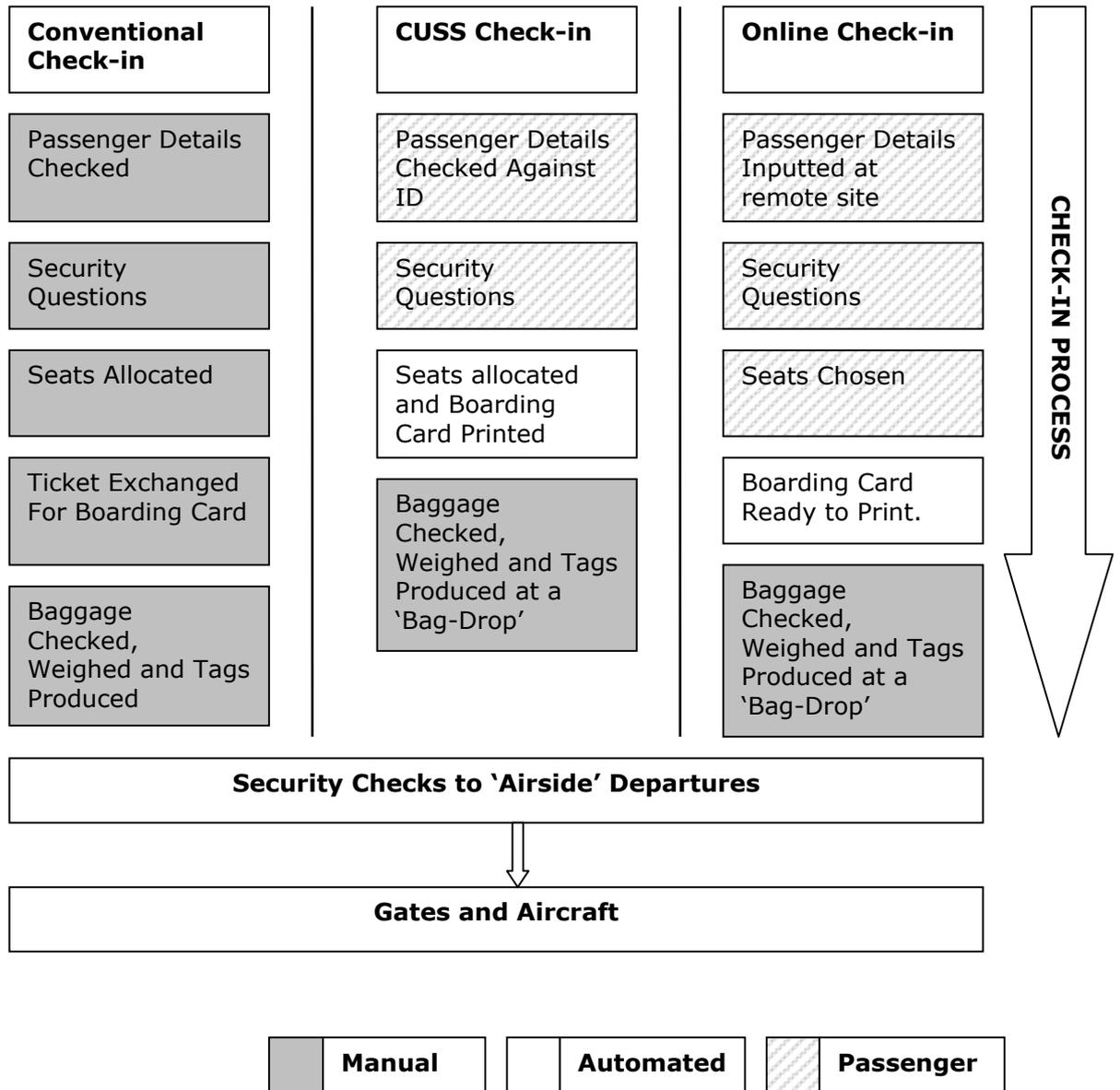


Figure 5.3 shows a side-by-side comparison of check-in modes available using different check-in technologies. The shading in the figure above

depicts the level of automation involved using the three check-in technologies available. Both CUSS kiosk and online check-in technologies introduce an element of self service by the passenger. It is anticipated that these modes of check-in are not only faster to use for passengers, but reduce the cost of every check-in transaction; there is a reduced staff requirement and more passengers can go through the check-in process in a similar floor space within a terminal building.

At the time of writing, NEMA has both conventional and CUSS check-in capabilities. There are plans to launch online check-in with one of the airlines for the summer peak-season in 2008. This will increase the use of bag-drop desks (the interchange where checked luggage is passed from passenger to handling agent to be placed on the flight). Passengers will check-in using CUSS or online either by computer, PDA or mobile telephone and will proceed straight to the bag-drop desks where their baggage will be weighed, tagged and sent to the correct flight.

These kinds of technology opens the possibility for check-in to be performed outside of the usual departure hall with an array of desks located in the terminal building of the airport. Kiosks can be located at car-park facilities or at nearby public transport interchanges (e.g. bus and rail stations). The kiosk represents functional simplification (Luhmann, 1993; Kallinikos, 2004; 2005; Kallinikos, 2006b) of a portion

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of the check-in process (see figure 5.3); the checking of passenger details, the legally required security questions are asked, the allocation of a seat on the aircraft and the printing of passengers' boarding cards are all performed by the CUSS kiosk machine. Having checked-in for the flight, the passengers then must then take any hold baggage to a 'bag-drop' desk (similar to a conventional check-in desk, but only dealing with the processing of hold baggage). At this stage the bags are weighed, tagged and associated with a passenger on the flight. It is a legal requirement that hold baggage is 'reconciled'; bags cannot travel without their owner. This was implemented as a security measure following the bombing of Pan Am flight 103, where a bomb placed in an unaccompanied suitcase exploded bringing the aircraft down over Lockerbie, Scotland UK. Bag-drops are used to transfer passengers' baggage to be stowed in the aircraft hold by passengers using online as well as CUSS check-in.

For managers at MAG and NEMA this presented a new spatial challenge that had never been encountered in check-in halls before. Check-in desks typically line the back-wall of a building, opposite the entrances to the airport. There is one member of staff per desk who completes the check-in for a given flight and one flight at a time is served by a number of desks. The layout is conducive to accommodate queuing space in front of the desks and as a safe buffer between the automated baggage handling system that lies directly behind the desks and members of the

public. The adoption of kiosk and online technologies means that the 'desk' in the departure hall takes on a different function; to tag and then transfer baggage from the passenger to the baggage handling system. This has two immediate implications for the way space is used in the building. First, is that kiosks occupy the space where passengers would queue for the traditional check in desk and second, that kiosks and bag-drop desks will serve more than one flight at any given time. This presented challenges to managers who had to reconcile the addition of kiosk operations to established and solidified airport designs.

In the first era of self service check-in, individual airlines installed their own (proprietary) kiosks to reduce the number of check-in desks they would have to hire from an airport and pay for staff from handling agent companies. This was problematic for two main reasons. The first is that airport managers lost control of available space in their terminal buildings. Once an airline installed a dedicated kiosk, this was space that could not be used for anything else. Furthermore, if all airlines were to install their own equipment the terminal floor space would become overcrowded with kiosks. Secondly, proprietary kiosks did not fit with the established revenue streams in the airport industry. Whereas airports and handling agents may still receive revenue from operating bag-drop desks, a kiosk had no immediate yield for either airport or handling agent. This was a common issue raised by managers at NEMA

and MAG, the Terminal Services Development Manager at Manchester Airport recalls:

“It all started when airlines were going to self-service and more and more airlines were going individually to self-service and airports then started to say ‘oi, you know, there’s going to be a proliferation of these machines, do we start charging for floor space etc etc?’”

CUSS kiosks allow airport managers to control the space in terminal buildings because they are owned and positioned by the airport. At the same time, airlines can be charged per transaction using the kiosks which means that revenue can be generated by the airport. As the StB initiative identified and as the associated IATA materials emphasise (2004; 2008b), CUSS will deliver substantial savings as compared to conventional check-in. This balance of ownership by airports and payment by airlines seems to satisfy both parties. The implementation of CUSS does appear to take business away from handling agents, firms that would provide trained staff to perform conventional check-in on behalf of airlines. An interview with the Head of Operations at Gatwick for a major handling agent revealed that CUSS was perceived more of an opportunity for handling agents than a threat:

“From the check-In side of things, you already have Internet check-in, kiosk check-in, which is all fine; those are technologies that are being explored by the community. We’re exploring the same technologies because as a handling agent we provide the service and while it’s a produce enhancement, it doesn’t get away from the fact that you’ve still got to dump your bag. You know, so you still have the infrastructure requirement.”

For the constituent agents involved in airport operations, CUSS is certainly re-shaping the way they conduct their business. For handling agents, it has prompted a move toward running the bag-drop desks, having customer service teams to assist with CUSS check-in and focusing on ‘airside’ operations such as baggage handling, catering, cleaning and passenger movement on the airfield (stairs, busses, etc.). Amidst an industry move toward passenger self-service, handling agents have been quick to adjust their organizations to suit the self-service environment. In this sense it is possible to see how technologies such as CUSS are involved in shaping the spaces within airport terminals and simultaneously are reshaping the activities of organizations involved in airport operations. While the informational aspects (reservation, ticketing, passport checks) of passenger check-in are now dispersed across a range of available technologies, handling agents are focussing more on the physical flows of baggage that occur at check-in.

The following sections examine the roles internal organizational constituents involved in the implementation of CUSS Kiosks at NEMA and the organizational effects following their implementation.

CUSS Check-in at NEMA

The origins of CUSS at NEMA are embedded in a series of events that paved the way for the decision by parent company, Manchester Airport Group to invest in the technology. The first event was the start of a movement by airlines towards the installation of their own dedicated (proprietary) kiosks. The savings connected with kiosk technology were starting to be realised by airlines that had installed kiosks in their major hub and base airports.

There were concerns about how airports could recover revenue from automated check-in as it is a departure from the established business model of airlines or handling agents renting conventional check-in desks from the airport. In addition to the relationship between capturing revenue and check-in facilities is the problem of airport control over its own floor space in the terminals. The General Manager of Development at NEMA has seen her role change substantially with the advent of kiosk technology. Her job was created to oversee a project to build an entirely new terminal at the airport. This phase of expansion was cancelled in

favour of extending and refurbishing the existing terminal building. The General Manager of Development now oversees how to optimize current facilities and develop viable methods for increasing capacity. Within Manchester Airport Group, CUSS was seen as a technological solution to improving passenger handling in the current building space, while at the same time allowing the airport to control its terminal space and to offer cost savings to customers (i.e. airlines). Again, the issue of space and the projected problem of proprietary kiosks are cited as significant drivers for adopting CUSS technology by the General Manager of Development:

“We thought that [CUSS] was something worth investing in and it’s really because you could see the beginning of the self service kiosk and the effect that would have on, if you like, our space because it means, you know, you’re then providing traditional check-in desks and you’re providing a space for a specific airline and it could proliferate to the extent that everyone had their own [kiosks].”

The system design of CUSS, discussed earlier (Figure 5.1) provides functionality that overcomes the technological barrier that stood between previous check-in systems and integrating many airline check-in applications into a single machine – a kiosk:

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“That’s obviously the difference between CUSS and just the ordinary self-service ones is it’s based on a common user platform. Originally when there were check-in desks, well everybody did it manually to start off with, then started introducing systems and they ended up getting more and more sophisticated and their own check-in system. We still have that in as much as we’ve got a common system on some of the desks but not on all of the desks.”

As discussed earlier, the state of the technology *pre-CUSS* was multiple information systems for passenger check-in with each airline or airline alliance operating their own dedicated system. These systems have evolved from remote database systems connected to input terminals via Telex Relays developed in the 1960’s. Passenger check-in is currently performed on standard desktop PCs, normally hosted by some kind of emulation to enable connectivity with the legacy systems. The legacy of these systems is that most airlines still have large off-site databases with which the check-in computers communicate. Some PCs are able to run more sophisticated emulation that enables switching between the various airline systems, but only on a flight-by-flight basis, not a passenger-by-passenger basis – this is where IATA sees performance gains from moving away from extant systems towards common use terminal equipment (e.g. CUSS). The constraints of existing systems are emphasised by The General Manager of Development at NEMA:

“The thing about that is, if somebody checks-in on a desk for a Thomas Cook flight then you can’t use it for anything but a Thomas Cook flight until it’s finished, the thing about CUSS is that it can flick between different airlines so you can have a person who comes and checks-in as a BA passenger followed by someone who’s on KLM and then another BA...”

The General Manager of Development illustrates the flexibility that CUSS provides over existing systems by being able to communicate with multiple departure control systems. She then goes on to translate this into how this will affect passengers:

“...passengers could be from either of those airline groups and go up to a machine and check-in. That is really, in the end, what you’re trying to do, I mean apart from offering a different process of going through, but actually it means that, if there are half a dozen machines, you can go to the one with the shortest queue. You don’t have to queue up at the one that is just for your airline.”

The management at Manchester, overseeing the whole project and at NEMA managing the project on site both have notions of how users will first need encouragement to use the kiosks and then will develop

patterns of familiarity which means they will actively choose the quickest option for check-in.

“Amsterdam was really the first airport in this sort of region that’s had CUSS for a long time and that’s what they said – They’ve got to be right by the door basically so people have to walk right past them, through them, round them and then your hosts actually grabs them and says why don’t you use these rather than queuing there? And the idea is to get people to use them and use them and use them.”

The Terminal Services Manager based at Manchester likens the familiarisation process to other self-service technologies and the process of getting passengers to use CUSS. He goes on to expand the customer service agenda with the following analogies to existing technologies:

“Because once we’ve used the hole in the wall – it’s great isn’t it – you know – once you’ve brought your concert tickets online and you can see where you’re sat in the auditorium it’s bloody fantastic rather than phoning up and saying “where am I sat?”. And you do it again. If you go to the cinema now you book online don’t you? So you can go to the machine on the wall, just put your credit card in and it prints out your tickets, so you’re not queuing up with the plebs.”

At NEMA, these sentiments towards usage are echoed by the General Manger of Development:

“...shopping at Sainsbury’s and Marks and Spencer they introduce the self check-out and you know you scan your bar code and put stuff in the thing and again initially they had one host to every two check-out desks to make sure people knew what they were doing and help them, you know which button to press. But, if you’re a regular shopper you very soon pick up what to do so you automatically go and do it. If you’ve not got lots of shopping you know that there’s nothing complicated and I think that’s the idea initially, I think they’ll be quite heavily hosted but eventually it will get to the stage that you don’t actually need it or, well there will always be the odd person who doesn’t but they may be the person who wants to go to the check-in queue, they may want a personal service and then really it’s up to the airline as to whether they want to insist that all their passengers use a machine or whether they actually decide that they want to offer a whole variety of things.”

The introduction of CUSS Kiosks at NEMA is driven by parent company Manchester Airport Group, and occupies part of their technology-led strategy of *staying one step ahead* of competing airports. The following

statement by the CEO of MAG in a press release by kiosk supplier, ARINC confirms the technology-led strategy (ARINC, 2008):

“Our decision to install SelfServ last year has provided millions of our passengers with a new check-in choice,” stated Geoff Muirhead CBE, Group Chief Executive of The Manchester Airports Group. “With passengers able to fly to more destinations from Manchester than any other U.K. airport, we are expecting this summer to be our busiest ever, and installing more kiosks will give them the best possible experience. ARINC’s SelfServ CUSS fits well with our wider strategy to deploy new technologies to improve the passenger experience—such as Internet check-ins and wireless networking.”

In terms of check-in technology the CUSS architecture represents a solution to overcome the restrictions created by the divergent evolution of different airline-specific check-in and departure control information systems. However, by bridging some of the existing technical divides, new challenges and organizational responses are likely to emerge. The institutionalised model of check-in will be destabilised by CUSS Kiosks providing a general self-service check-in technology, requiring desks only for the transfer of baggage destined for the aircraft hold. The initial installation of the kiosks revealed that key constituents, airlines, were not entirely happy with the original user interface.

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A significant delay to the project occurred when the kiosks were trialled earlier in the year. They were tested with limited functionality, using one airline at a time. The first trial allowed airlines to review the functionality of the kiosks and for them to give feedback on their operation. The Product Research and Development Specialist at NEMA remarked:

“Version one of the CUSS system ‘worked’. However, the interface was unsatisfactory because it included the feature of being able to input passenger names which the airlines were not happy with.”

The airlines were unhappy with the ability on the system to enter a name, manually keying-in their details, when checking-in for a flight. The software was re-written with a redesigned interface that meant passengers were identified by either the credit card used to book their flight or the passport number they gave when making their booking. The kiosks were out of use while the software was re-written.

As well as the changes requested by airlines, the trials revealed problems with the type of boarding card printer specified in the original kiosk design. An interview with the Product Development Specialist, the manager who is responsible for overseeing the testing and internal feedback for the CUSS project recalls the situation:

“There have been various problems with getting the system into operation. The first was with the reliability with the printer units for each kiosk; these are specialist printers that print boarding cards for each passenger. The first batch of printers failed to print properly and had to be replaced by the manufacturer.”

From the two examples above, the trials revealed two different sources of problems for the project. The former is a lack of consensus or alignment among constituents. Airlines, as the ‘customers’ of CUSS, exercised their powerful position in influencing the redesign of the user interface. A technical flaw was identified with the original printer modules which meant another change to the kiosk design. At this early stage in the development of CUSS is it possible to see adjustments to the adoption process that are both socially and technically mediated which originate from within the sociotechnical constituency and from the technology itself.

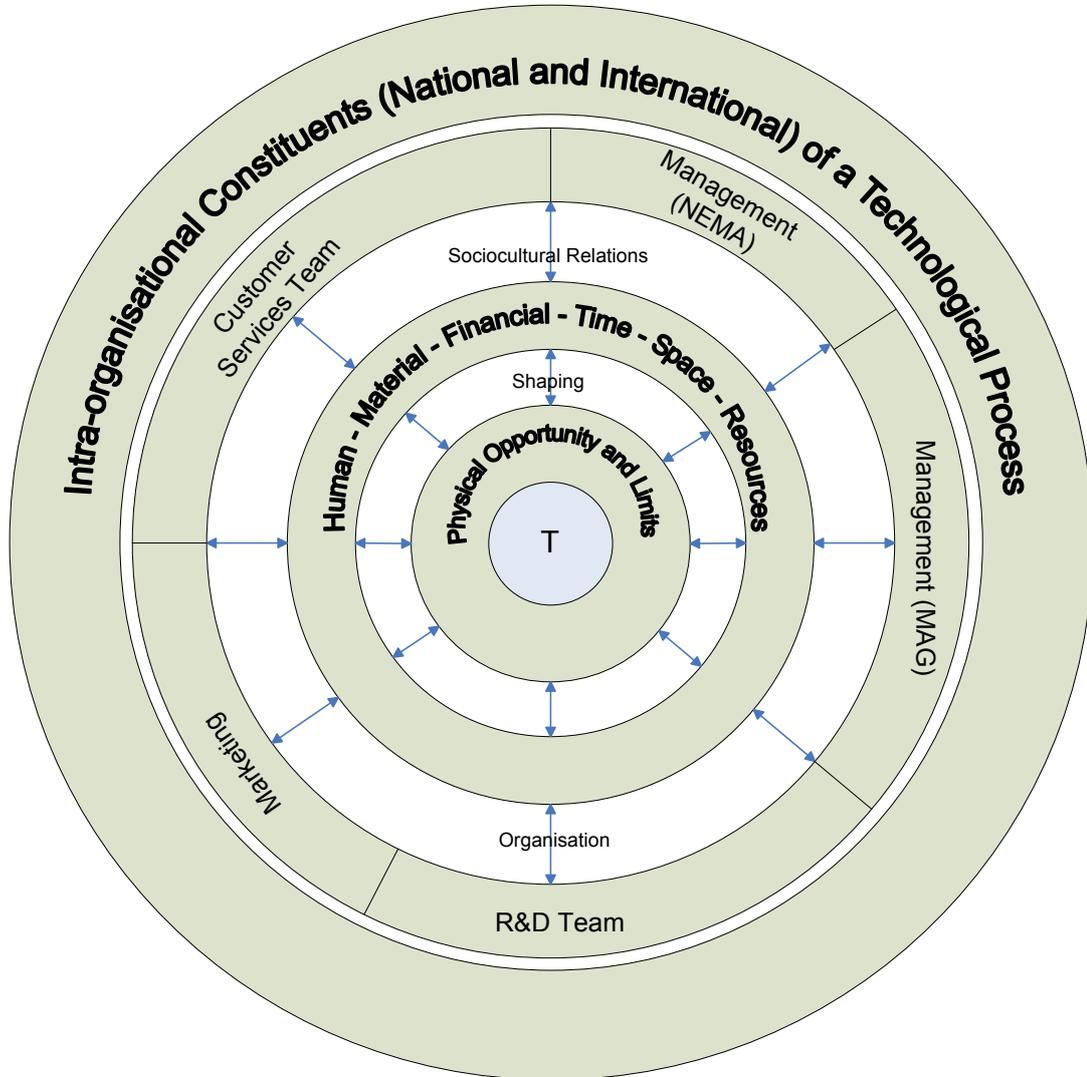
Change at NEMA, the Introduction of CUSS.

The introduction of CUSS Kiosks at NEMA will involve significant change at the airport. As the previous sections indicated, these changes are technological, inter- and intra-organizational and to the physical layout of parts of the airport building (Adey, 2004; Knox, O’Doherty et al., 2008). Across these levels the aggregate changes are designed to produce

increased capacity and cost saving at the check-in stage of airport operations. This case study reveals that there are also unexpected consequences from technological change in the airport, however, the groups within the organization adapt to produce the anticipated effects from the introduction of CUSS.

Figure 5.4 below shows the intra-organizational constituents of the CUSS project. In this project the low number of organizational constituents each interface with the inter-organizational constituents seen in figure 4.4.

Figure 5.4 The Intra-Organizational Sociotechnical Constituents of CUSS Technology.



The overall control of the project lies with Manchester Airport Group, based at Manchester Airport where decisions are made about scale, suppliers, maintenance and how best to roll-out the new technology across their three airport sites: Manchester, NEMA and Humberside. However, there are sub-committees who project manage the

implementation; one based at Manchester Airport and a second based at NEMA who also manage Humberside Airport's new kiosks.

The operation of the kiosks at Manchester airport will be hosted by a handling agent who already operates a range of ground handling for some of the airlines at the airport, including check-in. At NEMA however, the kiosks will be hosted by the airports own customer services staff who will take on the additional work as kiosk support staff. The general manager of development comments:

“...what we're doing is using our customer services assistants, the people who floor-walk at the moment and so they'll all be trained as CUSS hosts. There are quite a lot of things, they won't check in a group size over such and such, and for instance if you're there with a baby, buggy and that kind of thing it's probably best to send them to a traditional check-in desk because of all the issues that go with [the kiosks].”

There is anywhere between 18 and 24 customer services staff (depending on the travel season) who work in shifts at the airport. At the time of data collection the team had undergone training in how to use the kiosks and the targets the organization has set for CUSS compared with conventional check-in. The General Manager of

Development outlines the roles of the customer services team in the CUSS project:

“...We see, particularly at the beginning that the host role will be more to actually pull people across to even try the machines... there are going to be a load of machines standing there and nobody will... well, apart from people who’ve used them somewhere else, people won’t be induced to use them. Where they are is actually as you go in so that they hit you in the face and the hosts will be there to try to get people to use them straight away, if they can’t do that, they’ll go and comb the queues for the most likely looking customers if you like, the ones who are more likely to take to the technology, but I mean it was quite interesting because somebody said that the age-group we think, which is sort-of your age group, on charter holidays were less likely to than the forty pluses – which is really strange because you kind of think you know you get more techno phobic as you get older but it doesn’t necessarily seem to be the case”

The formal role of the customer services staff is to pick and then assist (if required) ‘suitable’ passengers to use the kiosks, this is expected to evolve into a troubleshooting role once CUSS is established at the airport and passengers make the choice whether or not to use the kiosks. The

kiosks have been physically at the airport for around six months but have been non-operational for much of this time

To examine the technology in-use I spent five separate days observing the kiosks being trialled and the final two days observing the kiosks in normal use. The series of observations were spread out over 6 months, August 2006 to January 2007. The advantages and constraints of non-participant observation as part of the research methodology were discussed earlier in Chapter 3. In the context of this case it proved particularly useful for gathering rich qualitative insight into the organization as during the course of one day many hundreds of passenger check-in transactions would occur. It also provided additional scope and feedback from those already interviewed and crucially, the opportunity to discuss the CUSS project with individuals who were not available for a 'formal' interview.

The Introduction of CUSS:

It is the last week in August, towards the tail end of the summer peak-travel season when I join the CUSS programme on the second day of full-scale trials at NEMA. The trial is 'full-scale' to the extent that the CUSS Kiosks are communicating with different DCS's during the same check-in period. Today there are two flights checking-in in parallel. There is a bank of ten kiosks at the airport; today only two are powered-on with their touch screen displays turned on. The trial period is about

to start when the check-in desks, and therefore the CUSS kiosks, open for the first flight included in the trials. In the check-in area is several staff who have come to work with or observe the trials. Present are six members of staff: the airport manager, the terminal duty manager, a representative of one of the airlines involved in the CUSS project, the product research and development specialist, the customer services manager and one of her customer services staff who will be 'hosting' the machines during the trial. Both the customer services staff are wearing sashes that promote the CUSS initiative, they include the airport logo and promote the speed and efficiency of the new means of checking-in.

All the staff are talking amongst themselves, the airport manager notes that they "*got 35% through yesterday*", 35% of all passengers on two CUSS-enabled flights were checked-in using the CUSS system. There are a few nods and the staff are pleased with this level, they are encouraged that the airport manager is enthusiastic about exceeding the "20% throughput level handed down from Manchester" (Project Research and Development Specialist).

Attention turns to the issue of only having two of the ten kiosks switched on and ready for use. The customer services manager remarks that it doesn't look very good that most of the machines aren't working. This is, in part, due to malfunctioning printer units on four of the kiosks. This prompts further group discussion about the current problems with the

latest software running on the kiosks. The project research and development specialist confirms with the customer services staff that the CUSS system is having difficulty in processing the check-in of groups of passengers greater than four people in number. The origin of the problem is unknown, but the system *fails to allocate seats on the aircraft* for passengers in a group booking where the party is, for example, a family of five. The hosts are asked not to target groups of four or more to use the kiosks for today's trial. The hosts note this and the customer service manager asks where there is anything else that isn't working with the kiosks. The Product Research and Development Specialist replies: "late bookings". The group nod and acknowledge the additional software glitch that the CUSS system has with not being able to retrieve bookings made in the week prior to departure; when a 'late booking' passenger attempts to use the CUSS system it returns an error as if the booking had never been made in the first place. However, these bookings can be checked-in without issue at the conventional check-in desks. The Customer Services Manager enquires "*have they had this problem at Manchester?*" After a brief reflection among the staff, no one is sure at this stage whether the problem is across all three sites or just here at NEMA.

The conventional check-in desks have staff (working for the handling agent for the first flight) sat behind four desks and the overhead display boards now display the first of the two flights using CUSS today. The

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customer services manager begins opening some of the cases of the kiosks that were not due to be used throughout the trial. She is turning on the PC that runs inside each kiosk and turning off the screens so that they are ready to use if the extra machines are needed. The other 'host' and the Product Research and Development Specialist print some test boarding cards; "each of these is different" he remarks to the customer services assistant, they nod and walk between the kiosks. There are a variety of problems manifest in the defective group of boarding card printers: Some of the printers need the cards pulling through by hand when they should spool the next card automatically through the printer. Some printers in the kiosks will print and some will "fire blanks" as the two customer service staff have colloquially framed the problem. This is where, either a blank boarding card is produced at the end of the check-in or additional blank cards are fed through the printer following what it was supposed to print. A call is made to the technical support company who look after the printers to send out an engineer to fix some of the machines with more problematic or non-functioning printers.

There are now many more passengers in the terminal area where the CUSS Kiosks are located; a short queue is starting to build at the conventional check-in desks. The second flight being trialed on the system is about 10 minutes from check-in opening; as with the first flight there are check-in agents logging in to the computers behind the

desks. The CUSS system requires no human input to be ready to handle the second flight.

The customer services assistant and the customer services manager spring into action and approach the line for conventional check-in and invite passengers to come and try the CUSS system. Each of the customer services team are approaching passengers in the queue and checking that they are a) in a group of four people or fewer and b) had booked over a week before departure. For a period of around fifteen minutes, passengers arrive and are checked-in using the kiosks without any problems. A group of two couples travelling together on the same booking are checked-in by the customer services assistant, who although talking them through the process, has performed all the mechanical actions from swiping one of the group's passports to pushing the necessary buttons on the touch screen. At the end of the process involving the kiosk (see figure 5.3, above) the passengers seem very impressed with the speed of the process and begin to wander away from the kiosks leaving their hold luggage behind. The customer services assistant signals that they need to take their baggage to the 'bag-drop' for their cases to be weighed and put onto the correct aircraft. The passengers look less pleased as a short queue has built up for the 'bag-drop' desk, which they have no option other than to join with the other CUSS users. The Product Research and Development Specialist returns from the 'bag-drop' and remarks to the Airport Manager and myself that

the “girl on the bag-drop yesterday was faster than the one today”. The Airport Manager looks across the departure hall and says “it’d be alright if there were three or four bag-drops” there are nods of agreement the Airport Manager categorizes the problem of a lack of ‘bag-drops’ as an *issue of cost and the airlines not wanting to pay for extra desks.*

A representative from the technical support firm, KussTech (a pseudonym), arrives to fix the non-functioning printer units from the kiosks. The kiosk with a completely failed printer unit is opened up and a straight swap for a new boarding card printer is completed. During the time the KussTech technician has been replacing the unit, the Customer Services Manager has been trying to check in passengers with a kiosk where the boarding cards have come out of the printer tatty and chewed up. After re-trying the check-in process she has no option but to send the passengers back to conventional check-in. She apologizes to the passengers for the “embarrassing” situation, the KussTech technician says he is unable to replace the now broken printer on this call-out, just the ones he has been called to fix. Consequently two of the kiosks, both with printing problems have to be shut-down and are replaced by the recently fixed unit and an additional kiosk that was previously switched off. By the time the kiosks have booted up and are operational, there is about half an hour left of check-in.

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Two armed police officers stationed at the terminal walk past the kiosks. They talk to the Customer Services Manager; "Still Cussing with Cuss?" The Customer Services Manager sighs and says she dreams that they [CUSS Kiosks] are all stolen at which point the KussTech technician remarks "they're crap aren't they!" There is silent agreement with nodding and sighs as the two police officers leave.

As the check-in period draws to a close the staff congregate and discuss the trial. The Customer Services Manager thanks her Assistant who returns to her usual role on the main airport information desk. The Airport Manager remarks "you've got to have pro-active staff to get people to use these things" he nods to congratulate the customer services manager on her work he also identifies this as being a problem for the airport for the ongoing use of the kiosks. He then turns to the issue of the 'bag-drop' stage serving as a bottleneck in the flow of CUSS passengers; at points during the trial the queue for 'bag-drop' was longer than the queues for conventional check-in desks. This meant that the two customer services staff were overseeing the flow of passengers between the two available modes of check-in; either drawing passengers from the conventional check-in lines or on occasion having to pause or even direct passengers toward the conventional check-in when the 'bag-drop' queue was too long. The airport manager says he "will talk to the airlines about getting another 'bag-drop' open" as having lengthy queues there "seemed to defeat the point." The conversation finishes with the

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news that they have managed to exceed the target number of passengers using CUSS Kiosks for check-in on the two flights today; the Product Research and Development Specialist has a print-out of passenger numbers and their means of check-in. The trial is considered a success despite the two printer hardware failures and the bottleneck that occurred at the 'bag-drop' stage of the process.

My next visit to the project is four days after the last observation period. The live trialing of the CUSS kiosks is ongoing. Today represents a larger test of the system with three flights from two different airlines using the system. There will be a forty-five minute overlap period where all three flights are operational on the CUSS system at the same time. The volume of passengers will also be much greater with check-in for two medium and one small sized aircraft.

From the outset there is a problem with two new overhead plasma video displays which were intended to indicate which flights are CUSS enabled. They both display a blue screen with a very long error read out. The Product Research and Development Specialist informs me that the dedicated computer system that runs the display boards (e.g. arrival, departure and gate information; see figure 5.1) 'doesn't know' which flights are using the CUSS kiosks as sometimes it is slow to update.

The check-in period for the first flight begins. The customer services hosts are again approaching people in the queue which is building up at one of the nearby check-in desks and bringing them back towards the kiosks. Since the last trial I witnessed the whole procedure has become much more hands-off for the passenger. Almost all the interaction with the machine is performed by the customer services staff who are currently inserting the passenger's passports into the machines reader and reading the onscreen security questions to the passenger before pressing the on-screen buttons for them. As more passengers are checked-in using CUSS, the queue for the bag-drop grows longer than that for conventional check-in. Frequently, passengers begin to look disappointed having been checked-in very quickly, when they are directed towards the long line for the bag-drop. The customer service staff pause and look around for a while monitoring the relative lengths of the two queues. After about 10 minutes the bag-drop queue begins to move enough for them to resume getting more passengers to use the kiosks.

The second flight is due to open for check-in; the conventional check-in desks have staff, display boards and are ready to go. They are adjacent to the already operational check-in desks. The whole area is getting congested with long queues for both conventional check-in and CUSS; the Product Research and Development Specialist remarks to me "the airlines have cut one check-in desk for each flight using the CUSS

system” he turns and looks for confirmation from the terminal manager who nods and says “they won’t pay for any more bag-drops though will they!”

Shortly after check-in opens for the second flight there is an issue with the check-in of a family of four. The host tries to start the check-in process again by using a different family member’s passport (one passport is needed to access a group booking e.g. couples and families). The same problem occurs; the host asks the passenger whether they have the same initial they all look around at each other. “You know if you were John so and so and you are Jane so and so”. The CUSS system cannot cope with group bookings where the surname and initial are same for more than one passenger as it cannot differentiate between the two (or more) passengers. The host apologises saying ‘the system can’t tell you apart’ and sends them off to join the queue for conventional check-in.

About thirty minutes into the check-in period, one of the two flights using the CUSS system is now displayed on the screens above the kiosks and the displays no longer show any error message. Again the customer services staff have to wait a while as the bag-drop queue has grown significantly; the Product Research and Development Specialist raises concern that they’re not going to meet the target quota of passengers checked-in using CUSS today, largely due to the ‘bag-drop’ bottleneck.

He remarks "we had 42% on the previous day which is pretty good. Although it seems to be going a bit slowly today, we can't get the passengers through the bag-drop fast enough." The bag-drop queue once again begins to reduce in length.

The Customer Services Assistants move towards the standard check-in queues to get some more passengers to use the CUSS machines. A couple are checked-in using the system; "that's it?" asks one of the two passengers. "Yes" remarks the host. "What do I do with the bags then?" He asks. "Ah, just join the bag-drop queue over there" the Customer Services Assistant points towards the fairly long bag-drop queue. "Oh" remarks the passenger looking disappointed, "it's not very *express* is it?!" he remarks. Among the biggest problems and most frequent causes of delays is the reconciliation between passengers on a plane and bags in the hold. Baggage cannot fly without its respective owner on the plane – if passengers fail to show up at the gate the bag(s) they checked-in have to be removed from the aircraft before it can depart. It is therefore crucial that those passengers who checked-in using CUSS can be associated with the baggage they are flying with. There were problems with reconciling bags with their owners when a group of passengers checked-in using the system. This has now 'been sorted out' – they are looking to confirm this with the ongoing trials of the system.

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A lone traveller heads straight for the kiosks upon entering the airport. He is greeted by one of the Customer Services Assistants. The passenger remarks he has “used the EasyJet one before” – “ah good” remarks one of the CSA’s. They try to get the kiosk to read his passport. It repeatedly brings up an error. He is asked to try another kiosk; the second kiosk also refuses to read his passport information. The CSA eventually has to send him to join the conventional check-in queue.

The Customer Services Manager is looking at the queues. She estimates it is taking fifteen minutes longer for the to check-in using CUSS than conventional check-in. This is down to the queue at the bag-drop desk. She estimates needing another one or two bag-drop desks to make the system work. This initiates a conversation between her, the terminal manager and the Product Research and Development Specialist. The Terminal Manager agrees but is frustrated by the position he is in:

“I can’t get more bag-drops until someone agrees to pay for it. The airlines won’t want to pay for it. There is going to be a real need to incentivize having extra bag drops. I don’t know where it’s going to come from, whether it’s going to be via retail – giving people more time and more spend in the shops through departure? I’ll have to set up a meeting with the carriers.”

“We’re too good” (he nods to the kiosks), the terminal manager is impressed with the throughput of the CUSS system, but is frustrated at the bag-drop bottleneck that result from the rapid processing of the kiosk-based stage of check-in. With conventional check-in both the checking of the passenger and their baggage is handled in the same location; the check-in desk, so there is no opportunity for queues to develop between these two stages of check-in.

The third flight opens for check-in. Again the flight is not displayed on the monitors over the CUSS kiosks. The third flight is a larger aircraft with about forty to fifty more passengers than the previous two flights. It has three conventional check-in desks plus the CUSS system to check passengers in. As the check-in period for the third flight reaches peak flow of passengers queues start building at the desks and particularly at the bag-drop desk. A ServisAir (ground handling agent) Duty Manager responsible for the staff behind conventional check-in and the bag-drop desks suggests “snaking” the queue. It is, by now, very long and backing up across the terminal hall. Twenty minutes since the third flight commenced check-in and the first kiosk is opened; the boarding card printer inside has jammed. The CSA on duty removes a chewed boarding card and re-loads the printer with cards. She closes the kiosk casing and resumes helping passengers check-in. There are clusters of passengers milling around the machines; they stay there until one of the CSAs have finished dealing with their previous check-in transaction. A

couple of passengers refer directly to the kiosks: "I'm not into new technology, but this is great" remarked one happy customer. Another passenger relates the experience of CUSS to other technologies she has encountered: "It's just like the doctors when you check-in (for an appointment)".

Check-in begins to wind-down for the flights that have employed CUSS for check-in. The customer services manager thanks the two hosts for their work and lets them go about their usual role in the airport terminal. She then goes to the check-in desk and returns a few minutes later with passenger numbers for each flight broken down desk-by-desk. The list is handed to the Product Research and Development Specialist; after a brief pause he nods and says that the quota was reached for the third flight, despite the queues. The remaining staff talk amongst themselves and express relief that the trial is over and are also pleased by having reached the quotas set for each flight.

I return to the project at the end of their trialling period, nearly four months after initial interviews were conducted. Apart from the presence of the Product Research and Development Specialist at the start of most check-in periods the CUSS Kiosk system is running as if in full operational conditions. It is an exceptionally foggy day, I have arrived a quarter of an hour before the check-in period is about to begin and meet the Product Research and Development Specialist. He informs me that

there are two flights using the system this morning; the second departs nearly two-hours after the first meaning there is about an hour where both flights are using the system simultaneously.

We discuss the fog; “apparently we’re one of the few airports unaffected by the fog. I don’t think we’ve even got any delays so far.” I mention the morning’s news coverage about disruption at Heathrow Airport; he responds:

“yeah, I think we’re getting a few diverted flights which is good for us. We get the landing and parking charges when we wouldn’t normally.”

I ask about the scope of changes to CUSS since my last visit to the airport. “We’ve changed our name again” he says “East Midlands Airport, Nottingham, Leicester and Derby?” I look at the one of the screens on the CUSS kiosk; it still carries the previous airport branding. “We haven’t got a new logo for these yet.” He mentions that they’re about to launch ticketless check-in (i.e. online, see figure 5.1 above) with a few airlines which will share the bag drop desks, however this isn’t expected to be in common use until the summer season (six months ahead). It does mean that the CUSS platform and the ticketless check-in systems will share a requirement for bag-drop facilities. The hope is that, by bringing in another mode of check-in, there will be increased

capacity at the bag-drop stage reducing the impact of the bottleneck experienced throughout the trials of CUSS.

Two CSA's arrive for the flights using CUSS. The trialling of the system is now daily with between two and five flights every day using the system. The system is still unable to process passengers with the same surname and a common initial. This is pervasive to the extent that the hosts are asking passengers whether they share the same initials before taking them from the conventional check-in lines to use the CUSS kiosks. This has become a firmly embedded routine activity by the CSA's as it saves them the inconvenience of removing and then having to return passengers from the queue for conventional check-in.

It is about twenty minutes into the check-in. Two of the airport's armed police force walk up to the kiosks and one asks "do these things actually work?" gently tapping the top of a kiosk with the barrel of their semi-automatic weapon. "Not really" replies the closest CSA. The police officer continues to tap the top of the kiosk. "Just shot me" exclaims the second CSA sarcastically, pointing at one of the officer's gun. They laugh. "What a waste of money" exclaims one of the officers, the other laughs and turns to the first CSA, "they could have spent all this on your bonus instead" he jokes. "I'd be lucky" remarks the CSA, laughing. The two police officers continue on their patrol in the terminal building.

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As the check-in period for the second flight gets underway the terminal area becomes more congested. The CSA's are now fairly able to control and balance the queues and passenger flow between conventional and CUSS Kiosk check-in. The CSA's are still performing the majority of the 'self-service' actions on behalf of the passengers, with the majority of touch screen options being selected by a CSA and not the passenger.

A party of around six are stood in the middle of the kiosks looking at the overhead arrivals/departures screen. They are obstructing the kiosks and people walking through the entrance to the terminal building. A CSA approaches them to find out which flight they are looking for. They are not on a CUSS flight, so she directs them to the correct check-in area and goes off to seek more passengers for the CUSS system. After a few more passengers are checked-in, one of the hosts goes over to the bag drop. She spends some time talking to the desk staff. She returns to the kiosks and speaks to the other host; "they're [the bag-drop desk staff] asking the security questions again over there". They exchange remarks about how it'd be much quicker if they didn't ask the security questions. The CSA's begin to power-down the kiosks as the check-in period draws to a close. In these later stages there is no staff reflection on quotas, passenger flows or kiosk performance. The check-in data for passenger numbers is electronically fed-back to the Product Research and Development Specialist and the two CSA's return to complete their shifts at the main airport information desk.

Summary and Points for Analysis:

Throughout the case study, different constructions of the technology are more enduring than others and this is evident between the two main groups identified. At NEMA, both the airport manager and the terminal manager maintain that the kiosks are space savers and allow better use of available terminal space. This is in line with the expectations set by management at Manchester airport, the kiosk manufacturers (ARINC) and more generally the trade association IATA. The Product Research and Development Specialist maintain the “20% throughput” target, a locally constructed performance target. This is upheld despite the kiosks being used mainly by CSA’s and not the passengers, abandoning the merits of self-service, and because of their intervention, ignoring the technical limitations of the CUSS System.

In contrast to the technical rationality of the kiosk project, there is a general trend in-use for the CSAs to press the on-screen buttons on behalf of the passengers. This runs contrary to the formal, technically rational, expectations of the CSA’s role as trouble shooters in the CUSS project. However, the proactive behaviours of the CSAs are encouraged by managerial staff because it means that throughput performance targets are met easily.

Similarly, when queues build at the bag drop, passengers wanting to use the kiosks are directed toward conventional check-in so that the queues have time to abate. Rather than problematize the system and give the impression that the overall CUSS arrangement is not working, the CSAs always signal the shortest queues for passengers. The queues at bag-drop would appear frequently over the course of check-in periods. The CSAs undertake the task of dynamically directing passengers between kiosk and conventional check-in as the queues dictate. The system is not autonomous as its design and rhetoric as part of the IATA StB programme suggest.

The repeated hardware failure of boarding card printers, group size and having the same initials prevailed throughout the five month period. The CSAs consequently were implicated in making the system work; with management support, the numbers of hosts were maintained, not reduced as was originally intended.

The CUSS technology modified the role for customer services assistants in the airport. The group now has a platform for negotiating issues of resources and staffing because they are active agents in the process of “checking passengers in” as opposed to passive trouble shooters when, and if, passengers have problems using the system. During the trials the terminal and airport managers were on the floor alongside everyone else. Because of the introduction and importance connected with the

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technology, the customer services team manager was afforded otherwise rare occasions to talk directly to senior management. The behaviours that the customer services agents have adopted in response to the shortcomings of the technology have become embedded as they provide the means to ensuring that performance targets are met. These issues are examined in the analysis of this case in chapter 8.

Chapter 6 Case Study Two: The Organization of Hawkwindshire Council and the Transition towards a Browser Based Content Management Information System.

Hawkwindshire County Council (a pseudonym) is a large local authority organization in the UK. Hawkwindshire County Council (HCC) has recently implemented an intranet-based content management system and is one year into the process of training users and adding applications to deal with the information demands of the council. The intranet project is a technological component of a broader organizational change agenda, the 'New Ways of Working' (NWOW) initiative. The new system is designed as a key strategic component to work as a means for more efficient ways of storing, retrieving and communicating documents and information throughout the council.

This chapter examines the case study organization, Hawkwindshire County Council. The case study employs a combination of semi-structured interview, observational and documentary data sources to examine the nature of organizational change as part of the broader NWOW corporate change initiative. This chapter first discusses the methodological considerations specific to this case study. The organizational context is then explored by identifying a series of inter-organizational sociotechnical constituents involved in the development

and implementation of the intranet project. Various external stakeholders are identified, including national government, the auditing agency responsible for the assessment of local government organization, suppliers of technology products and other influential constituents. The final sections of this chapter provide a profile of the internal organization of Hawkwindshire County Council by mapping the intra-organizational sociotechnical constituents involved with the project. Chapter 7 documents the case of the implementation of the new intranet within HCC.

Case Methodology

This case study is an in-depth qualitative study of Hawkwindshire County Council and the patterns of use of its intranet system and is contrasted with the strategic goals associated with its implementation. The study was conducted over four months using a variety of interview, observation and documentary data collection methods. Building on the philosophical and methodological discussion in chapter 3, in this section the methodology and research design are explored and related to the case of HCC.

Interviewing Hawkwindshire County Council

A series of in-depth semi-structured interviews were conducted with key personnel from a cross-section of the organization. Five formal meetings with senior employees responsible for the operation and development of the intranet were held before interviews were conducted across Hawkwindshire. In the first instance this was to introduce the intranet project to me and to assess the likely value of granting access to the organization. The proceeding meetings provided a opportunity to obtain important contextual information about the intranet and its technologies, the business case for developing the intranet, the 'fit' with National initiatives for local government and the relationship the intranet has with the Council's own recent reorganization. The initial meetings furnished the study with information to shape and focus the themes included in the interview guide. For example, a key area for development was specified as being improved efficiency from improved information sharing (between structural divisions) to deliver improved services to the public. Insights such as this enabled the themes in the interview guides to be directed more effectively rather than being identified using the interview process alone. The use of semi-structured interviews afforded flexibility to explore beyond the themes uncovered in the initial meetings and were invaluable in gaining greater insight into the development of the intranet from the informants.

The term 'informant' is used to capture the informed nature of participants in the study in preference, for example, to 'respondents'. This was an issue covered extensively in the early meetings with HCC; the combination of the variety of roles within the organization, the limited number those using the intranet out of the entire employee base of the organization and the further limited number 'content authors' who use the technology. This study is predicated on examining technology in use. A distinct feature of the HCC intranet project is that, while the project has a near organization-wide coverage, the number of strategists, managers and 'content authors' who are 'informed' is relatively small. As a consequence, a research design to achieve 'depth' was employed to investigate the accounts and experiences of front-line users, technicians, support-staff, managers and strategists connected with the project. Early on it was acknowledged that these were the people shaping the evolution of the corporate intranet and it was crucial to capture empirically this process. Twenty one-to-one, in-depth interviews lasting between one and three hours were conducted on-site over a period of three months with a cross section of informants from different levels of the organization. All were identified as having knowledge of, but were not necessarily dependent upon the intranet system (see table 6.3 for further details of informants).

Observation

During the data collection period at Hawkwindshire County Council, the role of observation and its execution as a method for data collection is applied differently to that used extensively in the previous case study of Nottingham East Midlands Airport. While the previous case was highly amenable to study through lengthy periods of observation as a peripheral observer (Adler and Adler, 1987), the characteristics of HCC and the intranet project meant that peripheral observation would not capture the various facets and flows of information across the organization and the technology. The substantive amount of empirical work was completed using interview methods; however the opportunity for data collection using observation as a method was also incorporated into the research design.

During the period of data collection I participated in the 'content author' training sessions. This provided hands-on experience of using the content management system which is the interface used to administer information on the intranet. The training was run by the Intranet Officer (Bridget Wishart) and the Council's Webmaster. For the training session I was in the privileged position of being able to familiarise myself with the technology I am discussing throughout this case study, ask questions to both training providers and the training participants, collect documentary data about the technology and its use, and to observe the

system in operation with the participants being trained. Similar patterns of observation were available by virtue of holding interviews in the Council intranet and web site offices – the administrative centre of HCC’s intranet and internet operations. The research was presented to organizational members as ‘assisting the development of the intranet’. My affiliation with my university was strongly emphasised, yet my loose group membership with the intranet team often prompted dialogue with various organizational members. To quell any concern informants had over neutrality and confidentiality, they were assured of both anonymity and that I was working ‘with’ and not ‘for’ the intranet development team. Unlike the ‘peripheral’ observation role use in the previous case, the observational component of data collection is more akin to the ‘active’ level of group membership as described by Adler and Adler (1987). That is, the empirical work was conducted as a group participant in some of the core activities without becoming a fully integrated group member.

Documentary Data Sources

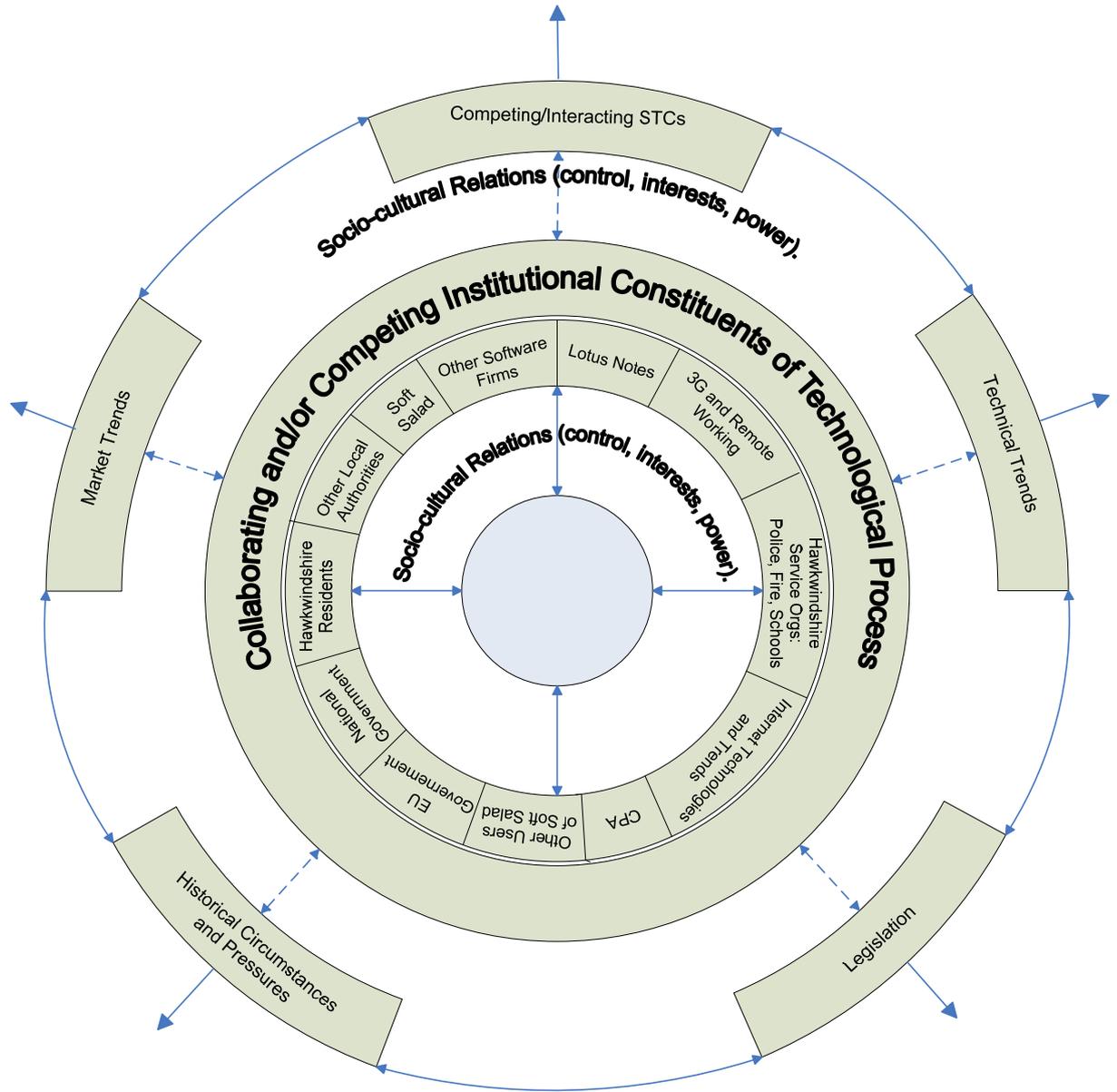
For the study of Hawkwindshire County Council and its relationship with inter- and intra-organizational sociotechnical constituencies, a range of documentary resources were collected. Chapter 3 outlined the contribution of documentary data sources. This case study is no exception. The use of organizational strategy documents, technology

training manuals, and web sites of various national government agencies and technology suppliers all provided greater depth and clarification of both the nature and the context of technological change. For each documentary source the issues of authenticity, credibility, representativeness and meaning (Scott, 1990) were raised to critically evaluate their input into the research process.

Organizational Context, National Government and Local Government, the Inter-Organizational Sociotechnical Constituency of Hawkwindshire County Council

Hawkwindshire County Council is a local authority organization. While it is not within the scope of this thesis to try and capture or analyse the structure of UK government, the organizational context – the inter-organizational sociotechnical constituency that HCC operates within has significant bearing upon its own actions. The inter-organizational sociotechnical constituency for the HCC intranet is shown below in figure 6.1. Before attempting to understand the internal dynamics of Hawkwindshire council, this section examines its organizational context.

Figure 6.1 The Inter-Organizational Sociotechnical Constituency of HCC.

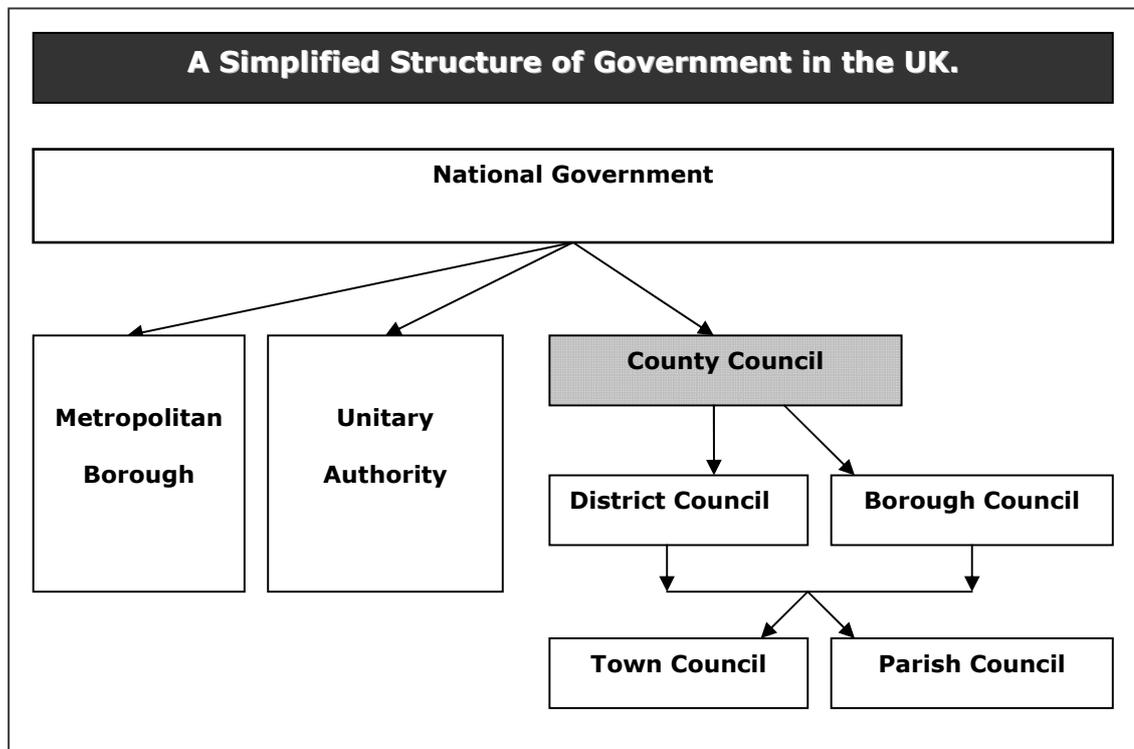


The following sections outline the institutional constituents involved with the sociotechnical constituency of the HCC intranet. These include

national government agencies and departments, residents in the county of Hawkwindshire and technology suppliers. Initial interviews and documentary research were conducted to examine the inter-organizational sociotechnical constituency. This is covered in the following sections which examine the organizational context of Hawkwindshire County Council.

The Structure and Arrangement of Tiers of Government in the UK

The structure and location of different tiers of UK government underlies their role and responsibilities to the public; the range of services across local tiers of government ranges from dealing with abandoned vehicles, childcare, town planning, rubbish collection to weddings (Inman and Picton, Forthcoming). Figure 6.2, illustrates a simplified representation of the UK government from the national to the town council level:

Figure 6.2: Simplified Topology of Tiers of UK Government

Source: Author

“Hawkwindshire” is a county council organization, as highlighted above in Figure 6.2. County Councils exist as overarching regional agencies for District and Borough Councils, deliver public services and implement National policies. Metropolitan Boroughs and Unitary Authorities include District and Borough Council responsibilities within the same organization. Across England, local government services are delivered by one of these structural arrangements, depending on geographical location. In practical terms, there is limited difference in what kinds of services are provided or how they are accessed and delivered, as Inman and Picton (Forthcoming) write:

“Ideally the customer or citizen should not need to understand the structure of local government in order to access the information or the services they require. In fact, neither should you really need to know whether the service you wish to access is provided by central or local government... .. [however] The structure of local government can be confusing as the pattern is not the same across the UK and it seems unlikely that it ever will be. This means that it is sometimes difficult to identify which level of local government is responsible for which services.”

The organizational implications of these structural variations are, however, substantial. In most areas of England (outside of London), local government is run by a two-tier system with county councils forming the overarching organization for district and borough councils. In other areas a unitary authority marries these two tiers into a single organization. To represent this contrast between unitary authorities and two tier local government organizations, table 6.1 shows the provision of services by the type of local government:

Table 6.1 Side-by-side Comparison of Service Provision by Unitary and Two-Tier Local Government Structures.

Unitary	Two-Tier System
Unitary Authority	County Council
<ul style="list-style-type: none"> ▪ Education ▪ Housing ▪ Fire Services ▪ Highways ▪ Libraries ▪ Passenger Transport ▪ Rights of way and Footpaths ▪ Social Services ▪ Strategic Planning ▪ Transport Planning ▪ Leisure and Recreation ▪ Waste Collection ▪ Waste Disposal ▪ Environmental Health ▪ Collection of Council Tax 	<ul style="list-style-type: none"> ▪ Education ▪ Fire Services ▪ Highways ▪ Libraries ▪ Passenger Transport ▪ Rights of way and footpaths ▪ Social Services ▪ Strategic Planning ▪ Transport Planning ▪ Waste Management ▪ Countryside Recreations
	District/Borough Council
	<ul style="list-style-type: none"> ▪ Housing ▪ Local Planning ▪ Leisure and Recreation ▪ Licensing ▪ Waste Collection ▪ Environmental Health ▪ Collection of Council Tax

(Adapted from: Inman and Picton, Forthcoming)

Hawkwindshire County Council as the upper layer in a two-tier system, has the responsibility for providing the services listed in the top right of table 6.1 above. It is the over-arching organization for five district and borough local councils. Each of these second-tier councils has some

devolved powers and collects council taxes for both themselves and for HCC as the county council organization.

To give an indication of the situation nationally, table 6.2 below shows the number of local authority organizations:

Table 6.2: Distribution of unitary and two-tier local government structures in the UK.

Local Authority	Number:
English Unitary Authorities (including Scilly Isles)	47
Welsh Unitary Authorities	22
Metropolitan Districts	36
London Boroughs (including City of London)	32
Shire Counties	34
Shire Districts	238

(Adapted from: LGA, 2008)

Hawkwindshire County Council is one of 34 Shire Counties and holds 5 of the 328 Shire Districts within its geographical boundaries. This is the current national situation, however a further 9 Shire Counties and their constituent Shire Districts will convert to Unitary Authorities in 2009. Not all applications by Shire Counties for conversion into Unitary Authorities were accepted and it is anticipated that there will remain a mix of one and two-tier local government systems for many years to

come. It should be noted that while there are 34 Shire Counties, these shouldn't be considered a group of homogenous organizations despite their common structural arrangement of local government. The geographical location of any local authority brings with it different challenges in terms of the size and population of its area and this will be reflected in how various services are planned and prioritised. An extreme contrast for example could be between the local authorities serving more remote countryside areas compared with densely populated urban or industrial regions. Certainly, different demands are placed on different local authority organizations; from outbreaks of bird flu, blue tongue or BSE to socio-economic issues of digital inclusion, poverty or industrial decline, the effects of these factors will vary depending on their locality.

National Government Policy, e-Government and Local Government

In the previous section, the structural relationship between various levels of government was outlined, locating HCC in its organizational context. As well as delivering local services, local government is subject to national policy initiatives that impact on the policy, priorities and performance measures that affect their running. Many of the National initiatives have been directed at making efficiency and cost savings across local government.

One of the significant and wide-ranging national government initiative is the e-Government agenda: "e-Government is of course part of a bigger picture and one element of a partnership between local and central government to improve public services" (Communities and Local Government, 2008). e-Government in the UK context was conceived in 2000 and outlined targets to be met by local government by 2008, this was brought forward to 2005 when on average 97% of the targets had been reached (Inman and Picton, Forthcoming). Essentially, this was a huge policy shift and created some of the first steps to linking the use of technology in local government and improving performance:

"E-Government sits alongside the wider modernisation agenda Community Leadership and Local Strategic Partnerships, Power of Well Being, Best Value, Social Inclusion, Governance, Beacons, and the New Ethical Framework. Each is significant but there are very strong interrelationships between Best Value, governance and e-government the core drivers of a wider improvement process. As a result, councils will increasingly need to develop strategic approaches that link these agendas to best serve the interests of their local communities."

(Department for Communities and Local Government, 2006; 24)

The literature on e-government is expansive. This section only scratches the surface of this literature but aims to identify some of the core debates on e-government. With regard to ICT and government organizations two stands of concern are apparent in the literature, these are issues of e-government and e-governance (Marche and McNiven, 2003). Although these areas are inextricably linked, the former broadly captures the *informatization* (Kallinikos, 2005; Kallinikos, 2006b) of government organization processes, the latter concerns the implications for democratic processes, policy, management strategies and culture (Dutton and Peltu, 1999; Marche and McNiven, 2003). Rather than draw-out the particularities of both these streams, throughout this thesis the term 'e-government' is taken to include implications for the shape of government and its patterns of governance. It must be emphasised that the implications of e-government are complex and cannot be understood in terms of technology alone (Dutton and Peltu, 1999; Homburg, 2008).

E-government concerns the strategic use of ICT and its connective capabilities using an ensemble of technologies for engaging government and its citizens across various levels (Homburg, 2008). The objective of e-government policy can be broadly captured as enabling more responsive and efficient government, improving access to services and making governments more efficient and democratic (ibid. Welch and Pandey, 2007; 87). Initial stages of development typically saw resources such as 'flat' websites offering information to citizens. Most recently, by

harnessing the interactive and connective capabilities of ICT, technology has been implemented in efforts to produce horizontal and vertical integration throughout government organizations (Layne and Lee, 2001).

This illustrates very clearly the program of modernisation, improvement and efficiencies that were anticipated by national government from the implementation of ICT throughout government in the UK. However, this reflects the thinking of a time where personal computers and various connective technologies – especially the internet – became the great panacea for every organization of the 'digital age'. The logics and substantial rewards witnessed in the dot-com, e-commerce era of the late 1990's and early 2000's saw policy makers in government turn to ICTs as the antidote to the cumbersome bureaucratic order of government organizations.

As part of the e-government programme, local government (and government generally) became e-enabled reasonably quickly: The number of government websites rose from 40 in 1995 to 300 in 1998 (Horrocks and Hamberly, 1998) and now has spiralled to the point where an unknown number of government websites exist (Irani, Love et al., 2005). This paved the way for a shift in emphasis from becoming e-enabled towards best value and best practice agendas. Much as we have come to realise the advent of desktop computers hasn't displaced the office worker, government policy has responded to the need to move

from equipping an e-government to being an e-government. Transformational government (t-government) is the progression from e-government and informs the ongoing use of information and communications technology by all government bodies (Inman and Picton, Forthcoming):

“...Transformational government – enabled by technology which set out the next steps required to achieve the delivery of public services through the use of technology to citizens and businesses...

... The timetable [for change] identifies three phases taking us through to 2011 where the ambitious aim is described as ‘boundaries between departments, between central and local government, and between public, private and voluntary sectors continue to be less important.’

T-gov, as it has become known, is intended to provide for:

1. The transformation of public services for the benefits of citizens, businesses, taxpayers and front-line staff.
2. The efficiency of the corporate services and infrastructure of government organizations, thus freeing resources for the front-line staff.

3. The steps necessary to achieve the effective delivery of technology for government.”

The authors observe that while e-government made major transformations across much of government, 't-gov' has the difficulty of translating the changes made by e-government into benefits and efficiencies by 2011. It is far more likely that the drive for cost-cutting while improving quality of service will be the dominant drivers for change. This fits with the model of performance assessment for local authorities, the Comprehensive Performance Assessment (CPA) exercise conducted by the Audit Office every year, which rates all local authorities on their service provision, use of resources and corporate arrangement (Audit Commission, 2008a).

This is not an exhaustive list of government policies that affect local councils. However, the Hawkwindshire County Council intranet project was certainly born out of the e-government era and will continue to be driven jointly by its legacy and the incoming t-gov policy. These policies are both decisive factors in how local authority organizations are structured and operate; hence they are an influential part of the institutional context of this case study.

Comprehensive Performance Assessment and Local Government

The comprehensive performance assessment (CPA) is used to impartially assess the progress of local government organizations and is conducted by the Audit Commission (Audit Commission, 2008b; 5; Communities and Local Government, 2008):

“The Audit Commission has a duty, from time to time, to report on its findings and categorise English local authorities according to their performance in exercising their functions. CPA is the way that the Commission fulfils this duty. It is an effective tool for categorising councils because it assesses performance from various perspectives in a consistent and comparable way,”

For a CPA, the organization and its departments are assessed and graded on their corporate arrangements, their use of resources, the quality of their services and monitors the direction of travel between each assessment (Audit Commission, 2008b; 4):

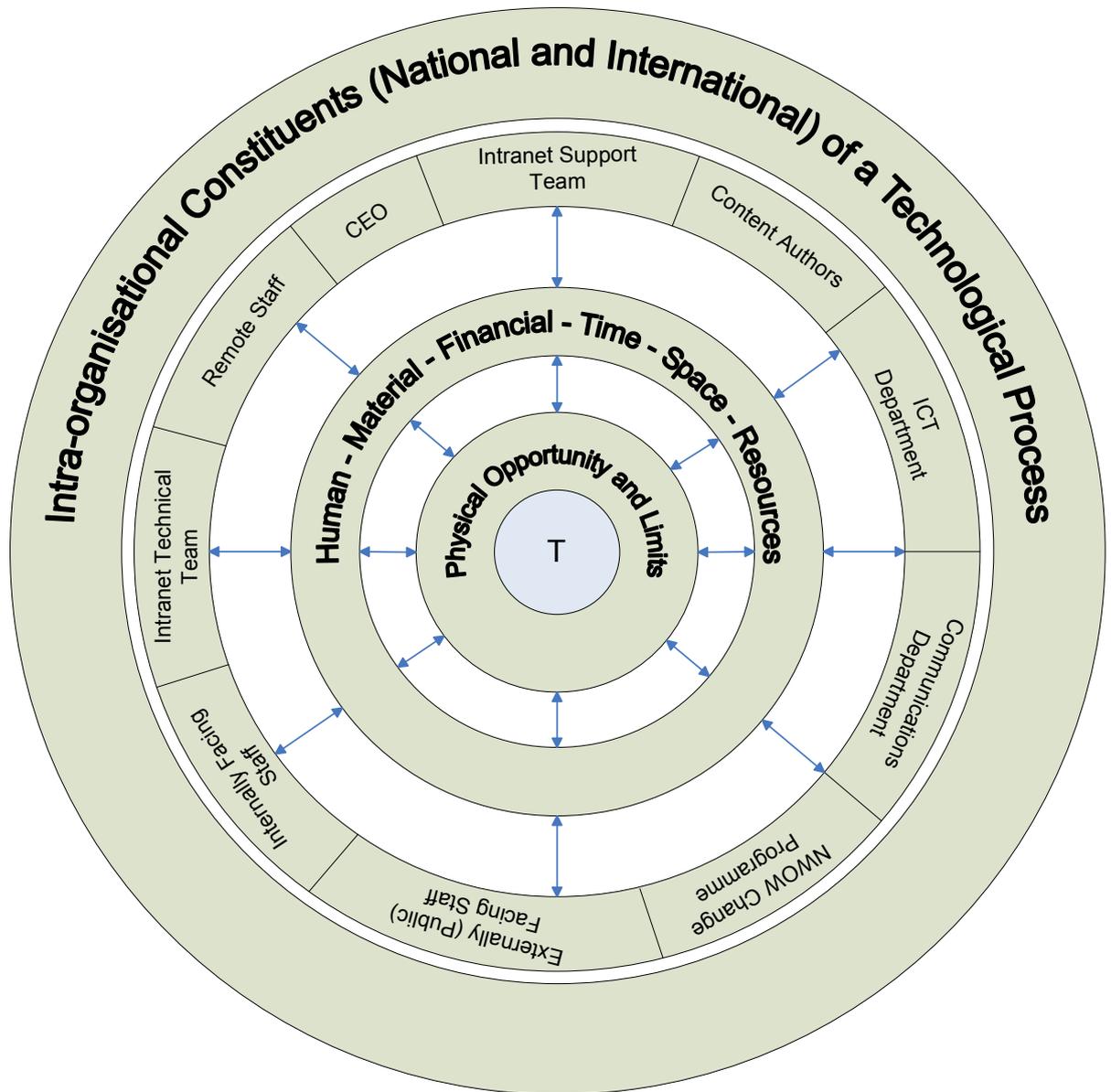
“Comprehensive Performance Assessment measures how well councils are delivering services for local people and communities. It looks at performance from a range of perspectives and combines a set of judgements to provide both a simply understood rating and a more complete picture of where to focus activity to secure improvement.”

The CPA is a powerful institution. The outcomes of CPA reports are used to identify strategic areas for development in local government organizations. The need, business case and subsequent strategies for corporate change and an intranet system in HCC was born out of a relatively poor assessment of their 'corporate arrangements'. The intranet project is a component of a corporate change initiative and was implemented with a view to supporting change throughout the council.

The Organization of HCC and Intra-Organizational Sociotechnical Constituents

The previous sections in this chapter examined the broad institutional context in which HCC operates. The following sections explore the internal organization of Hawkwindshire County Council and are used to trace the influential intra-organizational constituents connected with the intranet project within the council. The constituents here are all within the case study organization, figure 6.3 maps the intra-organizational sociotechnical constituency associated with the intranet project.

Figure 6.3 The Intra-organizational Sociotechnical Constituency of HCC.



Changes in HCC and New Ways of Working Programme

So far the overarching organization of local government authorities has been examined; it is apparent that the size, geographical location, status as a two-tier council and national policy all are likely to have a significant impact on the activities of HCC. The impacts of e-Gov and subsequently, to a lesser extent, t-Gov policies from national government have shaped and will continue to shape the local government arena. These factors are all relatively external to HCC with the organization having limited control over each. This and the next section begin to look at the internal organization of HCC bringing together the major ongoing programme of change, the specific strategic aims for the intranet and returning to the empirical dimension looking at the location of informants for the case study.

The evolution of the intranet project at HCC comes from a prominent internal driver for development and change in the organization; the Council's 10 year corporate change programme entitled 'New Ways of Working' (NWOW). As part of the NWOW programme it was envisaged that a corporate intranet would deliver the basis for information use and sharing to accompany the re-structuring of the Council. The creation of a formal intranet strategy was a key step in bringing about a vehicle for change in the Council and the birth of the intranet as a discrete project.

Both NWOW and the creation of a formal intranet strategy have served to shape significantly the ongoing intranet project.

At the point of data collection, NWOW was three years into its programme of change at the council and in that time has radically re-structured the HCC organization.

“The New Ways of Working Programme was launched in November 2005 as a 10 year change programme for the Council... ... [it was] Initially designed to address the practical implications of restructuring the organization into six directorates and concluding in April 2006, phase 1 created a ‘reliable platform’ from which the next phase of the programme was designed and launched in September 2006.”

(Hawkwindshire County Council, 2007b)

The initial change to the structure of the council followed the appointment of a new CEO who sought to streamline the organization. Before his arrival HCC had nine departments which functioned as more-or-less independent entities within the blanket of HCC. The first step towards bringing about change was to restructure the organization from these nine departments into six directorates. The council structure (see figure 6.6) now has six directorates which each contain between five and six divisions and within each division is several service-specific work

teams. For example: Paul Rudolph is an Electronic Information Officer, who works as part of the Library Information Service which is, in turn, part of the Libraries, Learning and Culture Division which is part of the Adult, Health and Community Services Directorate. The NWOW programme is pervasive; every informant at some point in our various meetings mentioned the programme by name or the massive restructuring that occurred some two years before my data collection. The legacy of changes in HCC is explored in more detail in the case study later in this chapter.

Following the massive structural change to the organization a series of eleven work streams were identified as areas where the Council would meet "Short Term Deliverables":

- **Business Process Reengineering**
- **Community Governance**
- **Communication**
- **Customer Service and Access**
- **Culture**
- **HR**
- **ICT**
- **Finance**
- **Planning and Performance Management**
- **Partnerships**
- **Property**

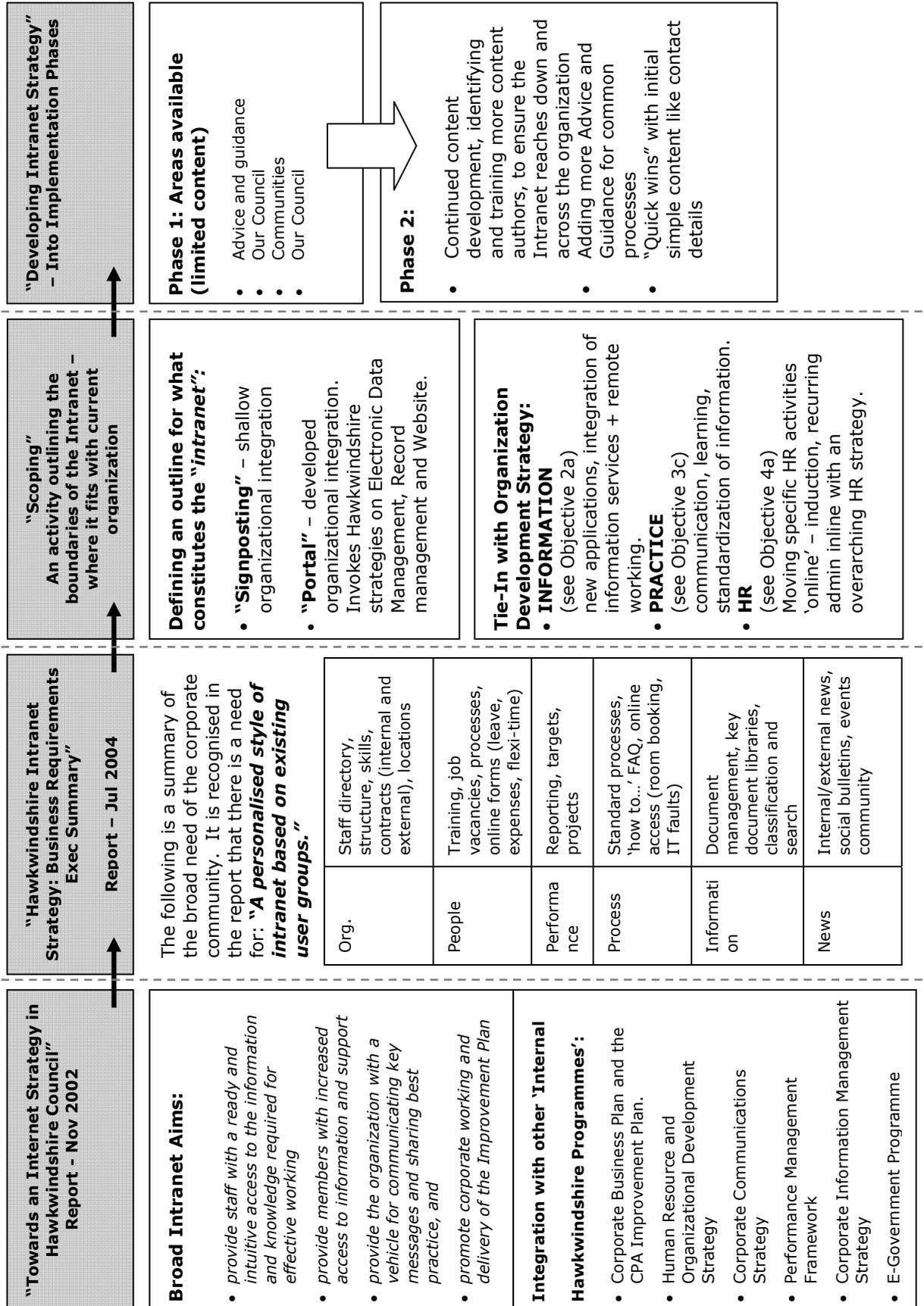
(Hawkwindshire County Council, 2007b)

Across these eleven work streams ninety-two “Short Term Deliverables” have been set-up. These are wide-ranging projects ranging from ‘one-stop shops’ (internet enabled computer kiosks) in various locations to promote and provide internet access to council services, or the piloting of 3G communications cards for laptops to enable roaming, through to the creation of team briefing meetings across all directorates. Some of these short-term projects span multiple work streams; for example the one-stop shops aimed at ‘housing’ form part of ICT, Customer Service and Access and Property work streams.

The re-structuring of the council was the underlying framework for phase one of NWOW, setting up the organization for improved performance and better service delivery. Where the organization is currently moving towards is the second phase where “short term deliverables” are designed to alter the way services are delivered and then to “strategically manage” the altered processes (Hawkwindshire County Council, 2007a). The intranet features as a key strategic resource for delivering some of the “short term deliverables” outlined by the Council.

NWOW has been a massive reform for HCC and has re-shaped the organization considerably. Interwoven with NWOW, in the midst of corporate change are the development of an intranet strategy and the creation of the intranet project itself. The project development is summarised below in figure 6.4 overleaf:

Figure 6.4: Phases of development: Tracing the Evolution of Hawkwindshire Intranet.



The need for an intranet strategy was born out of the creation of an internet strategy in 2002 (Hawkwindshire County Council, 2004) where it was realised that the online presence and application of web technologies had massive implications and potential for the council. As senior analyst programmer on the current intranet technical team Lemmy recalls:

“...well, there was Lotus Notes, and I can’t remember who it was, who, I don’t think he’s here anymore He said we need an intranet and these are the reasons why, and I think most of it was to do with people can’t find stuff, I guess, and it’s not very coherent as it is, and yeah, so we scouted around, so we, and there was, okay, a few products. There was also at the same time as we need an intranet, there was we need a document management solution from somewhere.”

(Lemmy; Senior Analyst Programmer)

From this position an intranet strategy for HCC outlined the need for a system that not only provides an intranet, but a document management system also was written.

Hence, as another information resource, the intranet was deemed to first, be a necessary endeavour for the council and second to require strategic planning for its development. The initial phase of the intranet strategy was to outline the business requirements of an intranet; in

essence this responds to 'what will an intranet do?' and 'how does an intranet fit without current internal programmes?' (this is shown in the first column of figure 6.4. Having written an internet strategy HCC began to consider the possibility of a more unified or 'corporate' approach to organizing its internal information rather than the disparate collection of databases that supported the council on a department by department basis. The ongoing legacy of the established information systems is discussed in more detail later on in the case study. At the formation of an intranet strategy, broad business aims were set; the project was characterised as a communications tool for improving quality and access to information for effective working. The merits of such a communications tool were expressed as integrating with six other 'internal programmes'. These include meeting the objectives laid out in the corporate business plan which responds to the Comprehensive Performance Assessment Improvement Plan by the Audit Commission at the council's last inspection. The intranet is specified as useful to improving a range of other corporate functions of the organization; HR, Communications, Performance Management, Information Management and, at that point, meeting e-Government policy objectives.

Forming an Intranet Strategy

The next epoch in the evolution of Hawkwindshire County Council's intranet strategy was with the formalization of the business case into an

'Intranet Strategy' in 2004. At this stage the project was under the auspices of a project board and an external consultant was appointed to "run a series of cross-grade and cross-departmental staff workshops to get feedback on the Intranet services considered most useful. The workshops also provided feedback on suggested information structures and what staff saw as blockers and enablers to the successful implementation of a HCC Intranet" (Hawkwindshire County Council, 2004). As well as the workshops a much broader response was collected via an electronic survey of council workers which captured 1000 responses. It was during this phase that the notions of customisation and standardisation of intranet content were aired. There was some debate about whether a corporate template or a more flexible, targeted approach to information management was more appropriate for the organization. While there was 'widespread support' for a corporate, more standardised for the intranet, a major barrier was the, then, nine departments each having independent practices and processes from each other; for example many back-office processes like procurement, expenses or booking leave all existed in different guises on a departmental basis. Observing the different information requirements of the departments, it was considered that a more flexible 'personalised' information model was needed. The proposition was that information demands of each user could be derived from their job type and departmental affiliation and appropriate information could be delivered via the intranet to each user or user group. Information content was

divided into six areas where the intranet could deliver information to staff; organization, people, performance, process, information and news were all identified as core categories for corporate information (see column two of figure 6.4). This map of content delivery has remained a mainstay of the project with types of content being mapped onto this template; it is used to identify and monitor the areas of information needed on the Intranet system.

The next phase of the project examined the information content areas identified and tried to develop a strategy and direction for the scope of the intranet. The organizational role of the intranet was reconsidered along the lines of its integration with electronic document management, record management and the system of Lotus Notes databases that exist throughout the council. Considering the issues of integration, the question of whether the intranet should function as a shallow system for 'signposting' or whether a 'portal' is the most appropriate strategy was raised. At this point in the project the issue of how deeply to integrate the system with organizational processes wasn't resolved. Instead, the tender process to find a provider for the client software to host the intranet was started. The specification in the tender included a the facility for both information models; a system that handles the more simple aspects of information such as fairly basic html, pictures and news feeds and that can handle application software, dynamic content and document management. With this specified range of functionality,

the tendering process began. After the initial rounds of tendering two software firms emerged as preferred providers of the intranet software. The two firms were asked to make presentations to the Intranet Strategy Board. Following these presentations the decision was made to purchase a full, enterprise content management (ECM) system from Soft Salad (pseudonym). The representative body of the ECM industry, AIIM, describe enterprise content management as (Association for Information and Image Management, 2008):

“... the technologies used to capture, manage, store, preserve, and deliver content and documents related to organizational processes. ECM tools and strategies allow the management of an organization's unstructured information, wherever that information exists.”

In principle an ECM system is analogous to a Material Requirements Planning (MRP) or even Enterprise Resource Planning (ERP), except that relationships between organization and its information are stored as opposed to raw materials, and production. An ECM system provides a means of storing, searching and retrieving documents and information (usually referred to as content). With an ECM, Hawkwindshire County Council is able to build a sophisticated database of all its content (documents, news, events) that can be accessed through an internet browser.

The intranet was featured as a vehicle for enabling change in the council. This was stipulated in the previous Comprehensive Assessment Exercise (CPA) and was due for review in the, then, forthcoming assessment. The software procurement phase was governed first by the need to get an intranet up and running and second by the specification for implementing an ECM system. The head of ICT comments upon the importance of the CPA review:

“There was an issue we definitely wanted to get it up and running by last November. There were imperatives for that around CPA inspections, etc. And so, basically, the product we went out, we secured the product, procured it and actually implemented Phase 1 with the sort of information we’ve got in there now. It’s a start. It’s a good start.”

Against this time frame, the decision to buy Soft Salad’s ECM product for the intranet was based largely on the claims made in their sales presentation, the offer of technical support, the portfolio of high-profile customers who are already using the software and the potential for the software to deliver the both ‘signposting’ and ‘portal’ levels of information system for HCC.

During this phase the Intranet Strategy Board looked towards the links between the intranet project and areas where its operation has significant tie-in with extant strategic areas within HCC. Three specific overlaps were identified between 'culture', 'practice' and 'HR'. Each of these areas draws particular links where the intranet can be used as a strategic tool to enable HCC to provide the necessary mechanisms for change. As a platform for storing and retrieving information, the tie-in with organizational culture recognises the interplay between culture and technology. The documentation from this phase of the project indicates that management of not only the technical, but also social and cultural aspects of the Council are necessary stages in providing a corporate intranet service. The Intranet Strategy Board state that:

"[HCC needs to] determine and deliver the people development and cultural change interventions to support new systems, processes and ways of working"

(Hawkwindshire County Council, 2004; 7)

The board calls for a "...framework to support the development of new applications and enhance the capabilities of existing applications and information services" (2004; 7). Under this strategic area, the possibility for working remotely is identified as a service that can be addressed by having a browser-based intranet. In addition to offering remote working to HCC staff, the opportunity to extend electronic information sharing by

having the facility for third-party access to some of the system, is perceived as a significant step forward. For example, the Police, preferred suppliers and other organizations like the Environment Agency could all be granted access to relevant information from Hawkwindshire County Council.

'Practice' is another area where the intranet is perceived as being an enabling technology to make in-roads towards better performance: "improve communication, learning and adoption of best practice across and between all parts of the organization, both to achieve improvements in efficiency and effectiveness and enhance learning potential in the organization" (2004; 7). The responses from the workshops and surveys signal that staff members would like to see improved access to and availability of specific information. This was not limited to the purely technical domain; HCC staff indicated that changes in administration processes and enhanced access to information are high on their needs rather than just having an intranet to deliver it. The board also reports that HCC staff would like an information resource with a corporate view of the organization rather than replicating the departmental databases that currently exist.

The third specific area identified by the board was to "implement an HR vision, strategy, policies and practices, which support improvement and the achievement of our change objectives" (2004; 7). Part of the HR

vision was to move some of the documentation and forms for recurring administrative processes on-line. This is where the intranet project intersects with HR strategy. As HR is a corporate (rather than departmental or team) function, the intranet was seen as being the perfect vehicle for storing information content for things like staff induction. The intranet would be the first time an organization-wide platform for this kind of endeavour.

This takes the development of the intranet into its most recent and current phases shown in the fourth column in figure 6.4 and this is where I pick up the case of the intranet project at Hawkwindshire County Council. This last column shows two phases for developing the content, the actual 'substance' of the intranet. The first, which at the time of data collection was broadly agreed to be complete, involved the 'flat', 'signposting' type of information, much like a static web site for an internal audience. This includes advice and guidance for employees which includes the common features and processes that operate across the whole council is based on the employee's handbook for HCC staff. The section, our Council contains information on the structure and directorates of the council, what each one does and where available their newsletters. This section also provides an information resource for employees about the NWOW initiative. The third component of phase one is the communities section which was truncated to provide an information resource for professional development of internal staff. Each

of these areas described represent text content across a series of pages viewable through a web-browser application. Although not very sophisticated compared to either the strategic aims for the intranet, nor of Soft Salad's available software features, the aim was to "start simple" and to begin to establish a user base for the intranet.

Phase 2 was designed to continue increasing the user base of the intranet and to train some of HCC's staff to become content authors. Content authors would be the personnel who would write, edit and collate information to go on the intranet on behalf of their team or department. They would 'own' the information, promoting the idea of devolved responsibility for intranet, or more broadly corporate information. As well as training and supporting content authors, more advice and guidance about common corporate processes and simple content, such as contact details would be added to further encourage use of the system. The intention is to allow the intranet to reach down and across the organization rather than existing as a closed, remote resource away from everyday users.

The four month period of data collection was conducted around six months after phase 1 had been completed. Phase 2 was underway and several content authors had been trained. The intranet has started to gain a user-base, although not as great as had first been expected. This case study explores the interplay of sociotechnical factors involved in the

impact of the intranet upon Hawkwindshire County Council as an organization.

A Profile of Hawkwindshire County Council

Hawkwindshire County Council is the local authority organization for Hawkwindshire County in the United Kingdom. The council employs in the region of 19,500 people (Harvey Bainbridge, HR Officer). This is a number of staff who are on the council payroll, this includes teachers, care workers, engineers, bus drivers, cleaners, road-crossing patrols, fire fighters and the administrative core of the council: see table 6.1 above for the range of services that county councils provide. As discussed in the methodology chapter and below, the diverse service base of any council creates a number of difficulties for empirical study. Council staff are not only widely dispersed over a fairly large geographical area but in some cases are fully immersed in other organizations, for example schools, fire brigades or care trusts. This raises an important issue in designing this kind of study as there is the danger of becoming technocentric in focus if empirical boundaries are drawn specifically around the physical technology. The figure below gives an overview of the employee base of Hawkwindshire County Council:

Figure 6.5: Employment Structure of Hawkwindshire County Council.

Employees on Hawkwindshire County Council Payroll		
Service-Level Workers	Office-Based Workers	
	Externally Facing	Internally Facing
e.g. Teachers, Care Workers, Highways and Lighting	e.g. Planning, Waste Management	e.g. ICT/Resources, Performance and Benchmarking, Payroll

The differentiation between layers of the organization helps refine the focus of this case study. Fundamentally, there is a significant organizational divide between the large group of employees who work at the level of service delivery and the central organizational core of HCC; this is seen in the divide between service-level workers and office-based workers. The study encompasses the office-based component of HCC which employs around 2,000 people. The second distinction that should be made is between the internal and external focus of the roles of the office-based employees. While all these employees are at the administrative core of HCC, an analytical distinction can be made between whether they are connected with the management of local services provision or serving the needs of the HCC organization; hence a distinction between external and internally facing roles can be made.

The intranet project is provided jointly by two internally focused divisions; ICT and Communications and Media (see figure 6.6). However, the long-term strategic aim of the project is to improve effective working within the council alongside the New Ways of Working Programme. In terms of the structure described above, the project can be translated as an internally-run initiative to improve the efficiency of the organization from strategic through to service-level provision. The strategic planning and phases of development are discussed in more detail in the following sections.

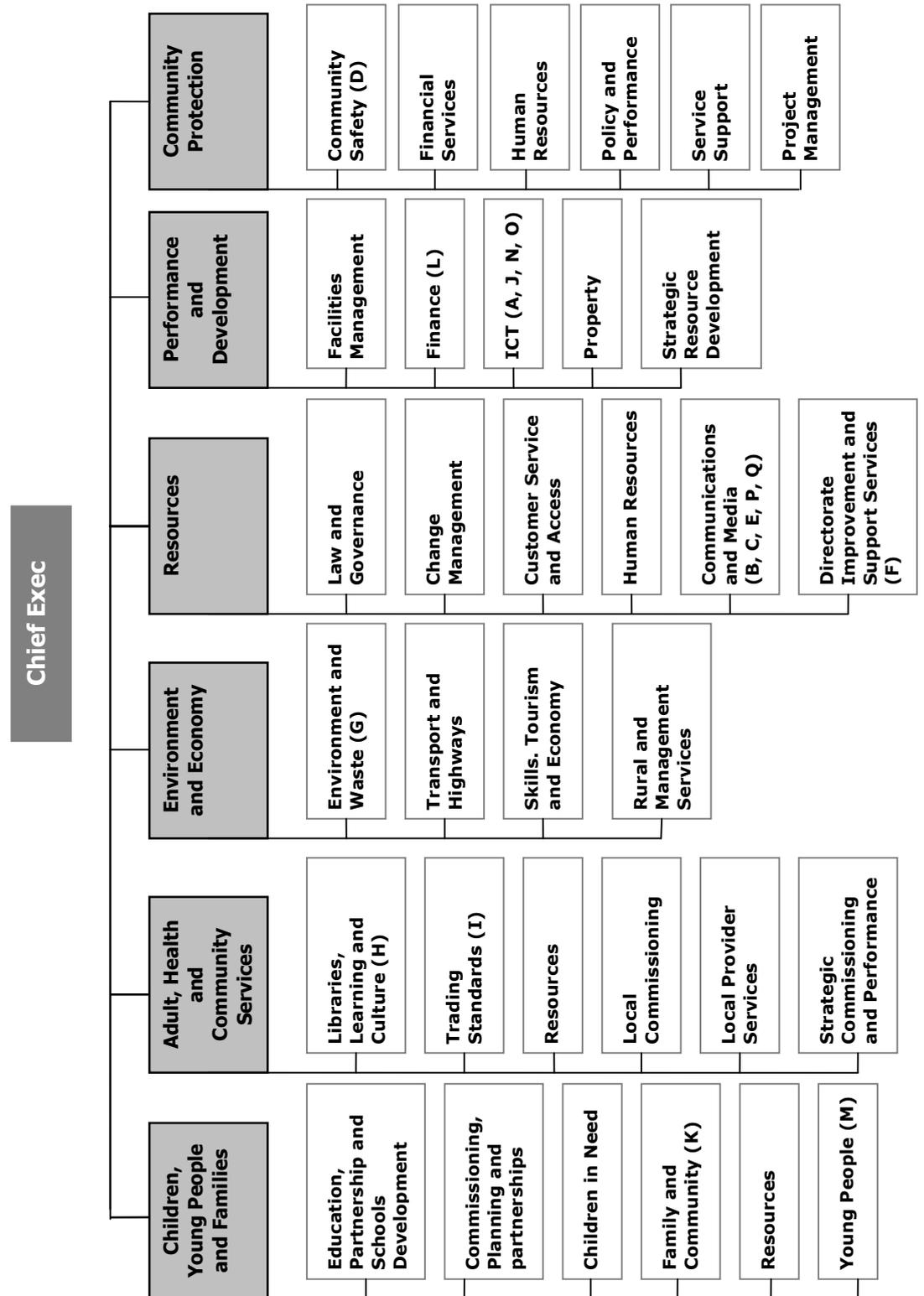
The Current Structure of HCC Organization

Previously, a distinction was made between HCC staff generally (19,500 people) and the administrative core that runs HCC (around 2,000 people). This section examines the office-based administrative core of the organization and builds on the contextual elements explored earlier to establish the boundaries of the empirical work involved for this case study. The office-based contingent of HCC is based across multiple office sites around the county town of Hawkwind and there is an additional office in the town of Bogtrench to serve the northern area of the county. The following table (6.3) outlines the names, job title and the directorate within which they work. It also positions each individual in the organizational structure depicted in figure 6.6, overleaf:

Table 6.3 Interviewees, Informants for Hawkwindshire County**Council**

Name (pseudonym)	Job Title	Directorate	Location in Org. Structure; Fig 6.6
Nik Turner	Head of ICT	Resources	A
Mr Dibs	Intranet Support Officer	Resources	B
Bridget Wishart	Intranet Officer	Performance and Development	C
Simon King	Community Safety Administration Officer	Community Protection	D
Ginger Baker	Internal Communications Officer	Performance and Development	E
Liquid Len	Development Officer Benchmarking and Development	Resources	F
Ron Tree	Waste Minimisation Manager	Environment and Economy	G
Paul Rudolph	Electronic Information Officer	Adult, Health and Community Services	H
Del Dettmar	Head of Trading Standards	Adult, Health and Community Services	I
Huw Lloyd-Langton	Applications Architect	Resources	J
Jerry Richards	Promotions Officer	Children, Young People and Families	K
Harvey Bainbridge	HR Officer	Resources	L
Dikmik	Youth Inclusion Officer	Children, Young People and Families	M
Lemmy	Senior Analyst Programmer	Resources	N
Barney Bubbles	Analyst Programmer	Resources	O
Dave Brock	Communications Manager	Performance and Development	P
Terry Ollis	Webmaster	Performance and Development	Q

Figure 6.6 The Organizational Structure of HCC



Incumbent Information System

HCC uses the collaborative application Lotus Notes organization-wide. It is used as a as an email client, for document management, calendars and scheduling and holds a series of databases that contain the majority of corporate information. The exceptions for corporate information include specialist HR and Payroll applications and information systems, and traditional paper records. Every HCC computer user uses Lotus Notes to access their email, personal drives, applications and the corporate document libraries. Most of the facilities of an intranet were provided via Lotus Notes but these are delivered differently than through a browser environment. Certain aspects of information delivery such as news and events were restricted to bulletin boards rather than the rich content provided by internet technologies. The age of the Lotus Notes software, the fragmented nature of managing corporate information and the possibility for browser-based access to information all signalled a need for an HCC intranet outside of the Lotus Notes application:

“I mean it wasn’t that we didn’t have an intranet until fifteen months ago, it was less than that, twelve months ago. It was more a case of we actually already had Lotus Notes providing a form of intranet in that basically that was how we shared information within the organization. We’ve had that for over ten years, and used Notes and document libraries as a way of doing

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that before really the intranet technology was really around. So one of the issues we'd had, although we had the some of the business elements of an intranet, what we didn't have was a browser-based access to those and a structured-base access to those."

(Nik Turner, Head of ICT)

The Notes system and the databases that provided the bulk of corporate information have evolved within their separate divisions within the council for nearly 12 years, as Applications Architect Huw Lloyd-Langton comments:

"Yes, the earth cooled and then we implemented Notes just after that."

This is not only problematic for bringing about change in line with the NWOW programme, but the databases were created under a different organizational structure and reflect the nine departments that existed before the council re-structured to six directorates:

"I mean basically it's still in the early stages as far as I'm concerned. I mean we've basically got the intranet up there. The key part was that we did want to have, as part of the work that was going on in bringing the organization together, it was very important that we started to move away from what departmental

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based document systems because the Notes systems were very much implemented on a departmental basis. Historical reasons: it's how the funding worked ten years ago, fifteen years ago, when we picked up Notes, so literally each department was encouraged to have its own area. That was how the organization worked. It's nobody's fault; that was how the organization worked then."

(Nik Turner, Head of ICT)

Nik is very clear on how the intranet will differ from the current Notes system, however the ongoing discrepancy between the structural changes at HCC and the incumbent Notes systems is still felt around the organization: The implications of the structural legacy of the Notes system ranges from the more trivial with user login codes no longer resembling their directorate or work team membership, through to the more severe problem of having to reconcile information and processes spread across nine departments with a new organizational structure. Currently some databases and the departmental document libraries have been successfully combined while others remain split over multiple libraries and databases. In addition to the lack of 'structural fit' with the contemporary organization, the Notes system has been used in markedly different ways by each department over many years. The net result has been that nine, and now condensed into six, disparate, information systems exist in the one organization. For example, there is no single form for booking leave from work; each directorate has developed

different ways of organizing its administrative processes. Equally, each has a different model for storing their information in corporate document libraries. Some directorates (notably Environment and Economy, who are regarded as setting the benchmark for information management) have large and sophisticated document libraries containing their work, corporate information and extensive guidance for users. Others have a bare minimum of information content and employees store information locally on their machine, as a hard copy or on network drives. The evolution of these disparate ways of working has led to what the CEO has called 'silo working' leading to his NWOW programme and the subsequent restructuring of HCC to unify, what he considered nine separate organizations into the six directorates that could function as a unified entity. This, strategically, is where the intranet fits with the NWOW programme and the ongoing reform of Hawkwindshire County Council: by providing a corporate information system the practices that underlie 'silo working' can be counteracted by creating a foundations for a more corporate way of acting and organizing.

Chapter 7 Case Study: Hawkwindshire County Council (HCC) – Organizational Change and Technology.

The HCC intranet system is now approaching 1 year old having gone 'live'. However, it has been operational onsite for around only four months due to a combination of problems with the Soft Salad software product that runs the intranet system and training the number of staff needed to provide content for the site. The intranet was conceived at board-level to facilitate a cultural change which emphasised information sharing between the new structure of directorates and departments of Hawkwindshire Council. The strategic plan was to produce intranet content "from the bottom up". The argument for this is one of embeddedness; to locate the intranet as conduit for crucial flows of information simultaneously in and between departmental divisions.

The implementation of the intranet technology was conceived as a two-phase sequence. The two phases cover the project from having the incumbent Notes system and the Soft Salad software running together until the content management aspect of the new system can replace the old Notes databases. To enable this change, the type of information and content to go onto the system were ascribed levels of urgency and practicality in terms of getting the intranet running. The informational aspect of this was described earlier in this chapter with 'flat' information

content (i.e. basic web site informational properties) forming the foundations of the available content and adding more information and complex facilities to progressively phase out the use of Lotus Notes databases. The second phase is adding in features for integrating applications (e.g. document creation, collaboration, storage and retrieval) that allow a range of work processes to be carried out via the new system. The second phase falls in line with the strategic vision for the intranet of providing "...the infrastructure to have a dynamic personalised portal" (Huw Lloyd-Langton, Applications Architect). This means that all the information and applications would be accessible through a browser environment which would be tailored to each user's needs. At the level of the user this would mean that selected news items from the organization would be displayed along with access to documents, email and any applications that might be needed for their work when logging on to the system. The term "portal" is widely used to capture this computer working environment because it is the single access point, combining all the necessary tools for a day's work.

A practical example for a member of the payroll accounting staff would be that everything they need to do their job was consolidated into one place, a portal that is delivered via the intranet. Applications, such as Microsoft Excel and the Council's payroll accounting software would be available from them logging-in to the intranet. Alongside the 'tools' of the job, the applications, would be a news feed and links to the

information aspect of the system. Again, it is envisaged that the information content becomes more customised depending upon the user of the system. Hypothetically, for a payroll assistant this might include news stories about allowances for expenses, bonuses or hourly rates for staff. Equally the system enables the storage, retrieval and search of a corporate document library. The intranet, it is proposed, would be the interface that delivers access to these facilities through a browser environment (e.g. Internet Explorer, Mozilla Firefox, Opera).

Sociotechnical Change in Hawkwindshire County Council

So far the organizational context and relevant policies have been considered against Hawkwindshire's own agenda for change under the New Ways of Working programme launched by its Chief Executive Officer. The previous sections also outline the size and structure of HCC and identify the administrative core as the domain of empirical investigation for this case study. In the last two sections, the strategic development of the intranet has been traced and the characteristics of the new and extant information systems have been depicted against their organizational environment. The following sections describe the resulting changes within Hawkwindshire County Council by examining the responsibilities of the intranet team, the process of getting information onto the system, some of the successful features implemented and the

project's relationship with the New Ways of Working (NWOW) corporate change programme.

The Intranet Team

The intranet team are responsible for the day-to-day running and ongoing development of the intranet. The intranet team spans the communications and media and ICT divisions from two directorates in the council; see figure 7.1 below. The strategic and managerial responsibility for the project is shared across staff from the ICT and the Communications divisions. The intranet is supported by a technical team, who are part of the ICT division in the Resources directorate and the system is part of the broader ICT services at HCC:

"We manage and look after the infrastructure that, for example, the computer the intranet runs on, but also 5,000+ plus PCs, a hundred or so servers in total that deliver all the systems. So we manage the infrastructure. We provide support to that in that obviously as well as, yes you can imagine when you've got an infrastructure that's linking 5,000 PCs, hundreds of servers, 4,000 different sites, because, you know, you go to some councils and they've got one or two sites, ... the county council, all the schools, we've got a wide area network that covers 400 sites, things do go

wrong, and so we have staff that will be involved in supporting that and dealing with those issues.”

(Nik Turner, Head of ICT)

The ICT division provides and supports the infrastructure (e.g. the server space, desktop computers and the organization’s computer network) that gives users access to the intranet. The browser-based intranet environment that Soft Salad provides required minimal change in the computer hardware of HCC. The incumbent Lotus Notes system already provides HCC users with access to Microsoft Internet Explorer which is the application used for accessing the intranet. The server-side component of Soft Salad was installed onto an existing HCC server. The hardware change associated with the intranet project has been minimal. The most significant changes have been to the organization and its processes with the creation of an intranet support team (see fig 7.1, below) and through the association with the New Ways of Working programme which restructured the council.

The technical contingent of the intranet team is involved with developing and improving the running of the Soft Salad content management system. More specifically, the tasks that the two technical staff are involved with range from fixing system bugs (troubleshooting) to customising and testing new versions of the system and the development of applications for the intranet. In addition to the

managerial and technical levels of the team are the intranet officer and a support officer who provide training, liaise with users, authorise information and content for publication on the system and are the front-line in support for the system. The two intranet officers deal with all of the information that is published via the intranet either in an authorising (approving content to 'go live' on the intranet) capacity or by creating articles and documents themselves.

Figure 7.1: Distribution of Responsibility for the HCC Intranet Project

Intranet Project	
Communications	ICT
Management	
Dave Brock – Communications Manager	Nik Turner – Head of ICT Huw Lloyd-Langton – Applications Architect
User Support	Technical Support
Bridget Wishart – Intranet Officer Mr Dibs – Intranet Support Officer	Lemmy – Senior Analyst Programmer Barney Bubbles - Analyst Programmer

Figure 7.1 shows the hierarchical and functional organization of the intranet team. The management tier each has responsibilities outside of the intranet project, for example Nik Turner is responsible for all of ICT provision across HCC. The four full-time user and technical support staff work exclusively on the intranet project.

What is on the Intranet?

The two phase strategy for the Hawkwindshire County Council intranet (figure 6.4); will start with simple “signposting” information in phase one and progressing towards a full content management system by the end of phase two. The first phase was predicated on ‘quick win’ features. The ‘quick win’ features include items such as frequently asked questions, ‘people finder’ staff directory and news stories. These are ‘quick win’ because of the dual characteristics of being reasonably easy to implement and also being attractive resources to draw a user base for the intranet. Content authors are distributed across the organization and hold the responsibility of putting the necessary information and related documents onto the intranet; they are trained how to create certain page types viewable on the intranet. The belief is, crudely, that if enough information is available via the intranet that the organization will begin to use it more and the intranet will eventually supplant the incumbent Lotus Notes system. Hence, training and supporting content authors across the organization has been a priority for the development of the project. It is seen as having the “critical mass” effect by building-up a community of active authors, a user base will develop.

At the time of data collection, the council intranet team had established some of the content areas for the intranet and have trained around eighty content authors. Reflecting on the intranet strategy, the aim of

having content authors across the organization to help push content *down and across* HCC has been met insofar that there are many trained intranet content authors, however the vision of devolved information sharing, creation and ownership is not reflected in the patterns of use of the system:

“We trained 80-odd users to be devolved authors of content, which is brilliant, which is exactly what you should do. You should have the people who own the knowledge in the organization keeping it up to date and being responsible for it. Now we train them up, and because of a technical issue we’ve had, and also because the way the system works, and it’s not the most intuitive system in the world, and it’s probably not even in the top hundred thousand, that is awful, people don’t use it. I don’t mean on the delivery side, the delivery side is fine. It’s on the authoring side.”

(Huw Lloyd-Langton, Applications Architect)

The delivery of information through the intranet system is intuitive, menu-driven, much like many well designed websites. The system is accessed using an internet browser such as Internet Explorer, the navigation and display of content is clear and simple. By contrast, the system for content creation (authoring) requires authors to interface with a complicated series of menus and options to add anything to the system.

A similar barrier is seen for the development of applications for the Soft Salad system by the technical staff Lemmy and Barney Bubbles. Applications are additional layers of software that enable additional functions and interaction beyond pages of text, images and downloadable documents. Features including bulletin boards, polls, forms and resource booking facilities are examples of features that require some kind of software application to run as part of the intranet system. The Soft Salad software running the intranet includes an application development toolkit; however the technical staff describe it as "unusable" which has meant there has been very limited progress in developing applications for the intranet.

Both these factors transpire to be barriers to creating and sustaining a distributed content author base and creating sophisticated features as envisaged in the intranet strategy.

Creating Content for the Intranet and the Content Authorship Base

The intranet team are concerned about the intranet project and the obstacles that are preventing the project from growing. The concern of the intranet team is two-fold; first is gaining a strong content author base to provide the level of information that intranet users will need and

second is sustaining the content author base who will continue to update and add information to the system. The intranet team believes that for the intranet to function and offer a viable improvement from Lotus Notes it must have useful information in place, hence the need for a strong content author base. Second, they emphasize that these authors must update and maintain the information they own to keep the system up-to-date and relevant to the organization, hence the need to sustain the authorship base. The case study found that many of the intranet team's concerns were related to one or both of these problems.

Currently the scenario should be that there are eighty authors around the Council all creating, updating and maintaining their information on the intranet. HCC Intranet Officer, Bridget Wishart echoes the information model that should be in place behind the system:

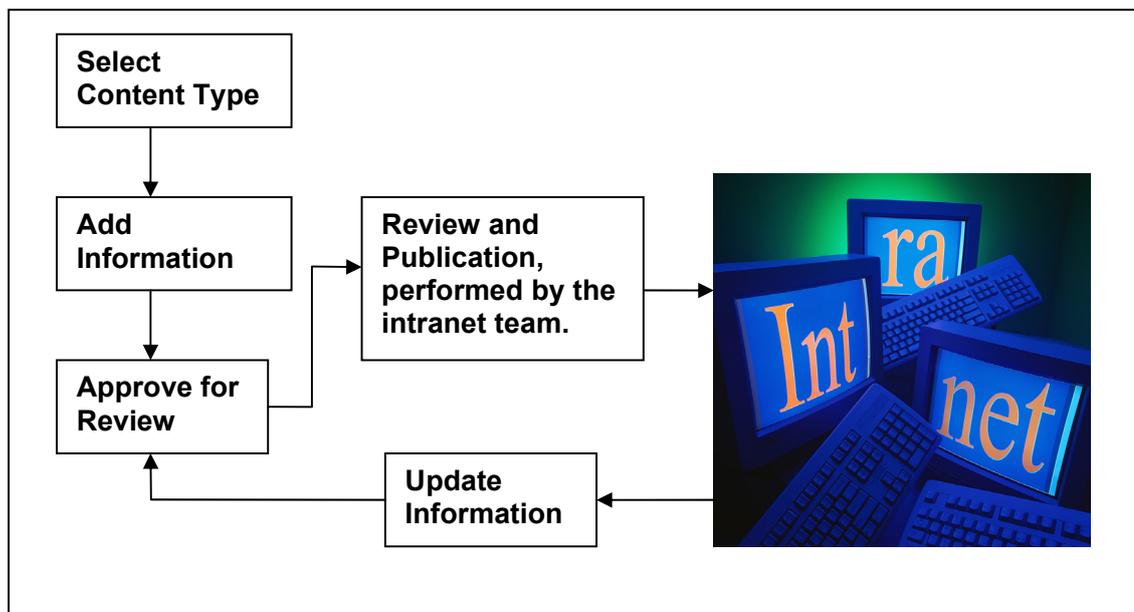
“The model we're using, we want people to own their information so when they're making documents it's their responsibility to publish them so it will become part of their job, when they are finished to post it on the intranet, in the appropriate place, if the document should be shared.”

However, due to a combination of the complexity of getting information onto the system for users and a limited number of software licences which limits the number of users who can add content to the system,

there are major barriers to fulfilling the role envisaged for the system. To experience using the content management system and the training process first-hand, I undertook the basic Intranet Author training course at HCC with some new trainees. The process of authoring involves the user putting information into a database by filling in a series of on-screen menus; this information is then used to produce a document or page viewable in a web browser. The author must first give their work a content type, for example *text*, *text with an image*, *a .PDF or embedded document or an event*. The content management system then automatically creates the item and the author has to fill in the pre-determined fields that constitute each item (typically a page title, an abstract and the text and images that are part of the page). The page is put in a folder location on the content database for the intranet site so that it can be navigated to and from by users. The author then checks over their page and approves their work for review; it is finally 'live' on the intranet once someone from the intranet team confirms that it is fit for publication and authorises the page for display. The system is configured so that categories of information are prescribed (e.g. 'news', 'event', 'document') and the presentation of information is pre-determined by templates on the system. The rigidity of the content authoring process leaves virtually no scope for author discretion about what, where or how their information should be on the intranet. All these areas are pre-determined by the Soft Salad system. In an age of graphical user interfaces, this method for creating items such as intranet

pages is quite an alien concept for those confronted with it for the first time in training. The content authoring process is depicted below:

Figure 7.2 The process of content authoring using Soft Salad



The Soft Salad system has the capability to alert users when their pages or information is out of date or is due to be updated by giving all items a review date. This is currently not enabled, but will become a feature of system over the next few months. Updates and revisions still need to be published centrally by one of the intranet team.

For users to add content to the system an additional software licence is required for the use of content management software that enables this. The Soft Salad software package includes a bundle of 120-user licences for the content management system. With 80 authors already trained

and a training programme of 10 authors every month, the number of software licences available for the intranet team to allocate to content authors is starting to cause concern. The limited number of licences available is likely to become a major constraint given the need for expanding the content authorship capacity of the council and pursuit of devolved content authorship:

“...we don’t have enough licenses for lots of content authors, so I don’t know if we can build up the intranet without having a lot of content authors. I’m going ahead, I’ve been told to keep training people, but I’ve commissioned work for our business unit to look into the licenses buying a few and maybe pruning a few that we’ve given out that aren’t being used. Given we’ve got 120 licenses that came when we bought the software. We haven’t quite got that number [of content authors] yet but I’m training 10 a month so it’s going up. I can’t see how it’s going to cease to go up because we want people to use it. That means that a lot of people need to have licenses even if the original authors ask them to do it for them, we are still going to need more than 120; we’ve got around 1 license per 100 people in the council at the moment.”

(Bridget Wishart, Intranet Officer)

It was seen first, there is a ceiling on licenses that will be reached in the near future and secondly, any limitation imposed on increasing the

number of content authors would seriously impede the model of distributed information ownership across the organization. In addition to the foreseeable limitation on increasing content author numbers for the system is the issue of user friendliness. This is a problem that extends beyond the training of staff to use the content management system. The complexity of the content management system is a pervasive problem for the development of the intranet. The intranet team reported that once trained, authors would not necessarily publish material on the system because of the complexity of doing so. These users still occupy one of the 120 software licences for the content management software, regardless of whether it is used or not.

The complex and difficult to use status of the Soft Salad content management system is endemic throughout the council; participants, all from different directorates, on the training day were discussing how difficult the system would be to use before they had even entered the training room! The complexity on the authoring side of using the software is also reflected in the accounts by those who are established content authors:

“I sort of did all my training autumn 2006 and I was quite lucky because the people developing the software system would actually come and sit with me at my desk and talk me through using the content management system. Then I went from there to literally

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using it everyday: and I have used it everyday. It's incredibly complicated to use, although now that I'm used to it, it's fine, I know the quirks, but for new users it is an incredibly complicated system to use. There aren't any automated processes, you put your article in, you have to approve it, but at the moment all the publishing is done by myself or Bridget or Mr Dibs, so people can't publish their own stuff. Whereas you compare it to the web, if a web author has done a page, there is a process but essentially once they press 'publish' that's ok. But I think the key thing is, if you don't use it for a few weeks you forget, because it's not easy to use."

(Ginger Baker, Internal Communications Officer)

Ginger Baker is responsible for internal communications across HCC and uses the intranet on a daily basis. However, she emphasizes that if the system isn't used regularly it can be difficult to return to. The ICT department is also concerned about the way usability is going to affect getting information from Hawkwindshire employees onto the intranet:

"Right. I mean, as ICT we're not happy. I mean it's an external package, you know, but we're not happy with the amount of effort that's involved in getting content on. We want to simplify that. So one thing we've said is we'll be working with Soft Salad on trying to make that easier, because it's still too difficult. We won't

get the content now, the information won't be there and people won't use it."

(Nik Turner, Head of ICT)

When asked what would help move the project forwards toward meeting the strategic aims set out for the intranet, Analyst Programmer Barney Bubbles, illustrates some of the problems that face the project:

"[Improving] Usability and decentralizing the publishing, I think that would help a lot. Everything, that goes on now has to go through either here [the intranet team] or the communications team and ask them to publish. The plan was always to decentralize as soon as possible, because of the complexity of the system, we've not been able to do so as easily as we'd like. But certainly that would help no end if people were involved, the whole thing would be fresh and up-to-date and people would use it more frequently."

(Barney Bubbles, Analyst Programmer)

As far as having information on the system and getting users to become information owners Barney highlights two areas where the implementation of the system and its processes impair reaching the strategic aims of usability and full decentralisation of information. The first, usability, strengthens further the claim that the intranet system is

hard to use for putting content onto the intranet. This is something upheld, not only by nervous trainees on their first encounter with the system, but with established users alike. The technical, administrative and the managerial echelons of the intranet team all reported the cumbersome and unintuitive nature of the content authoring aspect of the Soft Salad software.

The second area highlighted was the full decentralization of authoring and publishing information on the system. A cursory examination of HCC might conclude that the distributed content authorship is in place, as per the intranet planning documents and business case (Hawkwindshire County Council, 2004; 2007b). Hence the intranet is enabling the kinds of information sharing activities and working practices outlined under the NWOW programme. After all, it is the case that content authors are distributed throughout the directorates, across the organization, as Ginger Baker describes:

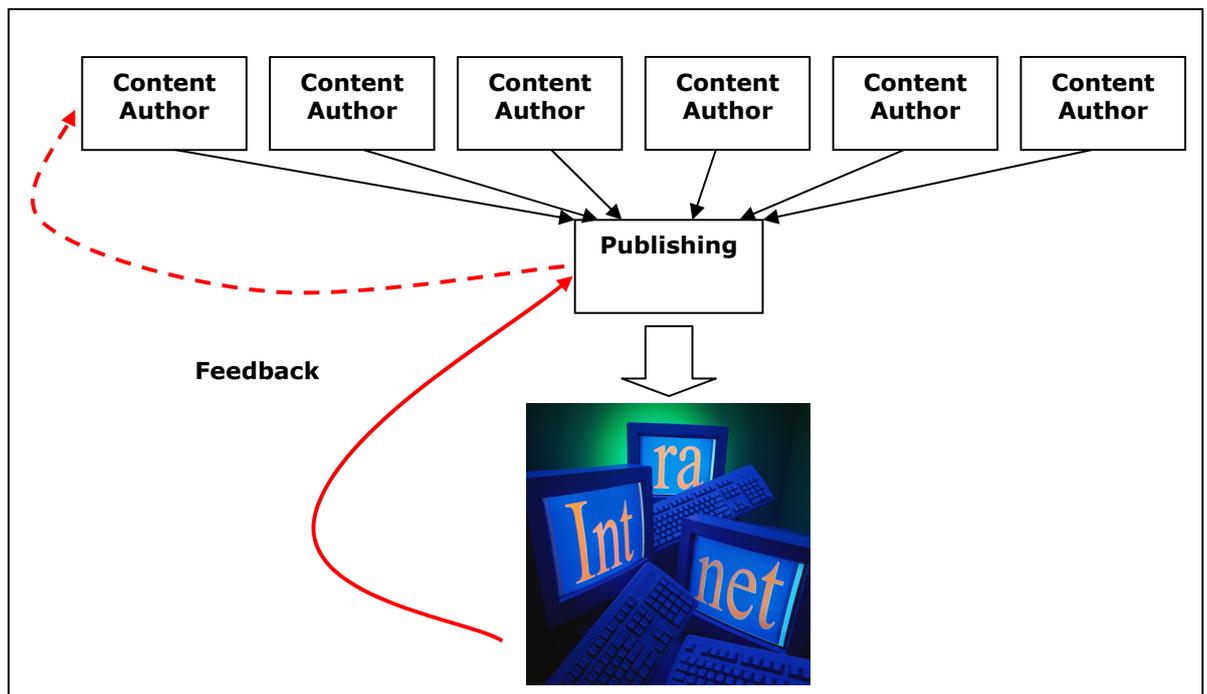
“The content authors are dotted around the organization. Typically they’re also the kind of people who would put stuff on the web so they sort of have an element of that in their job anyway. But, it can be anyone from a sort of admin assistant through to managers essentially. There’s no type of hierarchy. For example, Liquid Len, he works in the sort of ICT area, but he has a communications role in there and he puts all his pages on

[to the intranet]. So the levels of people who put content on does vary.”

(Ginger Baker, Communications Assistant)

However, as both Barney Bubbles and Ginger Baker have mentioned above, every item placed on the system has to be published by a member of the intranet or communications team, typically Bridget Wishart, Mr Dibs or Ginger Baker. The process from authoring content to publication (i.e. items appearing on the intranet system) resembles figure 7.3 below:

Figure 7.3: The Authoring Process for Intranet Content



Although the Soft Salad product allows a decentralized authorship base across HCC, the implementation at HCC has enabled the distributed creation, but not the publication of intranet content. While having centralised publication of information displayed on the intranet has the advantage of controlling corporate information, it also creates a potential bottleneck. The added publication stage also produced an impression of latency not seen in using Lotus Notes. However, it was recognised that with an increase in content authors this configuration of content publication will increasingly become a bottleneck in putting information onto the system:

“Eventually we will have to roll-out publishing groups because at the moment for content to go live it has to be approved by me which is a bottleneck in theory, it’s not acting as one yet, but obviously it will if it grows and we can’t have it all centralized like that. So we are going to have to strategically roll-out different people who can publish and people can contact who will take that on. There are a few people who would be clued up enough to do it but it’s difficult.”

(Bridget Wishart, Intranet Officer)

The constructions of the content authorship base by different agents at Hawkwindshire County Council vary from those who see the content authoring as distributed across the organization to those who see the

current system as a centralized information resource where content authors have no ownership of their information. This was most prominent in my conversations with Nik, the head of ICT and Bridget, the intranet officer. Nik was extremely pleased with the phase 1 roll out of the intranet and the number of content authors they had trained. The technology represents an 'organization-led' intranet with a devolved series of intranet authors feeding and updating the service with the latest information. The information model looks different from the intranet team's position. Bridget has become a central node in the publishing of the 'decentralised' information for the intranet. She reports that rather than spending time either training or supporting users of the intranet she spends most of her working day checking, amending and authorising intranet articles for publication on the system. Bridget expresses concern that there is a growing tendency for intranet authors to put incomplete or unchecked articles into the queue for publication. There is often work for Bridget to do in filling in the missing information, correcting or formatting the pages ready for publication. Some authors have even been known to bypass the Soft Salad system altogether and to email Bridget or Mr Dibs MS Word Documents to be inputted onto the intranet. The detachment of authors from their pages caused by the authorisation needed from the intranet team was cited as the major barrier in getting HCC staff to look after their own pages. Both Bridget and Mr Dibs were frustrated that the authoring and publishing process placed them in a bottleneck where they have to authorise each and

every page – a system that impedes the desired model of distributed information ownership and creation. With an increase in the volume of content generated by the rise in trained intranet content authors Bridget and Mr Dibs saw themselves as being able to offer less support to users due to the increasing the amount of checking and authorising of intranet pages.

The juxtaposition of the views held by the head of ICT and the intranet officers provides an example of contrasting social constructions of technology. Seemingly the system for authoring intranet content is both distributed for some agents and centrally controlled for others. This is one manifestation of change where the relationship between the social and technical is far from stable.

Successful Implementation; Internal News and People Finder:

Phase one of the intranet strategy concentrated on delivering signposting information resources to the whole organization. These were designed as simple, but effective features to draw people towards using the intranet rather than Lotus Notes. Two of the 'success' stories of phase one of the intranet have been the news headlines and stories along with the 'people finder' the intranet now offers. Across all the interviews, these features of the new system were mentioned by informants as useful resources.

Unifying Hawkwindshire County Council is at the core of the change initiative New Ways of Working. This stipulates that the organization needs to work more as a single corporation for Hawkwindshire rather than in "silos"; segregated along the vertical hierarchy of directorates. A feature of the pre-intranet organization was that internal news was conveyed via Lotus Notes bulletin boards. This has two major disadvantages; the first is the tendency for vertical divisions to use the bulletin facility to report only to themselves, important news stayed firmly within each directorate. The second is a technical limitation on the length of bulletin posts. Bulletin items are a feature in Lotus Notes to alert and signpost users to events other resources on the system, essentially a series of news headlines and a short explanatory text. This facility has been used crudely to convey news throughout each directorate. The limitation on the amount of text that accompanies each bulletin meant that detail was compromised. The bulletins would often simply have a headline and then link to a document, such as a newsletter, in the directorate's document library.

The introduction of the intranet saw the first electronic corporate news resource. The news is displayed on the intranet home page and deliberately mimics the Lotus Notes bulletin-style presentation for the headlines. However, the headlines each link to full articles which contain text, images, links to other intranet resources and links to external

internet sources in much the same way as contemporary internet news sites. The news content is administered by the internal communications officer, Ginger Baker. Her role was created following the New Ways of Working review and as part of the associated change programme at HCC. As part of NWOW, internal communications were seen to be a weakness of the organization and a dedicated internal communications officer was appointed to improve the situation. Ginger Baker's role is not totally dedicated to the intranet as service level staff (see figure 6.3) are best served by traditional communication channels such as printed staff newsletters. Ginger updates the intranet homepage news headlines on a daily basis, she collects and collates the articles and publishes them on the system. The news feature of the intranet was mentioned by all informants, both customer and internally facing as a beneficial and useful aspect of the intranet. The news features on the intranet are well trafficked and have been well received by HCC staff. Every informant, regardless of role and hierarchical position reported they looked at the service at least twice weekly. The spread of corporate information has been at the core of the news features with coverage of the Council-wide pay and conditions review, lift sharing, reserved car-parking, booking pool-cars and a subsidised bicycle scheme. The head of Hawkwindshire County Council's trading standards division recalls purchasing a bike through the council's cycle scheme:

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“I think the news, the front page, clearly a lot of work goes into changing that, keeping it updated. One thing that was personal, I picked up on the cycle scheme; I ended up buying a bike off that! I think it is an opportunity, if you take the trouble to go in. The problem is it’s only visible to those who go into it. I do think it has improved visibility over a number of issues.”

(Del Dettmar, Head of Trading Standards)

The regularity and the depth of the updates were qualities that employees were favourable about, especially compared to the bulletin boards using Lotus Notes. However the transitory nature of the implementation of the intranet and the ongoing use of Lotus Notes raised usability issues among several intranet users:

“Right now if you want your calendar, you go to Notes, if you want news you go to the intranet. I know it’s an in between stage – I hope it’s an in between stage, but ideally you’d have one place where you’d go for everything.”

(Liquid Len, Development Officer Benchmarking and Development)

Liquid Len articulates the problem that many users raised which was switching between the main application working environment of Lotus Notes, and having to launch an internet browser to view intranet content. The issue of moving to a browser-based intranet is picked up

later in the case and the strategic vision for an intranet portal and corporate document library.

The broad and rich content that the intranet news offers over the Lotus Notes bulletin boards has been well used and received by HCC staff. Informants were enthusiastic about the corporate news but were also looking across the other directorates at newsletters and other materials. In some instances managers were gauging their own performance against that of other directorates.

A second intranet resource that evoked positive support from the informants at HCC was the 'people finder' facility. People finder is a searchable database of HCC members of staff; the inclusion of some kind of searchable staff directory has been part of the intranet development plan since its inception and under the Phase 2 documentation where the intranet team was tasked to "Launch people finder and extend basic functionality to include structure information and generation of organization charts" (Hawkwindshire County Council, 2007a). The facility is a browser-based front-end for the extant Lotus Notes database that holds staff details:

"...we've replicated people finder, our staff directory, we've copied that across from Notes, well, made it available, it's running on the same database, but it's now on the intranet. We've added a few

new things to the intranet version. So it replaces everything you could download from Lotus Notes and a bit more. So we can hopefully now switch off the Lotus Notes access to that database, but that's one database out of thousands and thousands."

(Bridget Wishart, Intranet Officer)

The facility to search HCC members of staff pre-dates the intranet as a feature of Lotus Notes and the intranet continues to use the same Lotus Notes database. However, because the results can be displayed through a browser, the intranet development team have been able to include pictures of members of staff alongside the normal name, department and contact details. This feature is broadly constructed as "new" among the informants because of the inclusion of staff photographs with the search results even though there is very little that is new technologically with the facility. Even informants who rarely use the intranet reported that the facility to search HCC members of staff is very useful, as Electronic Information Officer Paul Rudolph remarked:

"As a source for finding information is where it's made a big difference. The people finder for example is perfect for an intranet because sometimes it's difficult to find that kind of information. It's a very small change, but it's made getting in touch with people a lot easier."

Simon King, a Community Safety Administration Officer, told me:

“I certainly use the staff people finder, although the photos are all wrong, it’s a very useful tool.”

In our conversation, he readily acknowledges his (and his colleagues) infrequent use of the intranet due to the ‘customer facing’ nature of their jobs, but they regularly used the people finder facility, despite the teething problems with it displaying the wrong staff picture with some staff records. The overall success of people finder has been accompanied by some unexpected consequences and adaptations of its intended use:

“People finder on the intranet has photos on, everyone has a badge with a photo on, so everyone now has a picture – that was always on the database, it was just Lotus Notes couldn’t display the pictures and you can on the intranet. And that’s been a huge hit, people just going through to see who people are, people have been speed dating!! It really is the tiniest little things, you can see someone’s picture, has made it the most popular thing on the intranet! There’s the thing that you can look up who someone is when they phone you, people were complaining that they hadn’t had the chance to pose for new photographs and it went live, and

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why is there a picture of a man when I'm a woman? You know that kind of thing, there are a few teething problems."

(Bridget Wishart, Intranet Officer)

People finder was always anticipated to be a well-trafficked, heavily utilised information resource, but the addition of a small staff photo has enabled users to be creative with the use of the intranet technology. In the example above casual browsing of the directory, using people finder as a surrogate 'caller ID' so see people while on the phone and even speed dating, have all emerged as instances of alternative use for the system. The most frequent 'alternative' use is to look-up HCC contacts during or after phone or email contact. A typical example is given by HR Officer, Harvey Bainbridge who, despite not needing the intranet in his everyday role, uses the intranet for this very purpose:

"I was aware of it when it was launched, the role I do doesn't require me to go onto it and find information, having said that I wouldn't say I don't use it totally. For instance, there's a useful feature that allows you to look at a picture of a member of staff you're talking to."

People finder is the most used feature on the intranet.

Breaking the 'Silo' Effect, Building a Corporate FAQ

The 'silo' effect is something that the intranet is intended to overcome. However, the rigidity of these silos is a product, not only of formal organizational structure, but of the allocation and competition for resources within the council:

“That’s also to do with the way that our fiscal network works. It’s to do with the fact that the council, traditionally, certainly since I’ve been here because of the open market between departments as it was then, was effectively nine organizations. So it seems a common thread was needed to join these together and it was recognized that an intranet could do that.”

(Huw Lloyd-Langton, Applications Architect)

Ultimately, the intranet technology would bring about a corporate ethos where information was shared and accessible and would break-down the fiscal divisions between departments. The intranet’s strategic value in bringing about new ways of working and departing from the pervasive 'silo' working throughout the directorates at HCC is brought to the fore where the established structural patterns of council organization, embedded information structures in extant technologies and current ways of working collide.

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The frustrations of those working with the intranet are apparent when they discuss the tensions between these factors. Generally conflicts arose where the corporate strategic model for the intranet clashes with directorate level processes and procedures; a tension between strategy and practice. Earlier in this and the previous chapter the New Ways of Working programme was profiled as a unifying initiative to improve the way the council conducts its work. The intranet was conceived as providing a corporate information resource to assist in aligning core organizational processes.

One step towards a corporate information system that has been developed as part of the intranet project is the 'how-to' database. This is an information resource for members of staff to find out how to perform various tasks connected with their jobs as part of the Hawkwindshire organization. A precursor to this has existed at directorate level for a number of years as a Lotus Notes database run by Environment and Economy directorate for its staff to help them with administrative processes. This facility has been very successful within Environment and Economy and the intranet team have been working to broaden the 'how-to' facility for the whole of HCC. Intranet Officer, Bridget Wishart discusses the transition from a directorate based endeavour towards a corporate information resource:

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“...we have a ‘how-to’ database being built at the moment, with general advice and guidance on how you do something. It’s grown out of one database that existed in one directorate – it was quite specific. How do you book a pool-car? How do find out about your leave? And that stayed within one directorate, but it’s a really good idea, the format works, it’s got a nice big A-Z index so we’ve copied that onto the intranet and we’re going to get other directorates to feed into it, so it’s going to turn into a corporate thing.”

By bringing the useful qualities of this information resource to the fore as a corporate resource, Bridget sees this as encouraging change in the Council. With the added transparency of seeing every department’s way of working she is hopeful that organizational members will start to see outside of their ‘silos’ and perhaps question the efficacy of having six parallel processes:

“It’s going to lead to better practice as well, because at the moment, if you’re booking leave you have a look and there are six different ways of booking leave, depending upon who you work for. Hopefully people will see this and start to realise – why do we have so many different ways of booking leave and their way is better than ours! Hopefully that will start streamlining a lot of the processes which what it is holding up a lot of the intranet. We

can't offer a leave booking system online because there is no one system and nobody is willing to give up their system. So a lot of people come up with these bright ideas, 'we can book our food on the intranet, we can book our leave on the intranet, etc' – no. So we're hoping this will be an intermediary which will mean that people will know how things work, which is as good as it can get."

Bridget illustrates how the intranet is a compromise between the directorates' ways of working rather than being the conduit that helps establish the new ways of working programme with corporate information resources. This sentiment is echoed by Liquid Len, the Intranet Development Officer:

"We've been trying to get a lot more corporate systems in place. Things like the 'how to...' database; that's from Environment and Economy directorate, they had a database called 'how to'. Basically any process or whatever within that directorate: How to fill out an expenses form, how to get set up with a user name and a password, how to whatever you can think of. They're now migrating that onto the intranet for the whole council. They're still then going to link to each directorate's way, rather than whoever is in charge, HR or something, of corporate expenses, saying 'this is the process', bang!! - on the intranet. The one process that

everyone uses. They're still going to go with the process with six different bits!"

(Liquid Len, Development Officer Benchmarking and Development)

Liquid Len is more specific about the problems of multiple processes and the intranet; he is frustrated by the migration of the established pluralistic, rather than a new corporate approach to administrative processes (e.g. expenses) to the intranet. He sees the way forward as the departments responsible for handling corporate services agreeing on a single process for all directorates across the council. The applications architect, Huw Lloyd-Langton, shares a similar view on refining organizational processes before attempting to implement technologies such as the intranet:

"But the problem is it's not just a case of throwing technology at it. You've got to change the culture of the organization. You've got to get good management practices and governance in place, all that boring stuff. What you do have to do is you have everybody working to standards because you have to have everyone describing things in the same way. If you don't have the business processes sorted out and you're just throwing ICT systems on top of it, you're just papering over the mess, and sometimes that's done to kind of create the illusion that

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everything's fine underneath but you're never solving the problem..."

(Huw Lloyd-Langton; Applications Architect)

The applications architect's role is to provide computer users with the computer applications they need in order to do their job. Connected with this is his strategic input into the development of ICT resources for staff, his job is to reconcile the operational and strategic needs of the organization and its employees with the current IT capacity of Hawkwindshire County Council. Throughout our discussion it becomes clear that "business processes" are significant barriers to Huw's vision for the HCC intranet or portal. He repeatedly signals the need to structure the organization and then apply technology:

"...Yes, you have to solve the process first. You have to get the business working in a set way. You can't just get the systems all talking together because if you haven't got the business process sorted, then you're stuck before you begin. So a big part of the, well it's very trendy in business over the last few years to talk about business process, management engineering, investigation, modeling, all of those things, and it is a load of wanky business bullshit, but it's very, very true."

The 'how-to' example shows a range of different constructions of the intranet technology. Throughout the interviews the more senior managerial staff members from across the organization cited the 'how-to' information resource as a best-practice example in managing corporate information. The intranet team were hopeful that by using the intranet to expose procedures where there are six manifestations of similar processes, that it might lead to organizational change. Finally, those who have to reconcile the organizational and informational aspects of the project saw the intranet as papering over the cracks rather than addressing the cultural and organizational factors that need to accompany technological change.

The Vision of an HCC Portal

The second of two strategic phases for implementing the intranet was to provide a 'portal', a combination of intranet, internet and document management technologies. According to the Head of ICT, Nik Turner, the final incarnation of the intranet will place the project at the centre of all computer use across Hawkwindshire County Council:

"Yes, it will supplant everything. You're talking about having a single point of access for all electronic services and information."

The 'portal' vision for the intranet was a key driver in the choice of software to run the system. A full enterprise content management system, Soft Salad, was purchased to enable this facility. The portal blurs the definition between internet, intranet and extranet; access to the system is entirely based on user context; members of staff have far greater access than members of the public browsing the site. Document management and retrieval would also be performed through the portal. The most significant changes for HCC members of staff will be the migration from Lotus Notes to a single point of access for email, to personal storage, document libraries and corporate information. To many HCC staff, the intranet is something they feel is separate from their everyday tasks. This was especially evident in staff who had a *customer focus*, those who saw their job as serving the public rather than any of the corporate and administrative functions that serve the Council. Most of these members of staff had used and were aware of the intranet but were unconvinced of its relevance to delivering services to the public. As users of the intranet, this group was very much confined to using the people finder facility and very little else. For them, phase one of the intranet was of little relevance to their daily routines as all of the documentation and electronic resources were available via Lotus Notes; the departmental document libraries. The dependence on departmental and directorate level documentation and information which is accessed and stored on the incumbent system is deeply institutionalised. Until phase two begins to utilise the full ECM

capabilities, it is foreseeable that Lotus Notes will remain as the document management system for departments and directorates in HCC with the intranet providing news, people finder and a directory of corporate information. Applications Architect Huw Lloyd-Langton describes the current situation of under-utilized system capabilities:

“So you can go out and buy a copy of FrontPage or whatever they're calling it these days, set yourself up with a little website, but that's all it's ever going to be is a little website, what we've bought is the infrastructure to have a dynamic personalized portal, but what we haven't done is put the elements in place to enable that fully.

I use this horrible analogy all the time that I know Bridget's started quoting as well, which is: 'It's like we've bought a mansion but we're living in two rooms downstairs!'"

At the level of operation the intranet team share a different perception of what stage the intranet is at and what has to happen before phase two, the portal, can be reached. Intranet officer Mr Dibbs emphasises the long term and perceived unobtainable goal of the intranet portal:

“The Holy Grail would be to have one portal for information where you'd be one click away from everything and any information you need will be added to this intranet.”

The primary task for the intranet team was to get as much content (i.e. information, news and documents) onto the system in order to bring users over from Lotus Notes. However, to placate the transition to the intranet, a lot of effort was made to try and replicate Lotus Notes functionality rather than orchestrate a full migration to the 'portal'. This was felt to be the best way of getting HCC staff to use the system so that Lotus Notes databases could be switched off and the changes made later to the intranet towards realising the 'portal' design.

At the strategic and managerial levels, there is recognition that the substance of change is not entirely technical, both the head of ICT and the applications architect are very much aware of the need for organizational adaptation in bringing about the changes that NWOW wants to instill in HCC:

"In terms of other barriers, the other thing is really about cultural change and just change in the organization. Hawkwindshire County council staff are no different to any other set of staff. They are used to working in certain ways, and when you want to do things differently, there is a certain amount of resistance because they may not know how to, they may not be comfortable to do that, and it's about taking that forward."

(Nik Turner, Head of ICT)

Additionally, Huw Lloyd-Langton describes the necessary ingredients of change as being a combination of technology and culture. Technology is seen to be a facilitator of better practice, better management and better working; IT solutions are not solutions in and of themselves:

“Yes, I think there are certain organizational problems that you can solve by having an effective intranet, but I'd take it a step further and say actually what I want to do is to ensure that we're using all the information we've got as effectively as possible in the best ways and delivering services in the best way that we can using technology. That's what it's about really, and what that means is implementing a certain amount of change both technically but crucially in the way that people work with the information, and the way that they use technology. So it's cultural as well as technical, I think that's really key, and if we're not able to address the cultural side, all you end up is with a load of flash toys that get partially used. We'll end up with a much more fractured set than we have at the moment. So you don't solve the problems just by throwing technology at it.”

(Huw Lloyd-Langton, Applications Architect)

From the managerial levels, there is the maintained belief that the Soft Salad system was the most effective way to deliver the technology that the NWOW change programme required.

Technical Merits and Constraints: Issues of Technological Duplication

The case study so far has looked at the role and shape of the intranet team who manage, support and administer the system, the information content of the intranet, examples of 'successful' features, the problematic process of content authoring and the alignment of the system with the corporate change initiative 'New Ways of Working'. This has revealed a partially used, complex information system that is yet to transform the council by providing a backbone of corporate information for the organization. This raises two issues, first what is the current level of operational support given by the intranet and second, why do users persist with the incumbent Lotus Notes system if the Soft Salad system is technically better?

The discussions and interviews with users reveal that while the 'successful' features on the intranet are useful, the system does not offer the capacity to provide operational support for their day-to-day tasks. The Head of Trading Standards gave the following response that was echoed across much of the organization:

“The intranet is not really providing operational support, other than people finder, which is excellent, but I’m not sure everyone uses it. I think it’s going to be developed so that there’s keyword search on it, so I might group people together under certain keywords which will be useful. As long as you’ve got an alternative, which is Lotus Notes directory, you’re not forcing people to use the intranet which will be a barrier to its effectiveness. It’s the fact we’ve got things running in parallel; it might be necessary at the moment, but at some point one system has to go.”

(Del Detmar, Head of Trading Standards)

This captures several core issues connected with the limited uptake of the new technology. Where features on the intranet are providing some operational support, there is both an alternative in the incumbent system and even where the intranet is technically superior, *not everyone uses it*. Across the informants, all indicated that for them to do their jobs they were still partially, if not entirely, reliant on Lotus Notes. The pervasive role of Lotus Notes in the daily routines of HCC staff featured in many of the informants’ accounts of using IT:

“Most of us don’t link in as much as we’d like to. That’s probably because we’ve got existing technology with Lotus Notes that we

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haven't switched off yet and that's probably because we're focusing on the public rather than internally on ourselves more generally, but that may change in the future."

(Simon King, Community Safety Administration Officer)

For me, I'm still very much Lotus Notes. In terms of where the content is for my job, where I get the content, the procedures I go through, most of it is still on Notes.

(Paul Rudolph, Electronic Information Officer)

For some staff, the focus on delivering public services was far more important than the internal arrangements that supported them. Hence there was a substantial attachment to established systems and ways of working were substantial barriers to change, despite the technically superior nature of the Soft Salad intranet product for delivering intranet content.

A further issue is that of HCC employees 'knowing' what the intranet is for. This ranged from uncertainty about using an internet browser during "work time" through to questioning the duplication of features in Lotus Notes:

"There were issues about appropriate usage. Is it classed as a work tool? Is it classed as a social tool? That always came across

as a bit of a problem. When I first joined [HCC] I wasn't told what it was for, so I never had a browse around or anything in case it looked like I wasn't doing any work or anything."

(Mr Dibbs, Intranet Officer)

"The benefits should be demonstrable and clear and communicated and that way you will get people on board. Any barriers to things like this tend to be individuals, they've worked this way for a certain length of time, and they can't see the necessity or the benefits of change, so the hearts and minds thing is always the biggest barrier."

(Del Detmar, Head of Trading Standards)

This study reveals that the culture of IT use in HCC is mostly at odds with the strategic vision for the intranet with members of staff unsure whether they should be using internet browsers (i.e. Internet Explorer) during the 'working day' and others persisting with using Lotus Notes for all their information needs.

Addendum - The Future of the HCC Intranet

Nearly 11 months after the period of data collection, an informal follow-up interview was conducted with a key informant at HCC. The conversation confirmed that much was the same with patterns of use

and an instilled dependence on Lotus Notes for information and departmental databases. The intranet still had not achieved the position as a corporate information system although it was used to provide regular updates of internal news. Crucially, however was the announcement that the council had decided to implement a new groupware platform which incorporates email, databases, applications and intranet facilities which would replace both Lotus Notes and the Soft Salad systems. Microsoft SharePoint has been selected as the next software platform for the council's needs. The new system will be implemented at the start of 2010.

Chapter 8: Analysis – The Case of CUSS Kiosks at Nottingham East Midlands Airport.

This and the following chapter revisit the theoretical arguments introduced in Chapter 2 for including the broader socio-political context of change (Orlikowski and Barley, 2001; Avgerou and McGrath, 2007), keeping technology visible without reifying the artefacts involved as *deterministic contingencies* (Bijker, Hughes et al., 1987; Woolgar and Grint, 1991; Bijker and Law, 1992; Bijker, 1995) nor relying solely on social explanations for change (Kimble and McLoughlin, 1995) in periods of technological change in organizations. The institutional context of each case study was examined earlier in chapters 4, 5 and 6 using sociotechnical constituencies as a mapping technique (Figures 4.4, 5.4, 6.1 and 6.3). The active and influential constituents are referred to in the analysis of the two case studies. In this *interpretive* account of technology and change the framework developed by Avgerou and McGrath (2007) is used. The framework attempts to capture the intertwined nature of technical rationality that underlies IT-led change, the power dynamics of organizations and the broad socio-political context of which they are part. A limitation of interpretive accounts, and potentially the framework presented by Avgerou and McGrath, is that given the intertwined nature of the analytical constructs, where does one construct begin and the other end? The categories of analysis are not directly observable phenomena. As this is not a deductive research

design, where each analytical construct can be separated from the next to be measured and compared, then the analysis and analyst must be aware and accommodating of these properties. In some cases it was impossible, even with further enquiry, to elicit whether an informant was discussing the broader socio-political context or *their aesthetic of existence*. The research design, covered in Chapter 3, partially accommodates this by using multiple-methods for data collection and 'holistic' description (Jick, 1979) from the empirical data.

Nevertheless, despite the above shortcomings, the Avgerou and McGrath framework provides a theoretically robust and conceptually broad underpinning for the current research. Therefore, Avgerou and McGrath's (2007) framework provides the foundation for analysis of the qualitative data collected for each case. It is used to show the role of power relations in the attempts to legitimate strategies of technological and organizational change. Technological change "...is a socially constructed effort to legitimate a technical/rational strategy about the need for organizational change. This strategy is negotiated and may be subverted by individuals forming reasoned personal stances reflecting moral and political concerns" (298). Table 8.1 below, defines the five concepts used in the framework, the connected issues and shows how they relate to the case data.

Table 8.1: Foucauldian concepts used for analysing sociotechnical change.

Concept	Definition	Relevant Issues
Technical Rationality	Technical/rational objectives and action that constitute a strategy in the formation and sustenance of a regime of truth about organizational change.	<ul style="list-style-type: none"> * The practice, resistance or adjustment of the strategy implicates power dynamics – these continue to form/reform regimes of truth. * Agent's conduct in creating or subverting these regimes can only be understood by their moral concerns. * Individuals step back from practice to examine their life quality.
Regimes of truth	Power-constituted legitimation of the knowledge that supports a society's institutions	<ul style="list-style-type: none"> * Interpretations of knowledge emerge in social discourse and a dominant regime emerges. * A dominant regime of truth can be challenged by an emerging one when different discourses become a focus of attention for society. * Subjugated knowledge is disqualified as naïve or inadequate.
Care of the self	A self-disciplinary process in which individuals strive to shape their life experiences through critical reflection and action	<ul style="list-style-type: none"> * People accept of their own accord the rationality conveyed by particular regimes of truth. * This judgement is not only cognitive, but also moral * Individuals shape their life experience through self-practice
Problematization	A self-practice addressing the part of one's life requiring ethical care	<ul style="list-style-type: none"> * Problematization is triggered by questioning the meaning, conditions and goals of a domain, especially under conditions of uncertainty challenge. * It develops a given into a question to which diverse solutions attempt to produce a response
Aesthetics of living	Formation of individuals' reasoned moral stances within the power dynamics of their social context.	<ul style="list-style-type: none"> * Pragmatically constructed according to individuals' life experiences * Desired life style carries certain aesthetic values

(Adapted from: Avgerou and McGrath, 2007; 307)

This framework is used to analyse both case studies and illustrates the power relations mobilised by various actors and their efforts to implement, sustain or subvert the course of organizational change.

The Introduction of CUSS Kiosk Technology and Sociotechnical Change

In the case study of NEMA there emerged two clearly defined groups; management and customer services. The former concerns the personnel responsible for the running, benchmarking and development of the CUSS project. The latter concerns the customer services function of the organization; around 24 employees and their manager who were appointed as 'kiosk hosts' to facilitate and troubleshoot wherever needed when passengers used the self-service kiosks.

The case study of common-use check-in kiosks saw their implementation at NEMA as part of a wider technology-led strategy by parent firm, Manchester Airport Group. Throughout the case it was seen that organizational groups were empowered and rewarded through association with the project. At the same time, the performance targets handed down from the parent company's project managers meant that the technology developed unintended patterns of use in order to meet the targets set. Throughout the analysis the drive for cost and space saving using the CUSS Kiosks is referred to the 'regime of efficiency'.

However, in the case it is also revealed that technical errors and the extended length of time the project has been running, challenge the legitimacy of this regime. Both the technical problems and duration of the project were events that could have subjugated the knowledge that sustains the regime of efficiency.

The Role of Technical Rationality at NEMA

The CUSS project has a distinct strategic history that involves a number of the constituents mapped in the inter-organizational constituency diagram (see figure 4.5). The industry trade association IATA has backed CUSS technology as one of six areas for *Simplifying the Business*. IATA have gone as far as setting targets for the uptake of CUSS Kiosks in airports around the world on the basis that it saves an average of \$US 2.5 per passenger, per transaction saving on the cost of check-in. In my conversations with the Terminal Services Development Manager at Manchester he confirmed that MAG follows IATA briefings very closely “to stay ahead of the game” as well as to try and access the cost savings that the technology will bring. MAG’s strategy includes implementing new technologies for realising efficiencies to stay competitive as opposed to complying with industry standards. The group have embraced the technical rationality of cost saving and elected to implement the CUSS Kiosk technology across its three airports in the UK. The strategic management team were confident that the investment in the technology

would pay off because of two areas where cost-savings could be made. The first at the transaction level, a saving on the cost of checking each passenger in, could be passed on to airlines using the airport making them more competitive. The second is the ability to delay the need for future spending on terminal building space – the kiosks save space. The technical rationality for this is that with the same number of check-in desks for bag-drops, the same floor space in a terminal building can be used to check-in a greater number of passengers. These two rationalities of cost and space saving were central in the choice to implement the technology and also in the system trials at NEMA.

The decisions to implement the kiosk technology occurred against a background of uncertainty in the future of airports in the UK. In 2003 the government published a White Paper outlining a 30 year strategy for air transportation in the UK (Department for Transport, 2003). Following the publication of this report, airports were asked to submit “master plan” documents making a case for expansion. The White Paper recognises that the capacity of the UK’s airports is being stretched, especially in the South East of England, and that the government will have to allocate extra runway capacity across the country. The White Paper also introduces competing and conflicting discourses to the proposed expansion of airports; the political sway of sustainability, environmentalism, eco-tourism, communities and transport alternatives (i.e. rail, road and sea) are all involved in shaping the course of airport

expansion. In the knowledge that expansion is an uncertain option for many airport sites and that the consultation period before any permission to expand is granted is likely to be lengthy, airport operators are turning to alternatives to increase their passenger capacity using their current infrastructure. Embedded in this socio-political context, NEMA was in a position to handle more passengers through making better use of its terminal building as runway and apron space have headroom in their capacity.

The strategic managers of MAG and NEMA adjusted their strategy to incorporate CUSS technology into their operations. In the case it was seen that there was a drive to install the machines supported by the technical rationality that they will reduce costs while increasing passenger handling capacity within the current infrastructural configuration of the airport. Regimes of truth underlie technical rationalities and sustain or destabilise their legitimacy, in the following section the regimes of truth are analysed. The pursuit of the technically rational cost and space saving technology implementation at NEMA was supported by a dominant regime of truth.

Maintaining Regimes of Truth; the Sociotechnical Processes of Continuity and Change in the Face of Technical Difficulties

The technical rationalities associated with cost and space saving were seen in the case study as supporting strategies for technological change

within the Manchester Airport Group, including NEMA the case study organization. This aspect of the analysis begins to underline the sociotechnical dynamics that accompany technological change in organizations.

Regimes of truth are described by Avgerou and McGrath (2007; 306) as “... *the dominant logic that determines particular social objectives as legitimate ends and give rise to particular strategies as means for their achievement.*” There are often plural discourses that form, maintain or subjugate knowledge that sustains regimes of truth. The authors draw on the work of Foucault to argue that the mechanisms of change for a regime of truth may come from external or internal factors to the organization. Broad, external changes in social or political agenda (e.g. environmentalism, terrorism or changes in government) and localised actions by actors and their *continuous care of the self* are concomitant constituents of change. These external and internal factors were illustrated earlier using the inter- and intra-organizational sociotechnical constituencies maps (Figures 4.4 and 5.4).

The previous section illustrated the technical rationality of lowering cost while increasing the use of space this is captured as the regime of ‘efficiency’. Avgerou and McGrath (2007) saw the recursive attrition between the regime of modernisation by providing an effective, computerised, public administration and the rationality of bureaucracy

surfacing to impede the organizational reforms that went with IS innovation. In the current case study there is a less drawn-out phase of implementation for the kiosk technology, mainly because CUSS caters for a single organizational process rather than a multitude of different tasks carried out by the modernising efforts in a social security agency. The regime of 'efficiency' evolved relatively quickly and is a pervasive force in the shaping of the CUSS kiosk project. The origins and proponents of the regime of efficiency connected with the technology can be traced across different levels of the sociotechnical constituency (see figures 4.4 and 5.4). The proponents of the technology, IATA, lay claim to CUSS providing "Time saving for passengers. Cost savings for airlines: US\$2.50 per check-in; US\$ 1 billion annually for the industry [and] Space savings for airports: increase capacity at a lower cost" (IATA, 2008a).

The efficient properties of the technology promoted by the industry association, IATA, were echoed by the MAG and NEMA management when talking about the advantages of CUSS.

The dominant regime of truth constructs the implementation of CUSS technology as a means enhancing the performance of NEMA, and Manchester Airport Group sites more generally. To prove the effectiveness of the system, NEMA was expected to perform 20% of passenger check-in for CUSS enabled flights using the kiosks. Throughout the period of data collection at the airport, this target was

regularly exceeded. Team members took great pride in reaching and exceeding this target and this measure was regularly discussed and monitored. On each occasion where the kiosks were in operation, the research and development specialist would arrive with a print-out of passenger numbers from the previous day. The print-out included a breakdown of passenger numbers by flight and by the means of check-in used (i.e. conventional, online or CUSS see fig 5.1) this was then used to calculate and assess whether the target had been reached. Whenever the terminal and airport managers were witnessing the check-in processes they also took the chance to congratulate the customer services staff for their help in reaching and exceeding the targets. With the rest of the CUSS team the managers remarked that they were happy to report back to Manchester that they were *beating their targets*. When the kiosks are in operation there are between two and four fewer (depending on the size of aircraft for the flight) conventional check-in desks being used. Throughout the duration of the case study levels of 35% of passengers using CUSS kiosks were not unusual. The efforts to maintain this passenger throughput were consistently a focus for the CUSS team.

From a technical-rational point of view, the technology is “successful”. The CUSS kiosks are achieving the level of passenger throughput and the team responsible for the kiosks is ensuring that the level of passengers using the technology is maintained. Both the airport and the terminal

managers signal their support of the technical rationality of the CUSS project; they construct the kiosks as being able to reduce costs and act as a means for making improved use of terminal space. This perceived and measured success is contiguous throughout the case study however the study also indicates that there are a range of other events, problems and actors involved in the implementation of the kiosk technology. For example the repeated failure of boarding card printers, the inability of the system to handle group bookings and the more-or-less complete operation of the machines by customer services staff, rather than the passengers all appear to be discordant with the apparent success of the technology. Recalling Bijker's (1995) argument for the symmetrical analysis of technology, the apparent schism between the 'working' cost and space-saving kiosks and the 'nonworking' problematic software error and dysfunctional hardware components warrants closer attention throughout this analysis. That is to say the success of the CUSS kiosks is not wholly attributable to 'working technology'. This framework therefore accommodates a broadly symmetrical analysis (Bijker, 1995) of the CUSS kiosk technology by examining the social and technical factors, working and nonworking, that shape organizational change.

The regime of efficiency that upholds the cost and space-saving properties of the CUSS Kiosks remained pervasive throughout the case study period (and in follow-up discussions after periods of observation had finished). Analysis has already shown that these tenets of the

technical rationality of CUSS are not manifest in the innate technical qualities of the kiosk; rather performance was supported by particular, unintended courses of action. The rest of this section first examines some of the challenges to the regime of efficiency where the subjugation of knowledge could have destabilised the dominant regime and second, traces some of the means by which the technology continued to be an alternative solution to constructing more terminal buildings and reducing transaction costs for the airport and its customers.

Throughout the case study a range of problems with the kiosks surfaced and impacted on their intended function. Each of the technical problems with the kiosks could have contributed to forming or strengthening competing regimes of truth, subjugating the cost and space-saving regime of efficiency. The responses of the staff at NEMA to the dysfunctional aspects of the kiosks served to maintain, and often exceed the 20% passenger throughput target. For example, hardware failure of the printers often meant that another kiosk had to be used. The customer services staff on these occasions had often powered-up the computer running the CUSS software and turned the screen off before the check-in period began as a contingency. This meant that in the event of a printer failure the customer services staff would quickly be able to switch to another machine. The problem of the printers “firing blanks” – blank or chewed-up boarding cards – presented a slightly different challenge for the customer services staff. Because the

passengers are in effect checked-in to a flight but subsequently have no boarding cards, they need to be issued with valid boarding cards before they can pass through security checks and again to board the aircraft. The replacement boarding cards had to be issued at a conventional check-in desk where the operator can access and review the list of checked-in passengers and print boarding cards for them. When this occurs, the customer services staff escorts the affected passengers to the front of the conventional check-in queue so they can have their boarding cards printed. The customer services hosts subsequently respond to the customers' needs by ensuring that the passengers are checked-in for the correct flight with the correct boarding cards.

The management of queues emerged as a prominent task for customer services hosts and helped to maintain the dominant regime of truth. Queues would often form at either the conventional check-in desks or at the bag-drop desks. It was anticipated and a planned activity that the customer services staff would select passengers from the conventional check-in queue or as they arrived in that area of the terminal building. It was known and communicated to the hosts that the CUSS technology could not (at this stage) cater for very young or physically disabled passengers because there is no facility to indicate that is an infant travelling with an adult passenger, a buggy to store onboard the aircraft or wheelchair assistance required to and from the terminal to the aircraft (and again at the destination airport). The kiosk hosts were also

informed to select group sizes with fewer than 4 people as the system will not check-in groups of 5 or more. These technical limitations of the CUSS kiosks are accommodated by the actions of the hosts: When they approach the queues of passengers at the conventional check-in desks, they look for small families (without infants), couples or lone travellers. Over the duration of the study another technological factor emerged. Kiosks could not be used to check-in any group where two or more of the group shared the same first initial and surname; e.g. John and Jane Smith. Even though the occurrence of this was fairly low the hosts began to ask passengers whether they shared an initial before asking whether they would like to use the CUSS kiosks. The series of activities that kiosk hosts now undertook in selecting passengers from a queue now involved a cursory visual appraisal and a brief verbal interaction to ensure that the passengers could use the machines. This is much more involved than the more passive role of the hosts described by the managers where the hosts would ask if passengers wanted to try a faster method of check-in and to assist passengers if they were having difficulty using the CUSS kiosks.

Throughout the periods of observation the CSAs working as kiosk hosts were not only proactive in adapting the selection of passengers to use the system, but they also became very skilful in completing the touch screen menus on behalf of the passengers. In the account of the first day at NEMA, it was seen that the kiosk hosts “performed all of the

mechanical actions from swiping one of the group's passports to pushing the necessary buttons on the touch screen". The CSAs, while on duty as kiosk hosts, would regularly perform all the interaction with the kiosk on behalf of the passengers. This proactive activity by the CSAs became very effective, it allowed passengers to be checked-in and sent to the bag-drop desks very quickly. The staff became extremely adept at navigating the screens and menus on behalf of passengers and would be able to try another kiosk should the first one fail or escort the passengers to the front of the conventional check-in queue when CUSS could not process a check-in procedure. This was commensurable with the airport management's desire to show how 'effective' and 'efficient' the kiosks were by attaining a passenger throughput level far greater than the 20% target set by managers in the parent company, Manchester Airport Group. The customer services assistants, encouraged by their manager, were far more proactive and involved in the CUSS check-in process than was originally envisaged. Figure 8.1 below shows a schematic representation of the activities of CSAs during a typical CUSS kiosk check-in period.

Figure 8.1 Schematic Representation of CSA's Activities in Supporting the Regime of Efficiency.

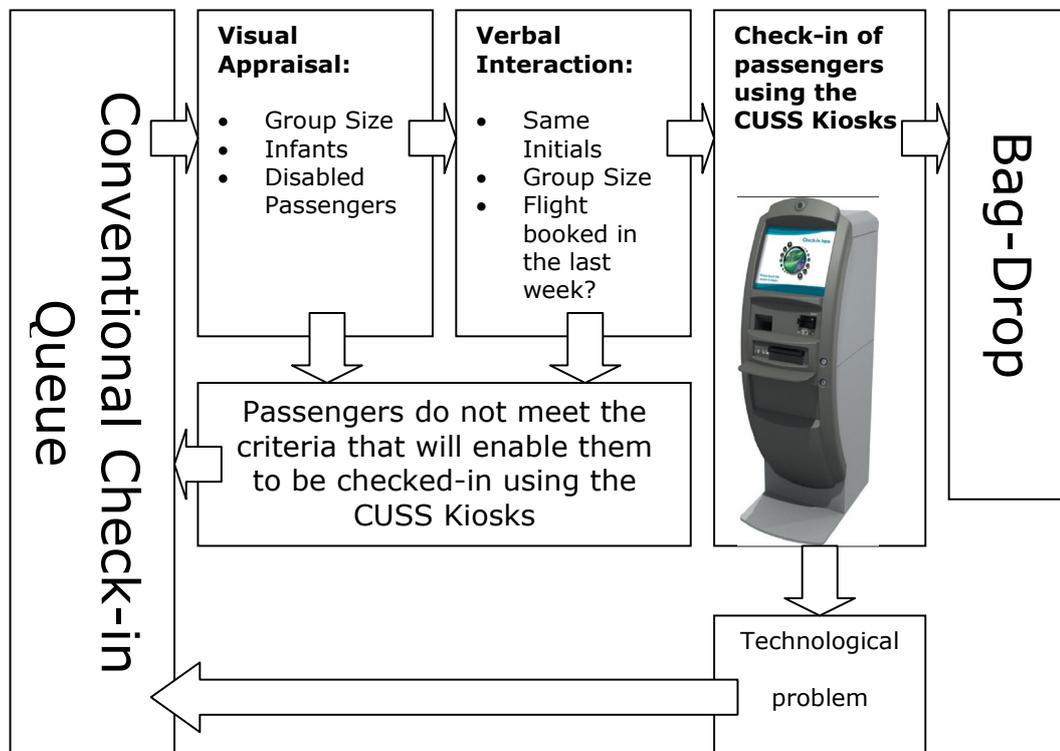


Figure 8.1 maps the first three stages of the process for 'CUSS Check-in' seen in figure 5.1. The figure above shows the means by which the CSAs help to maintain the regime of truth regarding the CUSS Kiosks. The visual and verbal checks the CSAs now use feature in the series of events for the check-in process to be completed. For passengers to be drawn from the conventional check-in queue, they must first satisfy the judgment of the kiosk host. Once passengers have been selected there is still the possibility that technological problems will prevent their check-in using CUSS. Examples of technical failure were seen where printers

did not function or the components that read passports or credit cards, which saw the passengers having to use conventional check-in.

The efficiency of the CSAs in processing passengers became such that queues would develop at the bag-drop stage of the check-in process (see figure 4.1). Because of presumed ratio of bag-drop desks to number of flights using CUSS (around 2:1 desks to flights) and with the drive to meet and exceed the 20% passenger throughput target, it was quite often the case that the CSAs would have to cease or slow the process of inviting passengers from the conventional check-in queues. In the case study it was seen that managers were concerned by the queues that formed at the bag-drop desks and that they would have to set-up meetings with the airlines and handling agents to see if they would pay for another bag-drop desk. The bag-drops were also portrayed as a potential weak link in the efficiency of the CUSS check-in arrangement. The fact that queues formed at the bag drop were attributed to the CUSS system being "too good" or the staff on the bag-drop desks being slower than previous trials of the system. Neither of these factors served to destabilize the efficient status attributed to the kiosks.

During the study, the actions and behaviour of the kiosk hosts became pivotal in maintaining the cost and space saving status of the kiosks. The actions of the kiosk hosts ensured that the throughput of passengers using the system is not held up by the known limitations of the

technology. This serves as a means of avoiding the technical constraints of the system before they affect the established performance measure of the system; that is maintaining a good throughput level of passengers using the CUSS kiosks. In the context chapter and in the mapping of the sociotechnical constituency for the CUSS kiosk technology it was seen that airports in the UK needed to respond to increasing capacity demands on the one hand and restrictive government (and environmental) policy towards airport expansion on the other. It is an improbable claim that because of the strategic significance attributed the CUSS Kiosks, the CSAs are compliant, if not proactively engaged, with supporting the success of the technology. Here the notion of an 'ensemble' perspective (Kling and Scaachi, 1982; Bijker, 1995; Orlikowski and Iacono, 2000) is extremely pertinent. From the observation and interviews carried out, it is apparent that the CUSS project is part of a broad interconnected system of rules, regimes, structures, groups and actors (Geels, 2004). Whilst the study has clearly framed a distinct technology in a particular organization as an object of analysis, the sociotechnical constituencies approach (Molina, 1990; Molina, 1993; Collinson and Molina, 1995; Molina, 1999) allows a vivid depiction of the 'ensemble' active in shaping the changes seen. This takes us beyond cause and effect assertions about the effects technology has on organizations. This raises questions about what is happening within the organization and how the new kiosks are influencing changes in the organization:

- * Why have the CSAs become so involved in maintaining and supporting the technically rational performance targets for passenger throughput?
- * Why is the tenet of 'self-service' overlooked in preference of the highly involved role of CSAs hosting the kiosks?
- * What are the subjugated regimes of truth and how have they remained subjugated?
- * How do the established patterns of maintaining passenger throughput fit with the institutional logics within NEMA and MAG?

The following sections explore the interface between individual actors and the regime of truth already discussed. By turning focus to the care of the self, problematization and broadly the aesthetics of existence, the questions posed above can be considered in more detail.

Care of the Self

The process of care of the self is the interface between individual actors and the regimes of truth they engage with. Care of the self is a reflexive process where individuals align themselves with particular regimes of truth and correspond to the measures delimited by technical rationality in an attempt to realise their desired lifestyle; providing a moral care of the self. This accounts for the actions of individuals and their encounters

with technology. It is emphasised that individuals should not be assumed to be rational agents who make decisions based on complete knowledge to maximise gains. Indeed, the philosophical position of critical realism distinguishes three strata that constitute reality; the real, actual and empirical (Bhaskar, 1989; Collier, 1994) and that mediating entities, social practices, form a recursive relationship between them producing networks of meaning. "Social practices are networked together in distinctive and shifting ways" (Fairclough, 2005; : 922), organizations and institutions are configurations of social practices (Sayer, 2000) which condition the dualistic relations of structure and agency. In their paper, Avgerou and McGrath argue that individuals source multiple modes of systematic reasoning and acting (2007; : 311). In addition to the technical/rational body of knowledge and practice that is coupled with technology led organizational change the authors identify two further sources of rationality: 1) alternative technical/rational bodies of knowledge (e.g. through bureaucratic principles of organization or through different technologies) and 2) *rationality from an individual's reflexivity*. The individuals involved in the case studies are not only reflexive subjects and agents of the technical/rationality of a programme of change, but also those of alternative strategies of change and as subjects of their own actions. This is demonstrated by CSA's behaviours in sustaining the regime of efficiency by compensating for some of the technical problems with the kiosk technology as this produced a more desirable status in the organization.

From the numerous studies of organization, information systems and technologies generally, it is regularly observed that technological change produces unintended consequences (Markus and Robey, 1983; Barley, 1986; Orlikowski, 1992; Clegg, Axtell et al., 1997; Grint and Woolgar, 1997; Doherty and King, 1998; Robey and Boudreau, 1999; Doherty and King, 2005; McAulay, 2007). As chapter 2 revealed, there is much debate about what mechanisms are involved in bringing about change and also the methodological techniques employed to trace these influences. As members of various sociotechnical constituencies, every agent is part of a system of, sometimes conflicting, rules, regimes, structures, groups and other actors (Geels, 2004). Each agent is engaged as a *heterogeneous engineer* (Law, 1987) in the process stabilising a technology; the process of sociotechnical alignment (Collinson and Molina, 1995; Molina, 1999). The role of heterogeneous engineers is: “...to associate entities that range from people, through skills, to artifacts and natural phenomena” (Law, 1987; 129). Indeed, the relative efforts of heterogeneous engineers will serve to strengthen or destabilise the network or sociotechnical constituency of which they are part. Here, care of the self is seen as a critically reflexive process undertaken by individuals, the heterogeneous engineers, in their actions which shape the process of sociotechnical constituency building. The relationship with the technology of different groups shows how a combination of social arrangements enhanced the performance of the

system, despite some of the technical quirks and problems that exist as departures from the kiosk technologies intended function and operation.

The customer services manager was acutely aware that the introduction of CUSS Kiosks would increase her team's workload. In her capacity as customer services manager she had to reconcile the usual demands on the customer services team and the additional commitment to CUSS Kiosk duties. The customer services team was assembled around seasonal passenger demand for air travel, employing between 18 and 24 customer services staff to run the airport information desk, 'floor walk' and answer telephone and email communications. There was no immediate provision for extra staff to accommodate the implementation and operation of the kiosks. In this sense the CUSS project threatened to stretch the resources of her department by creating a significant amount more work.

However, because of the central status of the technology and the high value placed on it being seen to work, to function as the technical-rational solution to cost and space saving, the kiosks had a high degree of management involvement. The presence of the terminal manager and even the airport manager *on the floor*, were seen as out of the ordinary. The CSAs and the Kiosk development team were surprised to see people who are *impossible to reach by phone and email* taking time to look at the project in such detail. When the managers are present, they

encouraged the pro-active work of the CSAs alongside the kiosks, supporting the perceived need for the customer services team to support the *self service* technology. At times where the senior managers were present the customer services manager would use the opportunity to speak to them about non-CUSS issues, particularly for financial support for additional staff, the customer services team or being able to afford more shifts from the existing team. Over a series of short conversations the customer services manager could raise issues (e.g. staff shortages) and arrange a formal meeting with the airport manager without going through the usual communication channels.

For the managers of the project, the technical rationality behind the implementation of the kiosks and its logic of cost and space saving is appealing; the kiosk technology eases the demands on terminal building space by increasing the passenger check-in capacity within the existing terminal area. The alternative solution to increasing capacity is to extend or build new terminal structures, which is highly regulated and costly for the airport organization. With the kiosk technology in place however, the managers need to produce some evidence that the system is performing in order to maintain the regime of truth that upholds their efficient status. The target measure "handed down" from the head office in Manchester of passenger throughput was adopted (rather than average check-in time or cost per-passenger) as the primary measure for how well the technology was performing. The management involved with the project were supportive of the CUSS Kiosk project and

supported the technical rationality that underpinned its implementation for three reasons:

- CUSS addressed the capacity constraints of the current terminal building.
- CUSS provided a source of competitive advantage by lowering the transaction cost of passenger check-in.
- It prevented a 'proliferation' of proprietary kiosks throughout the terminal building.

These three factors were explored earlier in the case study where the logic of each factor was related to the 'internal logic' of the organization. Just as Avgerou and McGrath (2007) showed how changes in the broad socio-political context influenced the actions of interested parties in the development of technological change, here the analysis needs to extend beyond the immediate and to examine some of the institutional players involved in the changes at NEMA. The sociotechnical constituency approach was used to illustrate the inter- and intra-organizational relationships that influence and shape technology in use through sociocultural relations between sociotechnical constituents of CUSS kiosk technology. The management team are concerned with sustaining the regime of truth of efficiency that underlies the technical rationality of the technological change. As regimes of truth are sustained by accepted knowledge supported by a society (i.e. sociotechnical constituents) the

formation and development of the regime will have been through various levels of institutional interaction (see figures 4.4 and 5.4). That is to say, it makes sense to trace the influential proponents of knowledge as the technological artefact is not 'efficient' in and of itself. The effects and influences of these institutional agents will also have a bearing on managers' care of the self as they shape the terrain on which they "*shape their life experiences through critical reflection and action*" (Avgerou and McGrath, 2007; 307). Earlier the links between inter-organizational constituents were seen to create and sustain the regime of efficiency; the trade association IATA and their *Simplifying the Business* programme have placed CUSS Kiosks at the centre of improving the air transport sector using new technologies. For managers on the CUSS project the drive for efficiency can be realised by meeting or exceeding the 20% throughput target set for them by parent company MAG. In the course of helping to produce the throughput figures the management involved with the project are perceived to be doing a good job and will be rewarded for their part in the process. This can be seen at the level of the individual; the Product Research and Development Specialist's success is judged by the trial period attaining or exceeding the level of passenger throughput using the CUSS kiosks. Equally, the Terminal and the Airport managers expect that, if the kiosks are 'efficient' the airport can become more competitive, offering lower handling charges to airlines. The passenger throughput figures take precedence as the most important measure of whether the kiosks are 'doing their job'.

Problematization of CUSS at NEMA

[Ethical] Problematization (Huijer, 1999; Avgerou and McGrath, 2007) is a component of an individual's aesthetics of existence. It is the critically reflexive process involved where the desired (or aspired) life style is considered in relation to context. In the literature review it was noted that problematization will be intensified where change affects the perceived relationship between the *self, regimes of truth and technical rationalities* producing conditions where individuals reflect on their *aesthetics of existence*. The rise of the regime of efficiency has been seen already to have tangible effects on managerial and customer service activities in the organization. For example, the overwhelming willingness of customer services staff to support the achievement of the throughput targets through their modified behaviours helped to sustain the regime of efficiency.

At the start of the CUSS project at NEMA, the customer services manager was faced with an expectation to provide support from her and her team to host the new kiosks. The whole customer services team were trained in the operation of the kiosks and how to replace the supply of boarding cards should they run out. This additional duty came with no increase of resources or reward for their team. However, as the customer services manager spent time with her assistants during the trial phase of the technology, she realised there was plenty of

opportunity to engage with senior management. Early on in the trials the issue of the added resource requirements of hosting CUSS kiosks was raised with the terminal manager. Later on in the trials she was able to talk directly to the airport manager about CUSS and other developments for the customer services team. The combination of the level of strategic importance applied to the project and the pro-active involvement of customer services afforded the customer service manager a more powerful position in the organization. The team's pro-active activities in ensuring targets were met created an impression of dependence on them for the system to perform: As the airport manager observed, "you've got to have pro-active staff for people to use these things". The customer services manager had to align her team with the CUSS Kiosk project somehow, and rather than a passive or resistant stance, she encouraged her team to behave pro-actively. By aligning her team and their activities with those of the regime of efficiency this resulted in the empowerment of customer services.

For both the management and the customer services team involved there is a recurring issue with the reliability of the kiosks. The problem of reliability stems from the material technical configuration of the kiosks and the software they run. The various technical failings of the kiosks led to different general problematizations by each of groups. These are examined here for each group in turn before assembling the technical rationality, the dominant regime of efficiency, the care of the self and the

reflexive process of problematization into the aesthetics of existence where the effect of these features can be examined on aggregate.

The management team found themselves stuck between a technology that was supposed to improve efficiency at their airport by increasing handling capacity while reducing costs and a day-to-day battle with failing printers, passport and credit card readers as well as software problems that limited the group size and groups with the same surname and first initial that the system could handle. The schism between the technical claims of how the kiosks were supposed to perform and how they functioned *in situ* meant that managers brought into question the legitimacy of MAG's technical rationality underpinning the project. However, because of the emphasis on passenger throughput figures, rather than self-service or time-saving agendas, the enthusiasm of the CSAs largely placated the questioning of the machines technical worth. The regular need for on-site technical support from "Kuss Tech" did resurface some level of problematization of the kiosks, however this was never sufficient a concern as throughput targets were still being exceeded, despite the poor technical reliability of the technological components involved. This meant that despite the heavy involvement of the CSAs and the regular replacement of items like the boarding card printers, the managers existed where the technology was seen to be working, the all important throughput measure was being met. Hence, for their part in the project, it was preferable to support the regime of

efficiency than to bring it into question, suggest alternatives or reject the kiosk technology.

As the project developed, it was clear that the activities of customer services were instrumental in the 'efficient' running of the kiosk system. The technology *as used* became heavily dependent on the actions of customer services assistants (see figure 8.1) and while this afforded the customer services function a more powerful position in the organization, they were also critically reflexive about their relationship with the technology. In working as the hosts of the kiosks, there was invariably an increased work load for the customer services team, without any increase in staff numbers. Because CUSS had become more customer service intensive in operation than was envisaged, the customer services manager often was faced with questioning the commitment of customer services' resources. The added commitment of the project had to be weighed-up against the empowered position of the customer services function afforded by association with the project. In addition to the increased demand on their resources, the customer services team also had to deal with the limitations of the technology as was described earlier (see figure 8.1). This behaviour was not an unquestioning acceptance of technology and the strategically significant 20% throughput target. In the case it was seen that CSA's were embarrassed by the technology whenever it failed and when the speed of Kiosk activity was mismatched with the [lack of] capacity at the bag-drop

desks creating queues. The flippant exchanges between the Airport Police and the Customer Services Manager regarding the technology again emphasised the high level of effort devoted to the project despite the abundant limitations of the technology. The customer services team were very much aware of the problems with CUSS, yet modified their formal working practices to compensate for the technical problems. When these factors are combined to form part of the aesthetics of existence, the domain of sociotechnical interaction can be better understood and provide insight into how the technology became 'successful'.

Aesthetics of Existence

The strong alignment of the customer services staff with the management-led push for passenger throughput using the kiosks might seem an irrational course of action, especially given the extra work it involves for her and the customer services team. For the customer service manager and her assistants however, the kiosk technology provided an empowered position in the organization. Their involvement with such a strategically important project afforded privileged communication channels (direct contact with the terminal and airport managers) and reinforced the importance of having a customer services function in the organization. The care of the self for the members of the customer services team is intertwined with their ability to align their

activities with fulfilling the legitimate performance measure for the CUSS Kiosks and the heightened involvement and power that this brought within the organization. The customer services manager did raise questions about the technology and the technical rationality that supported its implementation, especially when the project required increased input from her team. However, none of the aspects of the project problematized by customer services challenged the regime of efficiency such that its supporting technical rationality was modified or the body of supporting knowledge subjugated. Instead, the customer services manager and her team often suspended their judgements (Robey and Boudreau, 1999) of increased workload in order to support the *efficient* functioning of the kiosks which afforded a more involved and powerful organizational position for the customer services division.

The managers responsible for the CUSS Kiosks operate under a broadly shared aesthetic of existence. Their priorities lie in the improving service delivery which is enabled by a combination of sociotechnical factors in the industry and more specifically within MAG. First, the broad industry drive to improve airport efficiency *simplifying the business* by IATA (IATA, 2004) signalled the advent of an era when six technologies would be introduced for the benefit of the sector. CUSS is one of the technologies that will streamline airport operations globally. In the UK, the 2003 White Paper (Department for Transport, 2003) reviewed the future of air transportation and effectively limited the expansion of

airports to only a few locations across the country. Particularly in the UK then, CUSS provided a technological measure toward improving passenger handling capacity without the need for terminal building expansion. At the same time as a partial solution to capacity constraints, it was promoted as offering cost savings on every check-in transaction, offering competitive advantage to early adopters. The ethos and targets of the IATA *Simplifying the Business* initiative were embraced by managers at Manchester who incorporated CUSS into their airport operations. From the interviews and discussions with MAG management, they had developed a competitive strategy of 'staying one step ahead' (particularly of BAA) which was based on investing in the very latest technologies to improve competitiveness. Projects such as CUSS and whole baggage security scanning for hold baggage were two such technologies as part of this drive. For managers at NEMA, this meant they were charged with implementing, marketing (to both airlines and passengers) and hosting the kiosks on their own site. The onsite management team at NEMA took the 20% passenger throughput targets as the 'working' criterion. In fact, although there was no express inter-site rivalry between NEMA and Manchester head office, the sentiment of managers at NEMA was that they could *show Manchester that they could do it* and meet or exceed their *handed-down targets*.

The 20% measure was an all-important indication for the NEMA management team. It embodied the regime of efficiency that was so

desirable to demonstrate to Manchester that the NEMA team could do it and was supported by the technical rationality for installing and using Common-Use Self-Service check-in kiosks. This '20% throughput target' would subsume other aspects of the broad technical rationality of CUSS systems (per check-in cost savings, space savings and time saving) as promoted by IATA (IATA, 2004; 2008b). This happened to the extent that the practice of self-service by passengers was superseded by the heavy involvement of customer services staff and again by their activities to minimise disruption from the limitations of the systems functionality (see figure 8.1) by dynamically managing queues and pre-empting technical problems. Management at NEMA also maintained and supported the regime of efficiency, despite the known and apparent technological limitations of the system. In table 8.2 below, the systemic and technological limitations are shown alongside the actions taken by the customer services team and the management figures involved with the CUSS project. The systemic and technological limitations are features of CUSS Kiosk system as seen at NEMA and are viewed as limitations because they represent challenges to the technical rationality of the project. Wherever the technology did not function as intended, it served to deviate from the technical rationality of the project which had the potential to destabilise the regime of efficiency. The table below depicts *how* the introduction of CUSS kiosks contained unforeseen technical limitations, which in turn led the customer service agents to adapt their behaviour (as in figure 8.1) to maintain their more privileged

position from being part of the project. Four of the prevalent limitations are shown:

Table 8.2 Mapping Departures from Technical Rationality and the Actions Undertaken to Maintain the Regime of Efficiency

Systemic or Technological Limitation	Departure from Technical Rationality	Actions Undertaken for Maintaining Throughput
Queues at bag-drop desks	The number of bag-drop kiosks is supposed to match the number of kiosks and the number of flights they will be handling during any given time.	CSAs dynamically monitor the conventional check-in and bag-drop queues to moderate the use of the kiosks.
Inability to process a group of passengers with a shared first initial and surname.	This is a limitation of the CUSS Platform’s software which means the individual using the kiosk cannot be reconciled with the booking details stored on the airline’s DCS.	CSAs ask/observe passengers before they use the kiosks whether they are travelling in a large group
Inability to process groups greater than 5 in number.	This is a limitation of the CUSS Platform’s software which meant that it cannot handle large group information between the information systems involved.	
Failing printers	The magnetic boarding card (ATB-2) printers are a prevalent and established technology. When and if they malfunction inside a kiosk, the disruption is far greater than if they are situated at conventional check-in where they can be quickly un-jammed, refilled or even replaced, which is far more time consuming where the components are enclosed within a metal kiosk.	CSAs must switch to using different kiosks and have to take passengers to conventional check-in, should the printer fail mid-check-in.

For both the groups of customer services and the layers of management within NEMA, the introduction of new technology triggered different responses and actions. The establishment of a dominant regime of truth arose from the desire of NEMA management to demonstrate to their head-office (MAG) that the kiosks would work at their airport. The regime of efficiency legitimated the measurement criterion of passenger throughput using the CUSS System as an indicator of how well the system was functioning. There were various limiting factors in the technology and its implementation that were problematic to the 'efficient' functioning of CUSS. The actions of the CSAs helped to maintain the desired level of passenger throughput using the system. For both groups this provided the basis for a desirable position in their aesthetics of existence; through critical reflection (care of the self) and affordable obstacles (problematization) mutually satisfactory positions were reached. The management personnel had achieved demonstrable efficiency that supported the technical rationality underlying the project. At the same time, the customer services manager and her team achieved a more powerful status within the airport organization which was deemed desirable despite the added responsibility and effort associated with their involvement with CUSS.

Managing NEMA and Managing Airports: Challenges from Space, Flows and Connections.

This case study has examined the changes within and between groups and individuals who are involved with the CUSS project at NEMA. The adoption of CUSS technology has certainly provided an 'occasion for structuring' (Barley, 1986) with CSAs taking on significantly different roles and positions in the organizational melee. This section draws on the empirical work at NEMA and at other UK airports to explore the managerial and inter-organizational implications of kiosk adoption. As Knox et al. (2007, 2008) vividly capture in their portrayal of an airport organization, the 'hybridity' between the virtual and real in the overlap of technological and organizational systems 'enframe' the airport. To focus on the relationships between organizations and implications for managers, the airport must be regarded as a whole as opposed to discreet technological systems. Because of the intricate co- and inter-dependencies between technologies and organization, CUSS has to be simultaneously viewed in the context of both local and broader managerial and organizational considerations. The sociotechnical constituencies approach (Molina, 1990; Molina, 1993; 1999) as a technique for mapping the impact of the adoption of kiosk technologies is highly appropriate for this purpose as it combines what would typically be considered analytically distinct levels of analysis in case study

research. Additionally, it is recognised that the broader inter-organizational implications from kiosk adoption will, in time, be implicated in the future operating conditions for CUSS sites such as NEMA. This is consistent with a structural perspective on technological adoption (Orlikowski, 1992) where the effects of technology are both mutually constitutive, and socially and structurally mediated. This is addressed here in terms of the space, connections and flows that constitute airport organizations.

Managing Space:

This case study has shown the importance given to 'space' in airport organizations. Within NEMA this was reflected in the 'space saving' status ascribed to the kiosks by managers and in the technical rationality underlying kiosk adoption. The constraint of space in airports permeated not only the immediate organization of NEMA, but was prevalent in accounts by inter-organizational sociotechnical constituents across the sector generally. This signals that space is a persistent managerial challenge in the running of airport organizations. The challenge of managing space in airports can be traced across the levels of the sociotechnical constituency. The combination of increasing passenger numbers, regulation of airport expansion and advances in information technology are shifting the demand for, and configuration of space in

airports. For airport managers, the terminal building is an essential space and a precarious balancing act to ensure smooth operation, legal compliance (e.g. security) and a manageable source of revenue.

However, increasing terminal space can be problematic. An interview with the then CEO of Luton airport revealed that expansion can be unpopular with airlines. He recalled how the development of a new terminal building was very unpopular with low-fare operator Easyjet. Luton airport is the operations base of Easyjet who had chosen the location because of the low landing, parking and handling charges relative to other 'Greater London' airports. The airport certainly needed extra capacity to cope with the explosive growth in passengers following the emergence of low-fare airline operations; between 1996 and 2001 passenger numbers at Luton rose by 172%, an increase of 4.1million passengers over five years (Civil Aviation Authority, 2001). Easyjet contested the expansion on the grounds that the cost of expansion would be passed on to them as customers of the airport. A series of 'difficult' negotiations eventually secured the airline's continued presence at the airport. Although the terminal extension provided much needed additional capacity at the airport, it created tensions between the airport and one of its major customers.

This indicates that an airport cannot be perceived as a strict input-output system where passenger handling capacity can be simply added through

capital expenditure alone. Evidence from the data signals that short- to medium-term management of airport capacity hinges on improving connections and flows within the sector. Long-term expansion will depend on large, capital intensive projects (new runways, buildings and airports), which is currently the subject of a government review. These conditions have prompted firms to look at different technological possibilities in improving existing airport operations. The IATA StB initiative captures the industry efforts to join-up the technological “silos” (Doganis, 2006) that exist in different areas of airport operations. In the case study and from industry literature (e.g. IATA, 2004; IBM, 2006; IATA, 2008b; 2008a) it is seen that CUSS is a technology that provides an interface with various established departure control systems saving terminal space and transactions costs of passenger check in.

Managing Flows and Connections:

An airport is a node through which passengers and cargo must pass at the beginning and end of any journey by aircraft. This places an airport organization in the position of facilitating, if not performing the necessary steps in getting people and goods to and from their airplane. The airport and its constituent organizations must therefore accommodate flows of people, flows of data and the connected flows of revenue. Knox et al. (2008) identify that the movement of passengers and luggage through an airport site entails the simultaneous flows of people and objects as

well as their digital records through a multitude of information systems. NEMA and the various airport organizations encountered in the course of data collection for this research are no exception. To complement the physical and digital flows of people and objects through airports, the data also suggested that flows of revenue are also crucial in managing airports. In interviews with managers at both Manchester and NEMA airports a major incentive for switching to CUSS kiosks, rather than dedicated proprietary kiosks, was that airport managers have the means to charge airlines a fee for every passenger using the kiosks.

Furthermore, the kinds of information systems being developed to support technologies like CUSS have the ability to connect directly to airport accounting systems. The digital flows of passengers can be translated directly into flows of revenue between the constituent organizations in an airport. At NEMA the CUSS system did not connect directly to the airport accounting system, passenger numbers were sent to the finance department so that airlines could be invoiced manually for their use of CUSS. However, the airport and general manager of development were acutely aware that the system could provide these “back-office efficiencies” as well as the cost and space saving advantages seen in passenger check-in.

Managing connections is a further challenge for airport managers. To allow the necessary flow of people and objects through an airport a

range of infrastructure and agents from a variety of organizations are involved. With regard to the departure-side of airport operations this typically involves the airport, one or more handling agent organizations and the airline. Each stage of the operation is entirely dependent on the others. In the case study, the CSAs hosting the CUSS kiosks often had to slow, or stop the flow of passengers using the kiosks because lengthy queues had developed at the bag-drop desks. As the terminal manager commented “they [the kiosks] are only as efficient as the bag-drop, which is operated by handling agents”, the way the kiosks were operated the 20% throughput level of passengers could easily be reached. However, the ‘efficiency’ of the kiosks has put pressure on other stages of the flow of passengers through the airport creating a bottle-neck. This resonates with Knox et al. (2008) who saw that check-in staff could overwhelm a newly installed baggage system by forcing bags onto conveyor belts at peak times. Indeed, as Knox et al. (2007; 279) write:

“New technologies clearly enable new forms of organization and are typically developed to increase efficiency and productivity, but it does not extend the horizon of possibility of organization in quite the smooth, determined or predictable manner that management and technology consultants would often like us to believe.”

This case study has shown that the technical rationality of cost and space saving that supports the adoption of CUSS kiosks is supported at both

institutional and organizational levels. However, the adoption of CUSS *enabled* (Knox, O'Doherty et al., 2007) or *occasioned* (Barley, 1986) a modification of NEMA's organization. Managerial concerns for improving the efficiency and performance of the organization was influenced by an institutional rationality that supports the regime of efficiency within MAG and NEMA. As with the quote above, *the smooth, determined or predictable manner* of technology adoption was clouded by a variety of sociotechnical episodes producing effects which threaten or dilute the advantages of adoption in the first place. These sociotechnical limitations were summarized in table 8.2. At the organizational level the role of CSAs was seen to change dramatically. Managerial challenges arose from reconciling institutionalised expectations of technology and the "here and now of mundane organizational reality" (Knox, O'Doherty et al., 2008; 869). It was seen that NEMA's managers were supportive of the regime of efficiency and engaged in prioritising a level of 20% passenger throughput using the system.

The kiosk technology put pressure on the bag-drop stage of the check-in process creating another challenge for managers to address. With a bottle-neck at the bag-drop stage, long queues would form when the kiosks were being used. The flow of passengers would frequently need to be mediated by the airport CSAs who would intervene when the queues grew too long. The arrival of CUSS has prompted airport managers to reconceptualise the use of space in their organizations as

well as challenging the long-established need for staffed check-in desks. The terminal and airport manager both commented how they would have to enter discussions with airlines and handling agents to investigate increasing the number of bag-drop desks available when using CUSS. This supports the regime of efficiency, but could lead to the cost of additional bag-drop desks becoming a source of problematization for CUSS kiosks as it undermines the cost-saving rationale for their adoption. The view of airport managers and technology suppliers to the industry (SITA and ARINC) is that CUSS will have a 5-year product lifespan before online and mobile phone technology will supplant the need for self-service kiosks. Both mobile phone and online check-in are also dependent on bag-drop desks (see figure 5.3). The development of self-service technologies has started to redefine the management of airport passenger terminals. CUSS, online and mobile phone check in can be considered complimentary sociotechnical constituencies that add institutional legitimacy to self-service check-in of passengers. At the organizational level, it was seen that managers faced new challenges of managing space in their airport where queues, kiosks, bag-drop and conventional check-in desks must all coexist. The reconfiguration of how and where check-in is performed in the airport terminal has altered the physical and digital flows of people, objects and revenue through the airport. The adoption of self-service technologies is likely to realise the cost and space saving advantages promoted by technology suppliers and IATA and sought by airport managers. However, as was seen at NEMA,

the adoption of CUSS, or other self-service technologies, is also likely to produce localised, organizational effects. These could include changes in the relationship between airports, airlines and handling agents, the need for additional customer services staff, modified accounting procedures, increased baggage handling capacity and connections to other information systems to support self-service check-in.

Broad institutional logics for technological adoption are powerful forces in guiding management decisions on technological choice. Certainly the logics of cost and space saving promoted globally by trade association IATA helped to legitimate CUSS and other self-service technologies. However, the technical and organizational complexities of airports would suggest that adoption of CUSS kiosks will produce localized effects and raise new challenges for airport managers. At NEMA, the pivotal role of CSAs was one such effect and helped to meet the 20% throughput performance measure for the technology. Of course, at other airports, the ability of the CUSS system to integrate with an airport management information system or an accounting package in addition to the cost and space saving potential of the technology might form the technical rationality for adoption. What the case study demonstrates is a combination of institutional logics mediated the conditions of technological adoption and that this provides an occasion for structuring at the organizational level. The study, combined with out-of-case data, also suggests that the institutionalised shift towards self service

technologies in airports will feed-back from emergent local conditions to redefine the check-in process at airports. Whilst the former can be demonstrated from a single-case research design, the latter requires both multiple case and longitudinal empirical work to account for the build-up of institutional change.

Chapter 9: Analysis of Hawkwindshire County Council. Corporate change and the role of intranet technology.

This chapter examines the case study data for Hawkwindshire County Council (HCC) and their corporate intranet project. Chapter 6 outlined the organizational profile of HCC and examined its context as a local government organization in the UK. The Council was seen to be in a period of change as part of its 10-year corporate change initiative, the New Ways of Working (NWOW) programme. Figure 6.2 traces the evolution of the intranet project to the latest phase when data collection was completed. The intranet project was started in November 2002 with a report commissioned to evaluate the information needs of the organization. Broad intranet aims were agreed and the project was aligned with other internal programmes. By July 2004 an intranet strategy had been written identifying the "personalised" delivery of information to "existing user groups" as a key business requirement of the project. Before the formalization of the 'intranet team' (i.e. Fig 7.1), some members of the ICT division conducted a survey across HCC to identify what users of the system would require. This formed the basis of the 'portal' vision for the intranet discussed in chapters 6 and 7 with the notion of the delivery of customised information on a user-by-user basis. In April 2007, the council produced a "scoping" document to outline the type of content to be held on the system and to reinforce the

links with the NWOW programme. This produced two categories of information, "Signposting" and "Portal" levels, the former represents kinds of information that are typical of websites; largely static and are general in their audience for example, Council news and corporate documents including employee manuals. The latter refers to directorate, division or user specific information such as people management tools for heads of division or team leaders, document libraries or meeting schedules. The case study covers October 2007- January 2008 when the intranet team is trying to establish the project as a key information resource for Hawkwindshire County Council.

The rest of this chapter addresses the sociotechnical constituency of the HCC intranet and then uses the framework developed by Avgerou and McGrath (2007) to study the process of sociotechnical change in more detail. This framework illustrates the power relations mobilised by various actors and their efforts to implement, sustain or subvert the course of organizational change.

The Implementation of HCC's Intranet and Sociotechnical Change

The case study covers a period in the project where the intranet team (see fig. 7.1) are trying to sustain and expand the user base of the intranet. The logic is that by having a substantial volume of information

and many trained content authors to place more information onto the system, it will become an essential corporate information system. It was seen that the intranet project is embedded in the corporate change initiative, NWOW, which promotes information sharing to unify the departmental divisions that existed under the previous structural arrangement of the council, referred to as "silo working". This is a top-down change initiative originating from the Chief Executive of HCC, which positions the intranet as a strategic vehicle for change. The intranet team is jointly composed of staff from the communications and ICT functions of the organization. The team is represented by senior managers from both functions, front-line user support is provided by two members of the communications division and they receive technical support from two members of the ICT division. Informants were asked about the current state of the intranet to illustrate the type of information and facilities available via the intranet. This revealed that 'quick win' features, such as a corporate address book (people finder), were popular and well used. Regular online internal communications were delivered in an internal newsletter and via news headlines on the intranet homepage. The envisaged model of devolved content authorship was not being realised however. Despite a content author base of over 80 members of staff, the intranet was rarely used for the dissemination of information across the organization or as a document management system. The complexity of the process of putting content onto the intranet and the reliance of informants on the incumbent

information system, Lotus Notes, for document management and electronic mail represent major barriers in HCC employees' uptake of the intranet system.

Technical Rationality and the Intranet Project

The previous case study saw the formation of a strategy for change based on the regime of *efficiency*. The introduction of CUSS kiosk technology was seen by management at Nottingham East Midland Airport as an enabling force in being more efficient using the available terminal building space they had. The case of Hawkwindshire County Council again sees technology placed in a central role in the drive for change. In this case, the implementation of a corporate intranet is positioned as a modernising force in the way the Council carries out its processes. Chapter 6 identified the ongoing programme of corporate change, *new ways of working* (NWOW), as the underlying driver for the *regime of modernisation*. Just as Avgerou and McGrath (2007) saw technology placed at the centre of the modernisation of a Greek social security organization, HCC have placed great strategic importance on developing a corporate intranet for the modernisation of the council. The NWOW change programme directly cites the intranet as a means for delivering the corporate change envisaged by the new Chief Executive alongside a range of accompanying projects:

“Developing a cohesive Intranet Strategy is seen as being key to the achievement of internal HCC programmes, such as:

- * Corporate Business Plan and the CPA Improvement Plan.
- * Human Resource and Organizational Development Strategy
- * Corporate Communications Strategy
- * Performance Management Framework
- * Corporate Information Management Strategy
- * E-Government Programme”

(Hawkwindshire County Council, 2004; 2)

Some of the six programmes cited above in an intranet strategy document from HCC were identified in the sociotechnical constituency of the HCC intranet (figures 6.4 and 6.5). The six programmes listed above are “internal HCC programmes” meaning that they are established as strategic goals or practices underpinning the NWOW programme of corporate change. Agendas such as the ‘CPA improvement plan’ and ‘E-Government’ are inter-institutional (fig 6.6) in their origin. The comprehensive performance assessment (CPA) is an appraisal of UK local government organizations conducted by the Audit Commission; it is used to assess the quality of service and value for money provided by local government organizations. The assessment examines both the internal organization of local government and the delivery side of service provision. Local councils are obliged to respond to CPA reports and to form strategies to improve their performance. The CPA was a strong

impetus for the re-structuring of HCC under the New Ways of Working corporate change initiative. Just as the CPA had prompted a strategic review of the internal organization of HCC, the corporate intranet is embedded in supporting NWOW. The intranet, because of its browser based interface and "portal" design, is designed to underpin the corporate changes envisaged in the NWOW programme. The intranet will promote corporate thinking and practice, encouraging employees to work toward corporate improvement as opposed to working within their divisional "silos". This is the fundamental change objective for the modernisation of the council; the following sections track the evolution of the regime of modernisation at Hawkwindshire County Council.

The technical/rational case for the introduction of a browser based intranet system was two-fold connected to both software and hardware capabilities of the proposed system. Empirical studies of organizational change and information systems and ICTs innovation typically concern the computerisation of a manual process, the computerisation of social security records (Avgerou and McGrath, 2007), long-distance conferencing (Orlikowski, Yates et al., 1995), workflow systems (Hayes, 2008), group decision making (DeSanctis and Poole, 1994) to name but a few. The introduction of the intranet system is occurring where there is an incumbent information system. Lotus Notes delivers the applications and documents to users across the across the organization. The technical/rational objectives developed by the project team for the

intranet strategy were derived from two sources. First is the New Ways of Working programme; the organizational parameters which the intranet will have to address are also part of the corporate change initiative the intranet is part of. Secondly, the intranet is compared in technical terms to the incumbent Lotus Notes system. There are functional overlaps between the intranet and Lotus Notes. The technical/rational criteria for the switch to a corporate intranet are the ways in which information can be delivered to users in a personalised way via an information 'portal'. For example, the delivery of effective internal communication is one of areas of change under NWOW. The intranet offers a platform for delivering customised content on a user-by-user basis; one aspect of this is the delivery of relevant internal news stories to each user when they log-in to the intranet system.

The acquisition of Soft Salad involved a planning stage seen in the creation of an intranet strategy in the first instance and then the subsequent authoring of a business case for the intranet at HCC. The selection of the Soft Salad product was a process that spanned the informal and formal domains. Both Nik Turner, the head of ICT and Huw Lloyd-Langton, the applications architect used the rhetorical argument that other large clients were using Soft Salad to provide their corporate intranet and document management system. Additionally, calculative measures were used to demonstrate the value of implementing Soft Salad: Cost/benefit analysis, costs of running the system and the value

of having a core corporate information resource were used to select Soft Salad as the software vendor. A combination of calculable gains and rhetorical arguments were assembled into a 'comparison' for choosing the software product (Pollock and Williams, 2007), the rhetorical value of well-know clients was translated into a rational basis for choosing the product. The product choice placed additional constraints on enabling the technology to fully support the regime of modernisation. The need for additional software licences to put content onto the system, the need to purchase bolt-on software packages to monitor and report user statistics and the absence of any UK based technical support all contributed to subverting the efforts towards modernisation.

The case study reveals how the corporate intranet never gained critical mass of users and content authors it required to support the corporate change envisaged. The project did have limited impact on the organization; the success of the news, 'How To...' and the people finder facilities made in-roads towards aligning employees with a more corporate way of thinking. Technical/rational reasons were regularly used to explain the lack of content being put on the system and the low levels of use of the intranet generally. On the content authoring side, the complexity of the content management system was cited by the intranet team (technical, support and managerial levels) as the reason for the limited level of decentralised content authoring across council departments. The limited amount of user-generated content was, in-

turn, blamed for the low level of use of the intranet generally. This generated a circular argument to account for the lack of impact made by the new technology: 1) Employees do not use the intranet because of lack of content. 2) Training of key information holders to become content authors to provide the necessary information to make the intranet a corporate information resource. 3) Information holders do not put information on the system because of the complexity of the content management system. This was occurring against an ongoing programme of content author training, expanding the authorship base for the system. Simultaneously, there is a finite number of software licences for the content authoring application. This has been raised as an issue by members of the intranet team leading them to either investing in the purchase of additional software licenses or to review the patterns of use by current content authors and transfer licences to other, newly trained content authors.

The technical/rational case for change in HCC revolved around having an information system that reflected the corporate information needs of the organization outlined in the NWOW change programme. The intranet project was specified to embody the type of changes needed for a cohesive and efficient council that can deliver 'best-value' services to the public. The envisaged 'portal' design would support the organizational change by unifying common corporate processes (e.g. expenses, leave etc.), the information needs of each user would be customised according

to their role and provide a gateway for remote working. However, as the case study revealed, despite the restructuring of HCC, the adoption and use of the intranet system was limited and often secondary to the incumbent Lotus Notes system. The lack of widespread support and use of the intranet after two years prompted the acquisition of Microsoft Sharepoint to replace both the Soft Salad intranet system and Lotus Notes Groupware by the start of 2010.

The following sections examine the events that generated the lack of user acceptance of the new corporate intranet system. A sociotechnical lens reveals a combination of powerful factors that subverted the role of the intranet in the modernisation of HCC, despite the widely accepted technical/rational imperative for change driven by the NWOW programme. Two conflicting regimes of truth are identified in the study: The regime of 'modernisation' never established legitimacy over the regime of 'continuity'.

The Regime of 'Modernisation' and the Struggle for Legitimation

The implementation of self-service check-in kiosks at Nottingham East Midlands Airport saw the production of the regime of efficiency supported by the technical rationality of cost and space saving. The technical rationality underpinning the introduction of a browser-based intranet

system is enmeshed in the regime of modernisation outlined in the New Ways of Working corporate change programme. In other words, the intranet is a strategic resource for making the necessary changes to modernise *how* the council uses information by offering a 'better' information resource. The intention being that with improved access to information and information management practices, the council organization can deliver *best value to the public*; a central agenda in the NWOW programme and in the assessment of HCC's performance by CPA inspections. The intranet supports this regime by constituting a material response to both CPA assessment and to help deliver a more efficient council providing best value to the public. This is captured in the regime of modernisation

The case study saw the struggle of the intranet team in trying to gain enough users and enough content authors to use the intranet in a modernising way. This would establish the intranet as a key strategic information resource, replacing the information delivery and document management role of Lotus Notes. The Lotus Notes system was seen by strategic managers for both the Council generally and in ICT roles as a barrier to modernising information management in-line with the NWOW corporate vision. The origins of this assertion are grounded in having over 10 years of accumulated development of divisional databases and document libraries that reflect the old structural arrangements of the organization. For example, staff user codes reflect the pre-restructuring

shape of the council. Their access to the Lotus Notes system is allocated on the basis of the former nine divisions of the council; the structural 'silos' the regime of modernisation seeks to abolish. Some, but not all, of the document libraries have been combined to reflect new organizational structure (figure 6.3). The Lotus Notes system reflects the 'old' council and the previous organizational structure. The overarching effect of this is a new organizational structure of six directorates super-imposed on top of an information system that has evolved around nine departments. The persistence with the use of the Lotus Notes system provided a large amount of inertia in delivering the changes anticipated under the NWOW initiative. This kind of behaviour runs counter to the regime of modernisation and is captured here as the 'regime of continuity'. Continuity maintained support as the dominant regime for a number of interacting factors explored in the rest of this chapter. It should be noted that individuals involved in supporting the regime of continuity were rarely opposed or resistant to the process of modernisation or, indeed, a corporate intranet to deliver organizational change. Most proponents of continuity acknowledged the intranet as a *good idea* or a *useful system*, but held the perception that the intranet was either a peripheral tool to their job, a duplication of Lotus Notes or simply not ready to handle their information needs. The regime of continuity was sustained by a range of individuals from across HCC; crucially there were no conscious collective activities to subvert the development or implementation of the intranet.

The regimes of continuity and modernisation represent competing power-constituted interpretations about how HCC should be run and consequently the need and shape of change in the organization. Whereas Avgerou and McGrath (2007) saw the modernisers seeking to replace manual systems of cards and stamps with computerised social security records, the case of HCC examines the replacement of a long-established ICT system with a newer, more sophisticated ICT system to promote corporate ways of working. The mechanisms involved regime change, to establish a new dominant regime, can be external or internal to the organization concerned (Foucault and Rabinow, 2002; Avgerou and McGrath, 2007). This is where the value of mapping sociotechnical constituencies really comes into play to trace powerful influences outside of the 'immediate' case study. Indeed, as chapter 6 observed, the influence of inter-organizational constituents created a context for change (the CPA, e-Gov and t-Gov emerged as influential in creating the perceived need for change). Whilst these external influences created a platform for change by placing efficiency, value for money and ICT enabled local government as central values in social discourse, the *shape* of change at HCC would be determined inside the organization. Through the *continuous care of the self*, connecting problematization and the aesthetics of existence, by the individual actors in the organization through their use (and non-use) of technology, shape the path of change.

As the proceeding analysis explores, a variety of individual encounters with the technology across the organization help to sustain patterns of continuity while others support the efforts of modernisation.

The Analysis of Groups and Individuals

The final three aspects of the analysis focus more on the sociotechnical interactions between groups and individuals in the council. Before discussing these further, I would like to clarify the analytical treatment of groups and individuals in this case study.

Chapter 6 provided an outline of the employment structure of the council. The empirical focus of this case study was, by virtue of the intranet project, focused on the office-based contingent of Hawkwindshire County Council (Figure 6.3). A further distinction between internally and externally facing office-based employees was made. In this analysis three groups are distinguished: 1) Externally facing office staff, 2) Internally facing office staff and 3) The intranet team. Each of the three groups contains a hierarchical cross-section including heads of department, managers, administrators and function-specific employees (e.g. Youth Inclusion Officer). This is an analytical grouping of the informants in the case study as it places emphasis on the role-technology-use dynamics that are crucial in eliciting a grounded

understanding of sociotechnical interaction. This is preferential to, for example, grouping informants by structural-hierarchical position which has the potential to decontextualise the relevance of individuals' tasks from their experience of new technology. Given the technical-rational underpinnings of the intranet project as a vehicle for *new ways of working* at the council, the abstraction of sociotechnical interaction from the *ways of working* would be an analytical falsification. By the same virtue, these are analytical groupings and should not be conflated with the formal structural arrangements of the council.

The Care of the Self

Care of the self is the interface between individual actors and the regimes of truth they engage with. In this case it was seen that the corporate intranet project is part of a technically rational project embedded in the regime of modernisation at HCC. The case study revealed that the intranet had not been accepted as anticipated as a corporate information resource for the organization. The Soft Salad system had made minor inroads to delivering a corporate directory of staff (people finder), a Frequently Asked Questions database and internal news coverage. However, the project had not transformed the practices of information management in line with the strategic aims for the project as envisaged by senior managers at Hawkwindshire County Council.

Here, the relationship between the intranet technology and the employees of HCC are examined more closely.

Externally Facing Office Staff and the Care of the Self

Externally facing office staff provide and support services for the public of Hawkwindshire. All of the HCC staff in this group reported that their primary concern was with the delivery of the best possible service to the public as possible. The two principles that guided 'best possible service' were those of high quality service and best value service. This was echoed by front-line and managerial staff. Some of the staff had personal interests in the areas they worked. Ron Wood, a waste minimisation manager, is a Green Party member and campaigns on environmental issues outside of their role in HCC. Another example is where front-line social workers had transferred to jobs within the office-based core of HCC to work on programmes to encourage fostering or alcohol awareness in adult health across the county of Hawkwindshire. Particularly among the externally facing staff at HCC, their assessment of the intranet transcended their professional role in the council and invoked personal and political perspectives. For managerial staff, meeting recommendations from the comprehensive performance assessment (CPA) was a central concern. The CPA is the major evaluation and target-setting process for the council. For all informants in this group, the concept of the intranet was appealing as it supported

the provision of best-value public services, was aligned with the internal change agenda NWOW and by association, responds to CPA recommendations on improving internal communications. In this sense, interests were broadly aligned with the technically rational underpinnings of the project of modernisation. However, at the practical level of engaging with the intranet system a range of conflicts and contradictions saw the intranet technology sidelined in their day-to-day activities. The continuity of using Lotus Notes better serves the continued delivery of the public services and hence, the regime of modernisation experienced widespread problematization by externally facing office staff, this theme is examined in the next section. It is against this varied background of professional and personal reflection that externally facing office staff at HCC evaluated the value of the intranet system.

Internally Facing Office Staff and the Care of the Self

Unlike the externally facing office contingent of HCC who support the provision of public services, the internally facing staff are involved in supporting the organizations continued functioning of internal processes. Again, this group encompasses a cross-section of the organizational hierarchy with senior managers through to junior staff members. For example, Liquid Len is a Development Officer responsible for Benchmarking and Development. This entails the collection and reporting of ICT usage across HCC. This information is used to assess

the demand and usage of ICT resources as a whole (including desktop computers, application and email servers and the website) and to make decisions about future ICT requirements and maintenance. Ginger Baker, whose current position as Internal Communications Officer was created as a response to CPA recommendations on improving internal communications, is responsible for the publication and distribution of a corporate news letter. This is distributed in both print and electronic format via the intranet. Internal Communications Officer, Ginger Baker had to use the content management system in order to publish the electronic internal newsletter, a feature that had attracted a regular audience within HCC. While the newsletter was a 'successful' part of the intranet, the Soft Salad system was not being used for content management, nor had it achieved the contextual or 'portal' format for delivering information to council employees. Employees were pragmatic about their use of the intranet; until it provided an enhanced solution to managing the information used in their work roles, they saw no compelling reason to move away from using Lotus Notes. Again, this group of staff showed support for the technically rational strategy of modernisation supported by a corporate intranet. However, their support for the regime of modernisation was undermined by their experiences of using the intranet in the course of their work lives and its content management system. The regime of continuity was bolstered by staff continuing to use Lotus Notes in support of their everyday tasks and activities. The reliance on Lotus Notes persisted through the

restructuring of the organization despite the pivotal role envisaged for the intranet as a vehicle of change.

The Intranet Team and Care of the Self

The intranet team (see Figure 7.1) have a similar 'internal' focus to the members of staff described above. However, as their job roles are directly concerned with the set-up, maintenance and day-to-day running of the intranet, this has a bearing on the care of the self for the team members. As introduced in Chapter 7, the managerial echelons of the intranet project team also have responsibilities outside of the intranet project. As the strategists and proponents behind the intranet and its role in HCC, the managers have been active in the creation of the technical-rational underpinnings for the system. This is reflected in the alignment of the intranet project strategy with the broad objectives of the NWOW corporate change initiative. As the strategic decision makers of the project, the management are supporters of the regime of modernisation as entire, or substantial, parts of their jobs are appraised based on the 'success' of the intranet. The roles for the four staff in user support and technical support for the project were created by the technical rational strategy for organizational change and the decision to implement an intranet to meet the needs of the organization.

However, for both managers and the four support staff, being part of the intranet team embeds them in one of pillars that support the regime of modernisation. From mapping the inter- and intra-organizational sociotechnical constituencies (Figures 6.5 and 6.6) there is evidence of wide ranging interests and pressures upon the intranet and its role in reforming the council. The individuals in the intranet team are far from recalcitrant allies of their formal role in the organization, they are reflexive agents acting within their socio-political context and shaping the sociotechnical constituency of the intranet. The technical problems and complexity of the system and the barriers of established ways of working within HCC prompted degrees of problematization of the Soft Salad system among intranet team members.

The problematization by staff members across the three groups identified above are explored in the following sections. It is argued that various social and technical factors undermined the legitimacy of the regime of modernisation and bolstered a regime of continuity, even where there was support for the principle of modernisation within HCC.

Problematization and the HCC Intranet

Problemzation is the critically reflexive process involved where the desired (or aspired) life style of individuals is considered in relation to their context. Problematization by individuals becomes more intensive

where change affects the perceived relationship between the *self*, regimes of truth and technical rationalities that support them. The case study saw that, despite the relative success of some features available via the intranet, the project had failed to establish the platform for modernisation that the strategists at HCC had planned.

From the outset, the strategists and managers responsible for change at HCC created both technical and rational goals and justifications for change supported by technology in the council. These are captured by the production of intranet strategy documentation (Hawkwindshire County Council, 2004; 2007a; 2007b) and in the regime of modernisation to provide a corporate approach to organizing and providing information across HCC. The regime of modernisation was linked earlier to the pressures from CPA exercise and broader national government agendas, e-gov and later t-gov. This underlines the strategic significance of the intranet project for HCC. The expectations to function as a unified, efficient corporate body and to deliver best-value public services using ICT are what brought an ICT-led strategy to the fore at HCC. Problematization by the staff at HCC emerged for a variety of social and technical reasons.

Problematization by Externally Facing Staff

Externally facing office based staff are responsible for supporting and organizing the front-line delivery of public services across Hawkwindshire. Problematization is the *questioning of meaning, conditions and goals that underlie a domain of truth*. This may include the questioning of knowledge and rationalities that support a regime of truth. At HCC, the apparent disjuncture between the operational support of the intranet to routine tasks and the delivery of front-line public services brought about problematic tensions between work and the new technology for externally facing staff.

Problematization of the intranet by externally facing staff was consistently found at the interface between public service provision and the internal organizational arrangements for providing them. Jerry Roberts is a Promotions Officer who coordinates a range of social services staff, health workers and schools for the protection of young people. Her comments on the use of the intranet were echoed by other externally facing staff in HCC:

“The scope of the Web is a lot more and the intranet is obviously internal and our services are mostly to the public so there would be a limit on what we’d personally use the intranet for, whereas what we could use the internet for is much bigger.”

(Jerry Roberts, Promotions Officer)

Council staff are critically assessing the value of the intranet technology on across a range of factors and certainly not exclusively on the technical rationality used in the formation of the intranet strategy. In the example above Jerry evaluates the intranet in relation to her job as a promotions officer as part of the Children, Young People, and Families directorate and in contrast to the value of Internet technologies; "the Web". Externally facing HCC staff begin to form the question regarding the value of the intranet to their roles as employees delivering front-line public services. An aggregate effect across this group is that the knowledge supporting the regime of modernisation is subjugated, as it is inadequate in its technical assessment of the value of the intranet. Indeed, the intranet is perceived as useful, but nonessential in the delivery of public services. Even for Dikmik, a Youth Inclusion Officer working in HCC offices in the town of Bogtrench in the north of the county, the intranet was always secondary to either Lotus Notes or the Internet for supporting her work in Youth Inclusion despite being geographically remote from the administrative core of HCC. The subjugation of the regime of modernisation was seen in the externally facing staff reflecting upon their professional roles and obligation to the public and the applicability of the intranet to that purpose. Put simply, the staff did not perceive the intranet as operatively supportive. Externally facing staff were able to perform their roles using the existing capabilities of Lotus Notes, to depart from this system was to depart from the best value delivery of services to the public. The use of the

internet was deemed comparatively more useful than the intranet because it *opened a dialogue* with the public. The perceived relevance of the internet (i.e. web site) technologies over the Soft Salad intranet again diminished the regime of modernisation within HCC. The incongruence of the intranet with the reflexive constructions of organizational roles for externally facing staff meant that this group would typically sideline the use of the intranet or would favour technological alternatives that engaged with the public such as a website. In both instances the problematization of the intranet challenged the regime of modernisation by focusing on service delivery through the established council processes and procedures.

Problematization by Internally Facing Staff

Internally facing staff are involved in the supporting the Council organization. This covers a wide range of roles and functions from accounting, provision and maintenance of resources such as ICT, human resources through to legal representation. Although the intranet was designed as a corporate information resource and should therefore meet the needs of internally facing office staff at HCC, it was seen in the case study that there was problematization of the regime of modernisation by this group of staff. The effects of problematization were seen in the continued use of Lotus Notes in preference to the intranet by staff and

for content authors in the difficulty of publishing content items via the content management system.

Problematization of the intranet was broadly around the level of *operational support* the intranet can provide to staff in their daily routines. Although the system provides some 'useful features', these 'quick win features' (Phase 1, column 4 in Figure 6.2) are intranet incarnation of the most heavily used Lotus Notes facilities. Whilst the popularity of these Lotus Notes features was precisely the reason they were chosen to be part of the intranet, it emerged that this prompted problematizations by users. The tension between the underlying technical rationality that supports the regime of modernisation and the care of the self by staff produced conditions where it was more desirable for staff to continue using the incumbent system:

"There are one or two features on the intranet, but they are already accessible within Notes, so because you've got to click on another icon to get to the intranet, I don't do it because I can already get it from Notes itself."

(Harvey Bainbridge, Human Resources Officer)

Because of the overlap in functionality between Lotus Notes and the features on the intranet, there was little point in using the intranet over the incumbent system. This was echoed by informants during

interviews, expressing no rational or compelling need to go to the intranet to perform their tasks.

A further source of problematization lies in the complexity of content authoring. The design of the Soft Salad system uses a complex set of menus as an interface for users to create content and upload files to be displayed on intranet pages. The case study reveals the problems for content authors in creating items to be displayed on the system, whether it is documentation for distribution across the organization (spreadsheets, documents, and PDF files) or departmental information to be displayed on an intranet page, the Soft Salad content management interface deterred a lot of users from regularly updating their information on the system. Again, the fallback of using Lotus Notes meant that the information could still be disseminated, even if it is not through the Soft Salad system.

In both instances, the limited operational support and the complexity of content authoring on the intranet gave rise to questioning the technical rationality that underlies the reasoning for technological change. Consequently the regime of modernisation is problematized by the internally facing HCC staff. Their dependence on the Lotus Notes system subjugates the efforts of modernisation using the intranet as a vehicle for corporate change.

Problematization by the Intranet Team

The intranet team contains diverse interests coupled around the intranet technology. Senior management levels are concerned with supporting corporate change under the NWOW initiative using the intranet as a means of meeting the information requirements of the organization. Intermediate management levels on the intranet team are acutely aware of the senior management agenda, but are more concerned with reconciling the engrained cultures of working and adapting the new intranet system to try to join together the Soft Salad system and existing patterns of work. The front-line technical programmers find themselves troubleshooting when things go wrong with the system or looking for, and programming, features and utilities for the intranet. The front-line support officers are engaged in the publication (rendering material viewable) of content items from the various authors around the council (Figure 7.3), answering and logging enquiries from users and training more content authors.

It is unsurprising that the front-line technical and user support staff experienced problematization given that they are formally responsible to proponents of modernisation while at the same time are the interface with users across the organization. The reception of the intranet throughout HCC has caused the problematization of the project by both externally and internally facing staff, usually through questioning the

level of operational support the system provides in their roles as council employees. For the technical and user support staff on the intranet team there were three main sources of problematization. First, the publishing bottleneck caused by the distributed authorship base and the centralised publication of intranet content. Second, the lack of software licences to allow the build-up of a large and diverse content author base for the system. Finally, the development and customisation of the Soft Salad for HCC was hampered by the lack of trained software engineers in the UK to support the customisation of the software system.

A Bottleneck in the Publication Process of Intranet Content

The bottleneck in the publication of intranet content occurs where any item for publication on the intranet has to be authorised by Bridget Wishart or Mr Dibs. This raised two sources of problematization for the two intranet support officers. The first is that with an increase in content authors comes an increase in workload for the team as they have to check and publish each content item destined for the intranet in addition to their roles of training, monitoring the system and user support. The second issue concerns the disjuncture between this process of content publication and the strategic model of distributed information creation and ownership as a new corporate way of working. These both raise issues that bring into question the technical rationality of the regime of modernisation.

The bottleneck problem of publishing content is inherently a technical one. It is an embedded feature of the design of the Soft Salad software. When questioned about this, neither the technical or user support team staff knew whether it could be overridden or redesigned so that the content authors distributed across the organization could publish their information without it being authorised centrally by the intranet team. This is a design assumption within the software design about how information is created and controlled in organizations (Pollock and Williams, 2007). When this publication process is considered in the context of the intranet team at HCC, it appears as a bottleneck in the process of putting information onto the system. There are two members of staff responsible for approving all the intranet content combined with the central agenda of building a community of users by adding a large volume of corporate and organizational information available via the intranet. The role of information gate-keepers was a source of concern for Bridget and Mr Dibs as their approval of content was both time consuming and detracted from their other roles on the project. The bottleneck was seen as an impediment to developing a *vehicle for corporate change*. The juxtaposition between the strategic visions for the intranet system the software implementation as it currently stands is captured by one of the technicians working on the project:

“Decentralizing the publishing, I think that would help a lot. Everything that goes on now has to go through here and ask them to publish. The plan was always to decentralise as soon as possible but because of the complexity of the system, we’ve not been able to do that as easily as we’d like. But certainly that would help no end if people were involved, the whole thing would be fresh and up-to-date and people would use it more frequently.

(Barney Bubbles, Analyst Programmer)

Barney captures the disjuncture between the *intended* and the *actual* functionality of the intranet. The centralization of content publishing has effects for participation through contributing information which, in turn, would make the system more up to date and would bring more users to the system than is currently the case.

The technical design of the Soft Salad system has also produced social effects in-use. In areas of the organization where there were active content authors (as opposed to staff members who sidelined the intranet), the centralised control over publishing intranet content had generated social effects in the way the system was being used. Both intranet officers, Bridget Wishart and Mr Dibs described how they would often receive unfinished, unformatted and unchecked items for publication. The centralised publishing of content has distanced users from “owning” their information and users have shifted the responsibility

of proof reading and amending information before it is published. The bottleneck in the process of publishing intranet content and the acquired patterns of use by content authors caused problematization of the regime of modernisation as the technology in-use contradicted the underpinnings of the technically rational reasons for change.

Availability of Content Management System Software Licences

In addition to the publishing bottleneck, the strategy of having a large number of distributed content authors is problematic when considered alongside the licensing of Soft Salad software. A site license allows the software to 'run' the intranet, a server-side software application that stores and displays intranet pages and documents made viewable through a web browser. The license also covers administrative access to the system, allowing Bridget and Mr Dibs control over the publication of content and technicians, Lemmy and Barney Bubbles, access to develop applications to run on the system. Additional licenses are required to use the content management system, the software component that allows users to place information and documents to create intranet pages. As Bridget notes:

"I think we got a block of 120 licenses that came when we bought the software. We haven't quite got that number yet but I'm training 10 a month so it's going up."

(Bridget Wishart, Intranet Support Officer)

This is a potential barrier to expanding the intranet. At the time of data collection there were over 80 trained content authors across HCC. The supply of software licences was therefore expected to last under six months, given the current level of training. It was also known that only a small proportion of trained content authors used the system regularly, if at all. Regardless of the level of use, every time a username is given content author privileges it requires a software license. Intranet team members Bridget and Huw Lloyd-Langton were both adamant that more licenses would be required to develop the system by adding more content in-line with the intranet strategy. They were concerned about whether they would get more licenses as a business case would have to be made for the purchase of additional licenses. There was concern that this would be an unpopular, but necessary step; the intranet team knows that “the view from the top is that ‘we’ve brought a software product’ and it will work, first time, that the software product *is* the intranet.” As an interim measure, Bridget has been in contact with Soft Salad to discuss the re-use of licences. She would like to be able to transfer licenses that are allocated to content authors who have limited or no input into the system.

The Lack of UK Support for the Technical Team

The design of the Soft Salad software has also frustrated the development efforts of the technical team for the intranet project. As discussed in chapters 6 and 7, the intranet was expected to grow and develop into a full corporate information system offering a customised, portal model for delivering information across the council. Figure 6.4 traced the lineage of the intranet strategy, in the fourth column it identifies two phases of implementation. The case study covers the transition into phase two; continued content development, more advice and guidance and quick-wins to capture an intranet audience (Hawkwindshire County Council, 2007a). Part of implementing phase two would involve developing applications to run on the Soft Salad system. This would prove problematic for the technical team. Barney Bubbles reflects on their attempts to integrate bulletin boards to the intranet:

“We were trying to get the bulletin boards that run off our Lotus Notes system onto the intranet... ...they were going to be our ‘killer-app’, something that draws people across onto the intranet. The problem is that we haven’t got platforms to develop the application in. Soft Salad did come with an application builder which is meant to enable you to build applications for the intranet, but we found it’s just unusable, there’s hardly any support for it.

We tried to build the bulletin board using it and we asked for a bit of support on it and found there was no-one in this country trained to use it.”

The application builder, a development toolkit, included with the Soft Salad software was unusable for the task. With no UK support from the suppliers of Soft Salad and no programmer community associated with the Soft Salad application platform, the technical team were left to search for a useable and compatible application platform for developing the features envisaged for the intranet. As Barney comments, this translates into a problematic scenario for the technical team:

“Whenever you’re dealing with input and output on a page you need something more than just the content management system. For this to happen, usually you’d find that contractors are needed rather than permanent staff like me. Again for Soft Salad, to get anyone in who can do this is difficult. It’s a problem.”

The Soft Salad software as an applications platform is a further source of problematization for the intranet team. The fact that the technical team are unable to develop applications, specifically bulletin boards, which were scheduled as part of phase two development represents a challenge to maintaining the regime of modernisation. Given that the applications that enhance the intranet cannot be built and implemented into the

system the technical rationality of the regime of modernisation is brought into question and the pace of technical change at HCC is diminished.

Aesthetics of Existence

This analysis has examined the production of a regime of modernisation which placed technology at the centre of its agenda for change in the HCC organization. It has examined the interplay between the rational design and expectations for the new technology and the socio-political engagement with the organization as the intranet was implemented. As Avgerou and McGrath (2007) argue, the combinations of technical rationality embedded in the application of information technologies to organization and the reflexive reasoning by individuals that produces different courses of action. The aesthetics of existence captures the desired life styles of individuals in relation to their interpretations of regimes of truth, practice of care of the self, and the process of problematization.

The analysis of the three groups has shown that the efforts to support organizational change with a corporate intranet at HCC produced only limited impact towards modernising the council. The aesthetics of existence for each group provide an overview of how similar interests developed following the implementation of the intranet.

Aesthetics of Existence and Externally Facing Staff

Externally facing staff were unanimous in their support of the technical rationality associated with the regime of modernisation; it is “a really good idea”. It was seen that their priorities are aligned with delivery of best-value public services to Hawkwindshire residents. The care of the self by these employees involved critical reflection on the contrast between the intranet technology as a technically rational project and as implemented at HCC. This produced a series of problematizations by staff in this group because of the disjuncture between the technically rational intranet *as planned* and the intranet *as implemented*. Problematization of the intranet occurred where no positive link between its use and the delivery of best-value services to the residents of Hawkwindshire could be made. Communications via internet sites with the public were prioritised over developing an internal corporate presence by using the intranet. Equally, the continued use of Lotus Notes for document and information management was deemed in their best interests as it did not detract resources away from supporting the delivery of public services. Staff included in this group were far from resistant to the intranet and there was no hostility towards the project. The result was that for this group of staff the intranet provided only limited “operational support” in their daily work routines which sidelined the use of the new technology.

Aesthetics of Existence and Internally Facing Staff

Internally facing staff developed patterns of limited use, and in some cases non-use, of the intranet. Compared with their externally facing contemporaries, this was for a series of slightly different reasons. The first lies again with the degree of operational support for staff members the intranet could provide. Whereas for the externally facing staff the problematization of the system was in the ambiguity between the value of having a corporate intranet and the delivery of public services, for the internally facing staff the duplication of functions available in the familiar Lotus Notes system meant that continued use of the incumbent system was more desirable. Users, while receptive to the 'successful' features on the intranet (people finder, news and the how-to FAQ), would only use the intranet for features that were unavailable on Lotus Notes. Even then, these were regarded as enhancements and not crucial information resources in performing their work.

A second source of problematization comes from the complexity of the content management software. This was seen to produce a variety of effects that saw the departure from intended use. The first of these is again, non-use of the content management system. With some content authors choosing not to create information for the system, the model of distributed and devolved content authorship and ownership becomes problematic. This undermines the regime of modernisation by the non-

participation of trained content authors not providing the information that was supposed to draw users across from Lotus Notes. A second effect of the complexity of the content management system was that internally facing staff, rather than use the Soft Salad system, would send documents or text via the email system requesting that the intranet team places their information on the system on their behalf. In these instances, even though information was reaching the intranet, the practice of information ownership across HCC was being sidelined. In other words, the ownership and monitoring of information was not being practiced across the content author base. A third effect of the complexity of the content management system was seen in the training sessions that groups HCC staff attended. The members of staff attending training had negative impressions of the Soft Salad system before even entering the room. Intranet Officer, Bridget Wishart described how training sessions were often hampered by the negative preconceptions held by staff before they arrive. In one extreme case, a trainee "would only watch someone else use the system" rather than attempt the step-by-step training given in the session.

For internally facing staff, their encounters with the intranet are problematic with users questioning the need for the system or its duplication of functions already available via Lotus Notes. As such their persistence with the incumbent software or non-use of the Soft-Salad system has subverted the course of modernisation within HCC.

Aesthetics of Existence and the Intranet Team

The case study revealed how the intranet team experienced both technical and social impediments to their role in implementing the system as part of the regime of modernisation. The combination of the complex design of the content management interface, the difficulty of application development for the system, the potential for software license shortages and the design of the Soft Salad system publishing process all contributed to a problematic relationship between the technology and integration with the HCC corporate change agenda. The technical properties of the system shaped encounters with the Soft Salad system for content authors and the intranet team, often producing effects that are at odds with the technically rational intranet strategy. Because of the myriad of factors preventing the intranet from delivering its strategic objectives, the intranet team became pragmatic about how quickly, if at all, they could bring about change in Hawkwindshire County Council. After all, the patterns of non-use amongst council staff indicated that the team faced a cultural, rather than a purely technical, challenge: "...the hearts and minds" of individuals.

Avgerou and McGrath (2007; 307) write that the aesthetics of existence are "pragmatically constructed according to individuals' life experiences and capacity to act". The intranet team, while *de facto* proponents of the intranet project, have had to pragmatically construct their courses of

action according to their capacity to act. The user support team have continued to train and support content authors using the intranet. Their support has even included the proof-reading and entry of information from *unconventional* (e.g. email) sources for publication on the system. Their priority has been to get information onto the system, rather than to strictly enforce the distributed model of information ownership and publication. They acknowledge that the transfer to the Soft Salad intranet and removal of access to Lotus Notes databases and document libraries would push users across to the new system. However, this kind of intervention is beyond the control of the intranet team; all they can do is 'to ask repeatedly and wait'.

The technical team are constrained by the lack of a suitable applications development platform for the system and a lack of technical support in the UK. Like their user support counterparts, they too cannot make decisions on the purchase of additional software or hiring consultants or other expertise to assist, they are only in a position to make a business case for these developments to the Strategic Resource Development team and the Chief Executive.

Although the intranet team are aligned and support the regime of modernisation, they are constrained by the problematization of the technology by users and content authors throughout the council. The analysis has also indicated that the technology also caused

problematization of the system by the intranet team, especially in its suitability to deliver phase two of the intranet development plan. Despite the teams' efforts the regime of modernisation failed to achieve dominance in the organization due to the problematic encounters of users and content authors. While there were mild successes with 'people finder', the 'how to... FAQ' and internal news features of the Soft Salad system, it was seen that office staff across HCC found the continuity and familiarity of the incumbent information system, Lotus Notes, more desirable in supporting their daily routines. As a consequence the intranet system was unable to provide the envisaged support for the corporate change agenda across Hawkwindshire County Council.

Summary

The case study of HCC has examined the attempts at modernization using a corporate intranet technology in support of an organizational change initiative. This analysis has traced the implementation of the intranet system and the interplay between groups in the Hawkwindshire County Council administrative core and their experiences of the technology.

It would seem that cases of unintended consequences resulting from changes in computer software can be attributed to the level of congruence between information practices in organizations and

information processes embedded in computer software (Pollock, Williams et al., 2003; 317-318):

“Some of the consequences for those wishing to capitalize on the benefits of packages is that they often undergo unwanted organizational change in adapting practices to models of work and organizational process embedded in the software.”

In the case of HCC, the ‘portal’ model of information delivery through the browser based Soft Salad system was well aligned with the strategic objectives for organizational change. However it was largely incongruent with the established practices and behaviours within the organization and, as the case study reveals, within the subverting capacity of inertia captured in the widespread problematization of modernisation by different organizational groups. It is between this technological/institutional disjuncture that the critical processes of care of the self and problematization produce an aesthetic of existence that led individuals to support or subvert the course of change. In the case of HCC, intranet users and the majority of content authors found it desirable to reproduce patterns of working that relied on Lotus Notes, the incumbent information system. The intranet team, although culturally aligned to the regime of modernisation, faced technical barriers to change. For the user support team, the centralized publication of intranet content hampered their efforts to create a decentralized

authorship base distributed across the organization. For the technical team, the limited ability to develop applications for the intranet meant that the levels of functionality envisaged for phase two and the customised "portal" for the delivery of information was compromised. The lack of UK support and any Soft Salad specific program developer community were significant barriers to developing the intranet in-line with phase two of the intranet strategy.

The sociotechnical analysis of HCC depicts how the intranet project has evolved tangentially from the strategic response to CPA recommendations to the formal intranet strategy to support the corporate change initiative New Ways of Working.

Chapter 10: Discussion and Conclusions:

This chapter gives an overview both case studies and their findings. It then assesses this research in terms of the second research question; are there significant differences in patterns of technological adoption between organizational contexts? Although the research has not been entirely successful in addressing this question fully, it has provided a platform for developing future research in this area. Finally, the contributions and limitations of this thesis are explored. These indicate that possible future research contributions could be made by employing case study and other research designs united by a multi-level perspective (Geels, 2004).

NEMA and the Case of CUSS Kiosks

The new kiosks served to change NEMA as an organization. The adoption of CUSS Kiosks provided an 'occasion for structuring' (Barley, 1986). However, only through the combination of examining at the inter- and intra-organizational sociotechnical constituencies of CUSS and the framework employed were the mechanisms of change identified. The production of a technically rational strategy for the introduction of CUSS was seen to originate from a range of institutional factors which modified power relations and shaped social discourses connected with the technology and the air transport sector generally. The combination of an industry association (IATA) drive for new technology, the consistently

rising demand for passenger air travel, constraints on the expansion of airport infrastructure and a technology-led competitive strategy by the MAG group helped to push and shape the conditions for automating passenger handling processes in airports. The global IATA programme, *Simplifying the Business*, combined with the regulatory uncertainty surrounding the future of large-scale infrastructural expansion indicated in the government white paper (Department for Transport, 2003) legitimated the technological solution of CUSS Kiosks for abating capacity constraints. The 'regime of efficiency' evolved as a power-constituted legitimisation of technical rationality underlying the implementation of CUSS. Despite numerous technical problems with the technology, both the management and customer services teams at NEMA were pro-active in their support of the project, upholding the regime of efficiency. The limitations of the technology meant that customer services assistants modified their behaviour (see figure 8.1) in order to ensure that it met or exceeded the passenger throughput targets imposed by the head office at Manchester. The pro-active role of the CSAs meant that the self-service aspect of the technology was absent from most check-in transactions; a feature that contributes to the cost-saving properties of the kiosks by reducing the need for staff involved in the check-in process (see figure 5.3). The management team were content to allow the pro-active behaviour of the CSAs, even noting that they needed pro-active staff for the kiosks to work. It was perceived that their added input contributed to supporting the regime of efficiency and therefore was

aligned with the management targets for the kiosks. For the customer services manager and her team of CSAs, their close involvement with the project afforded an empowered position as it placed their department in close communication with senior management at the airport. This was judged to be a preferable position and one to maintain. Despite the technical limitations of the kiosk and the extra workload for her team, the customer services manager promoted her team's involvement with the project because of the empowered position it provided for her and her team.

To return to the research questions posed at the beginning of this thesis, the combination of the in-case analysis using Avgerou and McGrath's (2007) framework in conjunction with sociotechnical constituencies to map influences beyond the bounds of the case organization revealed a series of crucial and recursive interactions. While the day-to-day running of CUSS check-in was routinely governed by organizational power relations, the rationalities underlying the choice of technology, its anticipated use and its value to the organization were all co-dependent on inter-organizational relationships. Dual effects from rising passenger numbers and increasing demand on airport infrastructure from government regulation on airport expansion served to add legitimacy to CUSS as a space-saving technology. Through the reflexive process of care of the self the case revealed how managers abandoned some aspects of the regime of efficiency by allowing the proactive behaviours

of the CSAs to become a feature of the CUSS systems' working. That is to say, managers sidelined self-service in favour of meeting passenger throughput targets. The management involved with the project were supportive of the CUSS Kiosk project and supported the technical rationality that underpinned its implementation for several reasons:

- CUSS addressed the capacity constraints of the current terminal building.
- CUSS provided a source of competitive advantage by lowering the transaction cost of passenger check-in.
- It prevented a 'proliferation' of proprietary kiosks throughout the terminal building thus allowing the airport to manage the use of floor space in the terminal building. Common User kiosks compared to proprietary kiosks also save on the amount of computer network infrastructure (cables, routers and server rooms) required around the terminal building.

CSAs were far from being pro-active agents operating on behalf of the IATA StB programme or the technology-led competitive strategy of MAG. The study shows that they found it desirable to engage in practices that compensated for the technical limitations of CUSS because of the comparatively empowered position gained from their involvement with a 'successful' project within the organization. By aligning themselves with

the project as proactive agents, the CSAs were in a comparatively privileged position than before the kiosks were adopted.

The Case of HCC and Modernisation

In HCC, the case study examined the attempts at bringing about corporate change through the introduction of a browser-based intranet system. The information system was supposed to mirror a corporate way of working across the organization. Instead, the fragmented departmental "silos" continued to prevail and the uptake by organizational divisions of the new system was limited. The decision to mimic the most popular features of the incumbent Lotus Notes system, that access to the new system was delivered through the incumbent system (to launch the internet browser) and that Lotus Notes continued to be used in parallel with the new Soft Salad system all served as barriers to the widespread adoption across HCC. These three factors led users (and potential users) to problematize the system in several ways. For externally facing office staff, support for the intranet was subjugated by the relevance of Lotus Notes to their day-to-day tasks. So entrenched were the practices of information management and communication using Lotus Notes, that Soft Salad was an inconvenience or irrelevant to the individual at work. Externally facing staff expressed great enthusiasm for being able to reach the public by using web sites;

by contrast they saw no particular benefit from reporting or duplicating information via the intranet as this had no direct benefit to their customers, "the public". For internally facing office staff, what appeared to be the duplication of existing information available via the Lotus Notes system undermined the perceived level of operational support that could be sought from the intranet. This sentiment is typified in the response by Harvey Bainbridge: "...so because you've got to click on another icon to get to the intranet, I don't do it because I can already get it from Notes itself." These duplications undermined the relevance of Soft Salad intranet to the daily tasks of HCC staff.

Non-use by trained content authors also served to exacerbate the difficulty in getting HCC staff to use the intranet in place of Lotus Notes. Informants blamed the complexity of the authoring process in the Soft Salad system. The anticipated development of staff through training to become fully engaged intranet content authors did not occur. Therefore, these staff were not providing the information that would make the system a valuable information resource by producing 'content' that would create a corporate information system. With the available alternative of Lotus Notes, which has a ubiquitous and established user base in the council and was familiar to the vast majority of staff at HCC, the Soft Salad system never gained the *critical mass* of information it required to become an essential corporate information system. The project also faced the problem of scarce resources. Every trained content author,

whether they used the system or not, would need one of a finite number of software licenses. This placed additional pressure on future training possibilities, the financial cost of system and on the intranet team, who had to fulfil some of the demand for content authoring duties.

For the technicians supporting the project, the lack of UK support by the software developer and expertise in building applications for the system seriously undermined their efforts to develop additional features for HCC staff. The Soft Salad system had been implemented in large corporations, but not in other comparable organizations and certainly not among Local Government organizations where some kind of development community for building technical expertise could have been fostered. In this situation the technical staff realised they had powerful software capabilities, but no feasible way of harnessing them for use in the council.

On a final visit to the council it was revealed that a new all-encompassing groupware software package would supplant both Lotus Notes and the Soft Salad systems. The intranet had failed to become an established part of HCC's IT systems. A combination of technical limitations, complexity of use and duplication of established information management practices using Lotus Notes meant that a pattern of use as a corporate intranet was never established.

To address the research questions, the roles of both the internal and the institutional dynamics of HCC were both implicated in the case of the corporate intranet. First, inter-organizational constituents provided the stimulus for change in HCC. The CPA, which reviews the performance of local government organizations, had highlighted the weakness of the internal organization of Hawkwindshire County Council. The New Ways of Working corporate change initiative was a strategic response to this assessment. This programme of change was designed to be supported by a corporate intranet system. The technology was envisaged as a moderniser of organizational practice and to reinforce a corporate way of working. While the technology was a legitimate, technical rational, response to the external demands of the CPA, once adopted, the technology never acquired the status of a vehicle for change. The intranet technology made only limited in-roads into changing organizational practices. A wealth of factors connected with the design of the software led to the widespread problematization of the intranet by externally and internally facing office staff as well as the intranet team itself. The duplication of functionality with the incumbent information system meant that staff across all the groups of HCC could elect not to use the system. Through this lack of adoption across the organization the intranet was incapable of fulfilling its role and consequently subverted its position as a vehicle for change in HCC. Instead the non-use of the system helped stabilise existing practices that relied heavily on the Lotus Notes system; document management and departmental

bulletin boards were sustained throughout the implementation of the new Soft Salad system.

Between Case Comparisons

The second research question asked whether there are significant differences in patterns of technological adoption between organizational contexts. From the discussion and analysis above, it is difficult to make comparisons between these kinds of case study. As mentioned in the methodology chapter: The nature of the concepts in the analytical framework are abstract and situated in patterns of discourse, and are not therefore amenable to quantification or replication within each case study. Generally, the basis of comparative research is between similar or identical variables so that a like-for-like comparison over time, case or context can be made. Given the necessary abstraction from the empirical body of data, even between the two case studies in this research, like-for-like comparison is an unrealistic goal. However, it is envisaged that with a greater number of case studies a greater focus could be placed upon the role of technical rationality and its relationship with broad institutional arrangements. These would provide a broader illustration of similarities and differences in the role of technical rationality during technological adoption in organizations across different contexts.

In the case study of Nottingham East Midlands Airport, it was seen that the customer services assistants actively supported the regime of efficiency by modifying their behaviour. This served to accommodate numerous technical problems with the Common-Use Self-Service check-in kiosks that would have otherwise compromised their 'efficient' status. Their involvement in ensuring the success of the technology afforded their team a preferential position in the airport organization. In the case study of the HCC intranet, the regime of modernisation never gained the support needed to instigate the corporate change expected following the adoption of the Soft Salad system. Although strategically legitimate, the technology never supplanted the heavily institutionalised use of Lotus Notes for performing broadly equivalent tasks.

The implementation of the intranet technology at HCC is markedly different from the previous case study which saw a new check-in technology affect the balance of power between management and customer services figures in the organization. First, the CUSS kiosk technology operates, or should be operated, by passengers passing through the airport. The intranet technology seen in the case study of HCC represents an organizational information system that supports or supplants a range of established processes within the council. In this sense, the two technologies are very different. Secondly, the CUSS kiosks were implemented to enhance the competitive position of the Manchester Airport Group as a whole. The efficiency gains from reduced

labour costs and the increased use of existing terminal building space meant that the kiosks would reduce the overall transaction cost of each passenger check-in. In comparison, the HCC intranet project is designed to support a broader corporate change initiative within the organization. Efficiency is a substantive aspect of the intranet technology, however the 'spirit' (DeSanctis and Poole, 1994) of the technology is in changing information management practices to break down the silo-working that typifies the *current ways of working*. Thirdly, the CUSS kiosks saw the computerisation of a long-standing institutionalised check-in processes (identification of passenger, referencing their booking, the asking of security questions and so on) while the intranet technology is supposed to embody a range of institutionalised practices present in HCC's incumbent information system (e.g. document management) and outside of its computer systems (e.g. directorate newsletters). These differences signal that the institutional work (Lawrence and Suddaby, 2006) undertaken by constituents is likely to involve different mechanisms to bring about change (or continuity). The following section addresses the institutional dynamics of sociotechnical change.

Institutions and Institutional Change

This thesis is concerned with examining continuity and change at the level of the organization. However, neither the theories of technology nor theories of organization introduced in the literature review support

the idea that change is reducible to internal organizational dynamics. Consequently, while the analysis remains focused on the case organization, the theoretical and empirical work extends beyond the boundaries of each case study organization. The role of institutional dynamics across nested levels (Holm, 1995; Lawrence and Suddaby, 2006) was seen to be influential in shaping patterns of technological adoption in the two case study organizations. Additionally, this research employs a structuralist understanding of institutions (Barley and Tolbert, 1997), that the constraining and enabling properties of institutions are sustained and altered through agency. In terms of this research, this position implies that both NEMA and HCC are embedded in, and shape, their respective institutional fields. This responds to a gap in institutional literatures to the extent that the formation and evolution of institutional patterns are understood in terms of their mapping of similarities of general forms of arrangements (Hasselbladh and Kallinikos, 2000; Kallinikos, 2006b) and that limited empirical work has been conducted to indicate how 'macro' institutions are formed from 'micro' level organizational practices (Hayes, 2008).

In both case studies the patterns of technological adoption and subsequent organizational continuity and change were linked to institutional influences that existed across multiple levels. Whether these influences were broad, national or societal institutions or localised organizational institutions it was seen that these shaped the technical

rationality and regimes of truth in each case. Between institutional theory and Avgerou and McGrath's (2007) sociotechnical framework there is an apparent complement that hinges upon 'institutional logics' and 'legitimacy'. It was argued that technical rationality constitutes the logic for action, for example the implementation of new technology. This resonates with the notion of 'institutional logics', in that they both provide the organizing principles around which action takes place. A second complement is seen between regimes of truth and legitimacy. Legitimacy is taken to comprise "...a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995; 574). The construct of 'regimes of truth' shares common elements with institutional legitimacy in that both are produced through the cumulative processes of collective, socially-constructed beliefs. As seen in the case studies, the care of the self, problematization and aesthetics of living are each processes through which individuals are engaged with and shape their [institutional] context. Through the combination of this sociotechnical framework and the mapping of the case organizations within their sociotechnical constituencies a vivid institutional-organizational relationship can be produced. This provides an enhanced account of technological adoption at the organizational level than either framework on its own, as well as a more comprehensive insight than organizationally-bounded case study

research. The contributions and limitations of this research are discussed in the following section.

Research Contributions and Limitations

Before discussing the possibilities for future research that this thesis presents, this section critically reflects on the contributions it has made and some of its limitations. It makes sense to address these two themes in the same breath as it is often in areas where contributions can be made that limitations arise because of the necessary choices about research that preclude contributions in other areas. The conscious theoretical (Chapter 2) and methodological (Chapter 3) choices made for this research design inherently exclude others.

This research has provided an institutionally mediated account of organizational change following technological adoption. It has highlighted gaps in two related bodies of literature. The first addresses the apparent gap in area of organization studies in the theoretical treatment of technology. In response to this gap this research has employed a framework that accommodates the social and material aspects of technology and locates them in an institutionally embedded set of power-relations. Secondly a gap in institutional theory and building an understanding of the mechanisms by which institutions are maintained or modified (Hasselbladh and Kallinikos, 2000; Lawrence and

Suddaby, 2006; Hayes, 2008), and crucially the role of technology in these processes of institutionalization (Orlikowski and Barley, 2001). The framework used to guide the analysis of the two case studies implicates the role of an institutionally situated, technically rational drive for change. The use of a sociotechnical constituencies approach in conjunction with this framework adds greater substantiation to the phenomena seen in the case studies guided by Avgerou and McGrath's (2007) framework bringing together institutional field and organizational levels of analysis. Through including inter-organizational sociotechnical constituents in the analysis of change, this research provides the degree of detail that comes with a case study research design, yet is not entirely restricted to data collection from exclusively within the case-study organization. In the study of Nottingham East Midlands Airport and the introduction of CUSS Kiosks, the institutional context provided a wealth of information that illustrated the rationale for the introduction of the kiosk technology and also the setting of performance targets for the new system. Without the knowledge of how IATA, other airports and airlines were implicated in the CUSS Kiosk constituency, the data from NEMA would most likely have taken on slightly different meaning.

The second gap in the literature identifies the problem of a lack of fine-grained analysis of organizational practices within neo-institutional theory (Hayes, 2008) and in the role of these 'micro' practices in the creation, modification and destruction of institutions (Orlikowski and

Barley, 2001; Townley, 2002; Lawrence and Suddaby, 2006). Whereas this research was able to respond to the first gap in organization studies by combining sociotechnical analysis as part of a system of nested layers of institutions, it has been unable to draw cogent insight to the mechanisms of institutional change. This is not to detract from the contribution made from introducing macro-level institutions to the analysis of micro-level organizational dynamics following technological adoption. However, the structural theoretical underpinnings used here concerning both the ontology of technology and institutions (Orlikowski, 1992; Barley and Tolbert, 1997; Orlikowski, 2000; Orlikowski and Barley, 2001) implies that the micro patterns highlighted in this thesis are constitutive of the institutions identified as shaping factors in the process of technological adoption. Using this research design, it has been possible to produce organizational analyses through an institutional lens, but not an institutional analysis through an organizational lens where the micro, constituting mechanisms of institutions are identified. That is to say macro-micro influence is far more amenable to study using this research design than the build-up of micro phenomena in the constitution of the macro environment. This aspect of the research is discussed as a potential avenue for future research into technology and institutional continuity and change in the following section.

In-depth, interpretive case studies are time-consuming to conduct and complete. Although adding to our understanding of technological change in organizations, this approach does not have the same hard and fast view of technology as a quick-fix for automating processes or bringing the best out of the knowledge base of a firm. For this reason, the implications for practice from this kind of research are likely to appear far less precise than those by technological determinist accounts. The ambiguous theory-practice relationship is solidified further by the inability to generalise from specific cases to produce techniques to be put into practice. Whilst the logic and possibilities of real-world technological determinism have been rejected at a theoretical level throughout this thesis, the seductive nature of such deterministic accounts for managing change in practice still presents a barrier in the transfer of theory to practice.

The dimension of time is a common constraint on qualitative research, especially where in-depth and synchronous data collection is involved. A potential weakness of this study is when to begin and end data collection. For each case study a contact period in excess of six months (from initial meetings, to follow-up discussions) was maintained. It is emphasised that the internal dynamics of each case study are the elements that develop further understanding of sociotechnical change rather than a delimited amount or period of data collection. However, it

is recognised that further data collection, using a longitudinal approach, could add to the level of description and detail for the research.

Summary and Directions for Future Research

This research began by examining the current understanding of organizational change following the adoption of a new technology. A review of the literature revealed gaps in understanding across two parallel fields of study. Information systems approaches have traditionally focused on causal links between technology and measures of organizational performance and tend to be technocentric, disregarding the finer points of practice and power relations in the organizations they study. This generally leads to technologically deterministic accounts of change (Kimble and McLoughlin, 1995). Equally, in the field of organization studies, technology is often black boxed (Scarborough, 1995; Azad and Faraj, 2008) or even an exogenous or absent factor in accounts of change.

To address these gaps this thesis contends that information technology is inextricably embedded in providing or supporting the vast majority of organizational functions and practices and that: First, technology and organization are mutually constitutive; their ongoing socio-material relations both restrict and enable future possibilities of each other. Secondly, organizations as sociotechnical configurations are situated in

and conditioned by institutional arrangements. Accordingly, the study of technology and organization needs to be adapted to incorporate techniques for capturing the broad spheres of influence in shaping technology adoption without neglecting the fine-grained situated practices of groups and individuals who use and oversee such projects.

This research has responded to these gaps by incorporating a sociotechnical constituencies framework for mapping inter- and intra-organizational constituents involved in technology-led change. This was accompanied by the Foucauldian framework proposed by Avgerou and McGrath (2007) which examines the complex iterations between *the rational techniques of rational practice and its social context*. The build-up of a technically rational strategy of technological change was influenced by a wealth of institutional factors. However, the nature of technological adoption was mediated not only by its institutional context, but also in practice by the groups and individuals implicated in technological change. The case of CUSS Kiosks at NEMA illustrates how the technology was perceived to produce successful results. The adopted roles by CSAs supported the regime of efficiency by enabling the system to meet and exceed performance targets for the system despite its technological flaws. The case of Hawkwindshire County Council examines the development of a corporate intranet to support broad changes in the structure and information practices of the organization.

In neither case could these outcomes have been deterministically drawn from the properties of the technology alone. To gain further insight into the influence of technology in organizational change this research points to further empirical work using the frameworks employed in this project. Of particular interest for future comparative research is the creation and development of technical rationality and its role in the formulation of strategies for technological change in organizations. This provides a promising direction for research into the impact of technology on organizational change and continuity.

Although there is an inherent weakness in the ability of this research design to examine institutional change, this is perhaps best viewed as a platform for future research. One such avenue for future research is to trace the mechanisms technological innovation and adoption across micro and meso levels to produce broader accounts of institutional patterns of continuity and change. This clearly requires an expanded and enhanced research design. The work of Geels (2006) develops a multi-level perspective (MLP) to examine the build-up of large-scale technological systems. The MLP employs a narrower 'socio-technical regime' as compared with the sociotechnical constituencies as a meso-layer. The meso-layer in conjunction with the (micro) technological niches interact under the influence, and shaping 'landscape developments' over time. Using this as a template it is conceivable that a series of case studies using interview, observation and documentary

methods for data collection could be combined to produce an MLP that captures the role of technology in institutional continuity and change. A tentative complementary relationship between the core concepts within the sociotechnical framework used in this research and the concepts of institutional logics and legitimacy was made earlier in this section. Where this piece of research has been unable to address fully the micro-macro processes involved in institutional change, an extended program of research using an MLP (Geels, 2006) would be better positioned to capture the role of technology in institutional change. An MLP could, for example attend to the processes of inscription (Spicer, 2005), institutional entrepreneurship (Garud, Jain et al., 2002; Maguire, Hardy et al., 2004; Dorado, 2005; Munir and Phillips, 2005; Greenwood and Suddaby, 2006; Levy and Scully, 2007; Perkmann and Spicer, 2007; 2008) and technology as a carrier of institutional forms (Orlikowski, 1992) to produce studies of technology and institutional change.

Despite the limitations of this research to provide an account of institutional change or a strong comparative contribution, it has illuminated the centrality of both macro and micro institutional factors in shaping technological adoption in organizations. It has produced accounts of technological change that are strongly mediated by their institutional context and the immediate social context of organizations. It suggests that future research accounts for the role of technology in (re)producing institutional logics and as a legitimating factor as part of

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shaping patterns of sociotechnical change in organizations and as a complement to future institutional research.

Appendix:

Table 1: Glossary of terms used across cases:

Abbreviation	Definition
CPA	Comprehensive Performance Assessment
CSA	Customer Service Assistant
CUSS	Common Use Self Service
DCS	Departure Control System
HCC	Hawkwindshire County Council
ICT	Information and Communication Technology
LGA	Local Government Association
MAG	Manchester Airport Group
NEMA	Nottingham East Midlands Airport
NWOW	New Ways of Working

Table 2: Informants for the Case of CUSS Kiosks at NEMA

People Present in case:	Works for
Product Research and Development Specialist	NEMA
Hardware Technician	"KussTech" – [ESP]
Police Officers	British Transport Police
Customer Services Manager and Customer Services Assistants	NEMA
Servisair Duty Manager	Servisair
Terminal Services Development Manager	MAG
Terminal Manager	NEMA
Airport Manager	NEMA
General Manager of Development	NEMA
Out of Case Interviews:	
Matt Gomez	Luton Airport Operations Manager
Paul Kehoe	Former Luton CEO
Nick Gates	SITA – Head of UK Operations
Paul Griffin	ESP BHX – Technical Manager
Martin Beavis	LGW - Operations
Paul Gaiger	BA/CitiExpress – Head of Operations
Gary Hardiman	SITA
Chris Meeking	Avtura – Managing Director
Phil Westlake	XL Airways -
Charles Newman	Servisair – Head of Operations at Gatwick.

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