Changing Healthcare Institutions with Large Information Technology Projects

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ABSTRACT

This paper reviews the development of institutional theory in direct relations to historical changes within the UK's National Health Service (NHS) with an eye to contributing to the theoretical specification of social information processes. This is done partly by extending certain paradigms (see Powell & DiMaggio, 1991; Meyer & Rowan, 1977; Tolbert & Zucker, 1994) through a proposed model of causes and consequences of variations in levels of institutionalisation in the healthcare sector. It reports findings from a three-year study on the NHS implementation of the largest civil information systems worldwide at an estimated cost of $10 billion over a ten-year period. The theoretical basis for analysis is developed, using concepts drawn from "IT conversion effectiveness", "productivity increases", realization of business value", and "organisational performance improvements", as well as mixed empirical results about the lack of IT investments value in the NHS. The findings suggest that large-scale IT change imposed upon a highly institutionalised healthcare is fraught with difficulty mainly because culturally embedded norms, values and behavioural patterns serve to impede centrally imposed initiatives to automate clinical working practices. It concludes with discussion about the nature of evaluation procedures in relation to the process of institutionalizing IS in healthcare.

INTRODUCTION

An historical overview of IT projects on the UK's National Health Service (NHS) during the last five decades is presented here with the intention to both clarify the links between institutional theory and previous traditions of sociological work on organisational structure. The initial exposition of this theory by works of established institutionalists (Tolbert & Zucker, 1994; Meyer & Rowan, 1977; Scott et al, 2000) focuses on the ways of challenging dominant theoretical and empirical traditions in organizational research. While this paper clarifies some ambiguity and elaborates on the logical and empirical implications of a phenomenologically-based version of institutional theory, the primary aims are to clarify the independent theoretical contributions of institutional theory to analyses of the NHS and to develop this theoretical perspective further in order to enhance its use in empirical research in other healthcare environments (internationally and globally).

Markus (1983) claims that interaction theory draws together three principal strands of resistance: internal factors, technical problems and political context. This theory has been highly influential in IS strategy and other social sciences generally since Markus first developed the ideas over two decades ago. The focus here (see Table 1) is on how interaction theory offers a new way of looking at IS implementation in the healthcare industry.

Much has been researched in the last few decades about the major lack of a coherent implementation strategy for information systems (IS) in the healthcare industry (Stevens et al, 1993). Most of such claims have been levelled against an apparent "productivity paradox" with respect to investments in healthcare management (in general) and IS (in particular). Wanless (2002) and Committee on Quality Health Care in America (2002)—both national government's mandated investigations into the UK and USA national healthcare systems respectfully—among others, have failed to find a convincing body of evidence that investment in Healthcare IS is associated with increased output (refuting the productivity paradox), but not with healthcare value as measured by patient satisfaction.

WHAT IS INSTITUTIONALISM?

Institutionalism is continuously being used to mean different things by researchers of political science, economics and sociology. Lowndes (1996:182) presents institutionalism as informal codes of behaviour, written contracts and complex organisations with four elements:

- A middle-level concept. Institutions are devised by individuals and therefore constrain individuals' actions. Institutions here are seen as part of the broad social fabric and medium for individuals' day-to-day decisions and other activities. DiMaggio and Powell (1994) argue that institutions shape human actions, imposing constraints whilst providing opportunities for individuals.
- Having formal and informal aspects. Lowndes views institutions to involve formal rules or laws, which allows informal norms and customs to be practiced. That is because some institutions are not consciously designed nor neatly specified, yet part of habitual actions by its members. Such institutions may be expressed in organisational form and relate to the processes within.
- Having legitimacy. Legitimacy in institutions goes beyond the preferences of individual actors. Such preferences are valued in them and go beyond their immediate purpose and outputs.
- Showing stability over time. Lowndes views institutions as gaining their legitimacy due to their relative stability over time, and their links with a 'sense of place'.

Table 1. Implementation theory: Usage, fitness, relationship & sufficiency

Authors	IS Implementation	Theory Description
Lucas, 1993	Appropriate Use of IS	Process theory explaining appropriate IS use. Variance theory linking use with business value.
Grabowski & Lee, 1993	Strategic Fitness of IS	Process-type relationship between strategic fit and performance of IS.
Markus, 1983	Relationship of IS assets	How IS investment do or do not become IS assets. How IS assets do or do not yield improved organizational performance.
Sambamurthy & Zmud, 1994	Insufficient to produce impacts	Process model connecting raw material inputs to outputs. Variance theory of IS management competencies and IS impacts Variance theory linking impacts and business value.

New institutionalists generally view institutions to have "the humanly devised constraints that shape human interaction" (North, 1990: 3) what March and Olsen, (1989:162) refer to as "rules of the game" that organisations and individuals are constantly expected to play the game. Another stand taken by new institutionalists sees informal institutions (tradition, custom, culture and habit) are embedded in culture and conventions defined as behaviour structuring rules (North, 1990; March and Olsen, 1989). New institutionalists stress embodied values and power relations of institutions together with interaction between individuals and institutions (Lowndes, 1996). They attempt to distinguish between informal institutional rules and personal habits. Such distinction forms the basis for the definition of institution in this research where informal conventions and their impact upon the NHS and its partners are being explored.

RESEARCH METHODOLOGY

The research study began in 2001, with the initial interest of conducting an exploratory-descriptive study in ten NHS hospitals to explore why, 'historically, the NHS has not used or developed IT as a strategic asset in delivering and managing healthcare' (DoH, 2000). Intensive literature review unveiled few longitudinal studies, which systematically and rigorously examined how IT systems were introduced and changed over time. There were no studies that examined inter-organizational relationships between different constituents in the adoption and diffusion of IT systems (NHS directorship, hospital management systems or IT suppliers and patients). Not only were most of these studies descriptive and lacked an historical dimension, they presented IS in healthcare as largely theoretical with most contributions reporting the findings of a specific IT project implementation using simple success and failure criteria—Scott et al (2000) being amongst the most significant contributions.

Using such relevant and wide-ranging backdrop this research study recognized that it was important to extend the empirical enquiry for two reasons: (i) exploratory-descriptive case studies on a single organization (or one hospital) would not elicit in-dept and rich data to develop any meaningful analysis and conclusions on how IT was being deployed and managed; (ii) the introduction of a large-scale IT-enabled change program needed to be researched at the wider societal, organizational field and individual levels, covering an extended period of time, to understand the processes of institutionalisation (Tolbert & Zucker, 1994). The research study was therefore designed to capture the myriad of views and opinions about the NPfIT over a three-year period to build a rich picture of such processes underpinning large-scale IT change.

Three methods of data collection were adopted: (i) a range of academic, government and industry studies on the healthcare sector were assembled—both UK and healthcare services in other countries. The materials proved invaluable for understanding the societal, economic, political, cultural and technical differences in healthcare nationally and internationally; (ii) participation in trade fairs, conferences, workshops and exhibitions on healthcare—focusing on general or more specific healthcare activities. These events also generated many useful research contacts that proved invaluable for targeting interviews.

A semi-structure interview (see Table 2) schedule was used to enable interviewees to expand on their answers. While most interviews lasted for about ninety minutes, nearly all interviews were tape-recorded and transcribed. Respondents were later contacted with feedback from the interviews and where necessary errors were corrected. This method of data collection was critical for allowing interviewees to raise additional themes, issues and concerns that they felt were important to the research study. As a result of the political contention of some of the interview content, some interviewees asked that names of individuals and hospitals be anonymous.

During the first year of interviews, the scope of the study had to be extended, as it was important to elicit data and information from a wider range of respondents engaged in the implementation of NPfIT. These included IT service providers bidding for public sector IT contracts and doctors in general practices around the country. Most IT service providers offered critical insights into the political and procurement processes within the NHS and public sector more generally. General practitioners, on the other hand, offered useful insights about the communication channels underpinning the institutional processes underpinning NPfIT. Given the range of constituents involved, the resulting data was evaluated and interview schedule refined, ensuring questionnaires be more closely targeted to the professional and personal situation of the individual, as generic questions were less meaningful. The final questionnaire was ultimately divided into the following major themes involving 15 questions:

Vision for the National Programme for IT: overall vision and how it was compatible with individual hospital objectives.

Strategy for the National Programme for IT: Who was engaged with and how the strategy was being communicated within different organization.

Implementation of the National Programme for IT: What professional, managerial and technical skills or capabilities were needed to implement various elements of the National Programme for IT.

Value Delivery for the National Programme for IT: The main risks identified by each hospital and how past IT failure could be avoided, as well as looking at the cost/benefit choices and issues for each organization.

Risk Analysis for the National Programme for IT: The value being derived from the National Programme for IT?

The aim was to get the perspectives of a number of different informants using structured interviewing, by building up intensive longitudinal cases which would, nevertheless, be amenable to statistical analysis. In this method, differences of

Table 2. Numbers of interviews conducted

Categories of Interviewees	Year 1		Year 2		Year 3	
	Contacts Made	Persons Interviewed	Contacts Made	Persons Interviewed	Contacts Made	Persons Interviewed
NHS Information Authority	32	5	30	10	10	15
Major IT Service Providers	90	65	60	45	17	12
Primary Care Trusts Admin	15	5	25	12	22	12
Secondary Care Trust Admin	0	0	9	3	7	4
Local NHS IT Managers	15	6	20	11	60	42
Medical Consultants	3	1	8	4	9	6
Nurses & Junior Doctors	13	3	15	3	11	4
Healthcare Researchers	35	20	20	8	10	7
Total Interviews		**105**		**96**		**102**

Table 3. Frequently described implementation attributes and benefits

Implementation Attributes				Implementation Benefits		
Item	Count	% of Cat		Item	Count	% of Cat
Applications work together	40	13		Improved data accuracy/reliability	61	20
Data sharing	173	57		Lower Costs of support, maintenance	212	70
Common database	127	42		Greater efficiency & productivity	167	55
Real-Time processing	106	35		New or increased functionality	106	35
Record once, use everywhere	121	40		Better management, decisions, analysis	136	45

perception of informants become part of the data, not an inconvenience to be explained away in the search for some objective truth.

DATA ANALYSIS

Content analysis was used to surface themes in the interview data that reflected participants understandings related to systems implementation. The approach suggested by Weber (1990) was used to code the interview data. A set of codes used to classify the data was developed, based on concepts from the research literature and augmented with major additional concepts discovered by the researchers during the coding. We used a content analysis form where each sentence from the interview transcripts was assigned one or more codes. Each data element was coded with an assessment of the level of agreement in code assignments, involving certain degree of recoding of data sources. As this was the first study that uses content analysis about modelling of system implementation in the NHS, certain degree of recoding was considered acceptable.

Table 3 contains a list of the most frequently cited attributes and benefits of system implementation model. The audiotapes were fully transcribed, and individual site summaries were produced before conducting a content analysis of each transcript. After a complete review of all summaries, issues describing IS implementation strategies by iterative examination were identified. Certain themes emerged which were explored using the competing values framework as an interpretive framework where appropriate (see Table 3). The trustworthiness of such analysis has been assessed by triangulation between data sources and exploring any differences in the researcher' interpretations during a couple of follow-up meetings with selected interviewees.

During the period of the field study, there was a continuing, vigorous, informal debate within NHS Information Authority as to the merits of establishing a fault proof IS implementation framework in healthcare, particular for the NHS, during this period of healthcare reform. Benefits in terms of improved quality, greater structure and more discipline were widely accepted.

THE NHS CASE STUDY

The NHS is the institution responsible for all health care and services in the UK with the goal of undertaking this responsibility at no costs to the public, at the point of delivery. The NHS was created in 1948 by a parliamentary art of the UK government of Mr. Howard Wilson, after a national healthcare review by Mr. Black immediately after World War II. Within the past 58 years, the NHS operating environment has changed radically.

The period from late 1980's to early 1990's brought in the advent of competitive bidding bringing long-term increase costs to the management of the NHS, as well as a feeling of internal market within the NHS. By the mid-90's, management of IS in the NHS was division-based. Divisions were spread across several sites and medical functions were centrally controlled. Computing services and IS development project were beginning to be contracted to external private businesses and staff at the NHS were beginning to feel disgruntled and unappreciated. The increasing influence of global communications, Internet and other new technologies demanded a response from the NHS.

In the late 1990's the government increasingly recognized the opportunity to use IT to improve the delivery of service within the NHS. After a series of reviews of NHS IT service delivery, a more integrated and seamless IT organization was recommended (DoH, 2000, Wanless, 2002). The NHS Information Authority embarked on the Integrated Care Report Service (ICRS) project to provide, among other services, a nationwide electronic patient database. The result was a document called "*Information for Health*" that specified the need for the complete automation and integration of various patient information databases in the country (DoH, 2000). The system was commissioned to selected IS service providers at a combined price of $10 billion.

In spite of its vision—to transformation IT—the NHS has a history of introducing large-scale IT development projects that has not been an overall success, with some suggesting a failure rates of between 60 to 80 percent (Brown, 2001). Though the UK public sector spent around $3.5 billion per annually on IT, the failure of major IT-enabled projects were characterized by delay, overspend, poor performance and abandonment (NAO, 2004, p.3). At the political level, it is argued that 'better IT is needed in the NHS because the demand for high-quality healthcare continues to rise and the care now provided is much more complex, both technically and organizationally (Connecting for health, 2004, p.7). About $250 million is spent on management and administration in the NHS, a controversial figure, as many believe more doctors and nurses should be recruited.

THEORETICAL ANALYSIS OF THE CASE

The NHS case study illustrates the dynamic nature of a national healthcare information system implementation, set within the context of a rapidly changing organization. As with all large IT-enabled programs, the success or otherwise of the strategic plan is in its implementation (Herzlinger, 1989; Doolin, 2004; Hendy et al, 2005). The lessons IT costs versus medical decision-making are well documented in the literature and involve the lack alignment between the business and IT strategy (Luftman, 2000); a lack of ownership and leadership of the IT project among senior decision makers (Brown, 2001); poor risk assessment skills (Heathfield et al, 1998); over-scoping of the functional and technical specification leading to IT projects becoming over-budget and late (NAO, 2004); poor communication between program/project managers and potential users of the system (Guah & Currie, 2005); inadequate resources to deliver/implement IT systems (Currie & Guah, 2006).

The empirical research found that issues of project risk were at the forefront of the minds of clinicians, GPs hospital managers and IT staff. Formal project management methods and tools were perceived as offering only part of the solution to mitigate the considerable risks from introducing the NPfIT.

The fragmentation was not just about the diversity of IT systems within the NHS, but also about the political geographical, social, organizational and financial complexity of delivering healthcare.

The overriding view was for the NPfIT to become an integrated IS across and beyond the NHS. The threats to achieving this were perceived by many clinicians to fall within the control of politicians and IT service providers rather than from NHS staff. Project risk mitigation was a complicated issue, compounded by the political and ideological considerations, such as the PFI, which facilitated the increasing use of private sector firms. Whilst the NHS is often characterised as a top-down bureaucracy (Mohan, 2002), past achievements in IT development and implementation had often been initiated at a decentralised (hospital, departmental, unit) level. Although this was now discouraged by the centrist approach of the NPfIT, staff participating in the research expressed concerns that any failures associated with IT project implementation may be labelled '*staff resistance*' rather

than the shortcomings of external constituents, such as politicians, management consultants or IT suppliers.

The success or failure of information systems is inextricably linked with the dynamics of the organization within which they exist. Miranda and Saunders (2002) have demonstrated the complex interaction of technical, social, cultural and political elements that result in a failed IS. Equally, IS success depends on more than technical competence. The cultural and political environment of the NHS is difficult to study as it depends not only on the tangible organizational structure but also on the tacit knowledge and the perceptions of the participants (Guah & Currie, 2005). This is in addition to the cultural and political environment of an organization that is not static but in a rather state of constant flux and dynamic change.

Institutionalism of IS in the NHS is concerned with processes of cultural persistence and change of healthcare processes. The survival of an organization depends as much on conforming to societal norms of acceptable practice as to achieving high levels of production efficiency and effectiveness (Covaleski et al, 1993). Prior work has shown that an organization's formal structure, policies and procedures serve to demonstrate conformity with the institutionalised rules and requirements of external constituents (Meyer & Rowan, 1977; Dimaggio & Powell, 1983). In light of these concerns healthcare in the UK showed that the NPfIT was intended to play a high profile role within the heavily institutionalised environment of hospitals (Scott et al, 2000).

The vision for NPfIT was infused with the institutional logics more commonly associated with the private sector, as an innovation that would contribute to greater productivity, efficiency, cost control and customer satisfaction in healthcare delivery. Paradoxically, this externally directed institutional logic served to under represent and simplify the vast complexities and contradictions in how it was perceived, and reacted to, by those affected by government-led IT-enabled changed. Within the NHS, staff were increasingly sceptical about the merits of private sector logics, such as the PFI initiative, as their values, norms and goals invariably placed financial considerations secondary to choices about patient care.

CONCLUSIONS

The primary contribution of this paper has been to provide a theoretical basis drawing from Institutional theory, which was used to analyse the NHS implementation of NPfIT. The theorization goes beyond the relatively simplistic types of studies which dominate the IS literature today. Much to the contrary, it has been shown that an implementation strategy can accommodate elements such as the links between culture, contradiction and conflict, an analysis of detailed work patterns, and the dynamic and emergent nature of political involvement at national level.

The theory has been illustrated using limited empirical examples only, with a focus on the NHS systems, but it could be used to analyse any case study involving healthcare systems from any parts of the developed world. Viewed from a more critical perspective, however, any theory illuminates some elements of particular case situations and is relatively silent on others. The NHS has grown within an environmental niche that arose out of a complex interaction between the national healthcare environment, business environment, the organizational environment and the people within the NHS. Changes within the organization subsequently rendered the environment hostile to the NPfIT which was affected by its changing links with organizational structure and people, the changing responses of people within the NHS to the environment around them, and the changing individual and collective mindsets and understanding of those people. While a detailed discussion of ways in which this can be achieved is beyond the scope of this paper, some broad approaches have been mentioned.

In the current environment of increasing demands for better quality of healthcare from patient and seemingly reduced amount of funding from National governments, the need for suitable institutional theory is increasingly common and the IS field must increase its understanding of the problematic issues involved and approaches to resolving them. It is hoped that this paper makes a modest contribution to these goals.

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