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Theorising big IT programmes in healthcare: Strong structuration theory meets actor-network theory

Trisha Greenhalgh [a,*], Rob Stones [b]

[a] University College London, London, United Kingdom
[b] University of Essex, Essex, United Kingdom

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ABSTRACT

The UK National Health Service is grappling with various large and controversial IT programmes. We sought to develop a sharper theoretical perspective on the question "What happens – at macro-, meso- and micro-level – when government tries to modernise a health service with the help of big IT?" Using examples from data fragments at the micro-level of clinical work, we considered how structuration theory and actor-network theory (ANT) might be combined to inform empirical investigation. Giddens (1984) argued that social structures and human agency are recursively linked and co-evolve. ANT studies the relationships that link people and technologies in dynamic networks. It considers how discourses become inscribed in data structures and decision models of software, making certain network relations irreversible. Stones' (2005) strong structuration theory (SST) is a refinement of Giddens' work, systematically concerned with empirical research. It views human agents as linked in dynamic networks of position-practices. A quadripartite approcach considers [a] external social structures (conditions for action); [b] internal social structures (agents' capabilities and what they 'know' about the social world); [c] active agency and actions and [d] outcomes as they feed back on the position-practice network. In contrast to early structuration theory and ANT, SST insists on disciplined conceptual methodology and linking this with empirical evidence. In this paper, we adapt SST for the study of technology programmes, integrating elements from material interactionism and ANT. We argue, for example, that the position-practice network can be a socio-technical one in which technologies in conjunction with humans can be studied as 'actants'. Human agents, with their complex socio-cultural frames, are required to instantiate technology in social practices. Structurally relevant properties inscribed and embedded in technological artefacts constrain and enable human agency. The fortunes of healthcare IT programmes might be studied in terms of the interplay between these factors.

Introduction

The following data fragments are taken from some ongoing ethnographic research studies. The first two address components of the £12 billion government-funded UK National Programme for Information Technology (NPfIT); the third considers a different technology-supported policy in the National Health Service (NHS). They are taken from an interim analysis document made by the principal investigator and provide an important reference point for the arguments of this paper, since our theoretical position depends on the analysis of specific conjunctures at a particular time and place.

Data fragment 1

Our team wanted to observe the use of a newly introduced electronic outpatient booking service (Choose and Book), which allows general practitioners (GPs) to offer their patients a choice of hospital and clinic date, and book the appointment in real time. When we applied for the grant, a quarter of practices in our intended field site used Choose and Book. We anticipated catching the late majority of adopters. But by the time the research began in mid 2008, all but one practice had abandoned it – allegedly because the technology did not "work" properly.

Data fragment 2

Summary Care Records (SCRs, centrally stored, Internet-accessible summaries of patients' medical records) had recently been introduced in one area, though uptake and use had been slow. A commercial IT company offered to fund a pilot study in which district nurses were issued with Portable Digital

* Corresponding author. Professor of Primary Health Care, University College London, Holborn Union Building Highgate Hill, London N19 5LW, United Kingdom. Tel.: +44 20 7288 3246; fax: +44 20 8343 1348.
E-mail address: p.greenhalgh@ucl.ac.uk (T. Greenhalgh).

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Assistants (PDAs) so they could access the SCRs of patients visited on their rounds. The nurses were positive about the scheme, though few regularly called up patients' SCRs. Their enthusiasm seemed due to a combination of perceived appropriateness (as a mobile workforce, they should have a mobile technology); the PDA's general communication functions (e.g. Internet access); and their optimistic hope that the current 'clunky' technology would develop into a universally-accessible, fully integrated electronic patient record.

Data fragment 3

Almost all GP practices in the UK now use electronic records, known as local detailed records (LDRs). We found that considerable work went into constructing the LDR (for example, by adding coded data via pull-down menus) and keeping it up-to-date. A high proportion of this 'data quality' work was oriented towards a financial incentive scheme known as the Quality and Outcomes Framework (QOF), a government-funded initiative oriented to promoting evidence-based care of chronic diseases and increasing the transparency and accountability of GPs' performance.

These data fragments illustrate the pervasive presence of 'big IT' (large-scale technology programmes) in UK healthcare and the strong influence of both government and the IT industry. Such programmes, built on a vision of a 'modernised' health service that is fully networked, integrated, largely paperless, and uses standardised decision protocols, are seen by policymakers as key to improving the quality, efficiency and safety of healthcare (Department of Health, 2008). But they have also been criticised as grandiose, unfit for purpose, ethically naïve, poor value for money, distorted by commercial interests and dogged by delays and scope creep (Kreps & Richardson, 2007).

In considering how we might explore aspects of these polarised perspectives, we began with the question: "How do we begin to theorise what happens at macro, meso and micro levels when government tries to 'modernise' a health service with the help of big IT?" The paper is an attempt to initiate a theoretical frame that is broad enough to encompass all these relations, and which is precise and disciplined enough to provide empirically substantiated propositions. Both macro (e.g. policymaking, contracting) and micro (e.g. the clinical encounter) feature a complex interplay of influence, authority, the pursuit of goals, and the allocation of resources within a particular set of social norms, meaning-systems, and constraints.

Given that the clinician–patient relationship is an intimate and sensitive one, new technology typically involves subtle but potentially far-reaching changes in roles, identities and mutual expectations. Occasionally (when it "works"), technology makes possible new or more efficient ways of communicating and interacting for staff and patients. At other times, it is associated with disorder, inefficiency, and the need for stressful workarounds. The same technology may meet the former fate in one setting and the latter in another. Context matters. Furthermore, since investment decisions made in Whitehall directly influence technologies available to clinicians, and since, conversely, clinicians can and do refuse to use technologies they see as unfit for purpose, the macro and micro levels are closely and reciprocally related. Meso-level structures such as NHS organisations, professional bodies (e.g. British Medical Association) or civil liberties groups (e.g. see www.thebigoptout.com) mediate the relationship between the micro and macro and may allow particular actors greater or lesser influence in particular situations.

Extending previous taxonomies (Orlikowski & Baroudi, 1991; de Vaujany, 2005), we suggest that research on information systems generally takes one of four broad philosophical positions:

- *Positivist*, which assumes an external and knowable reality that can be objectively measured; an impartial researcher; and the possibility of producing generalisable statements about the behaviour of the natural and social world;
- *Interpretivist*, which assumes a socially constructed reality that is never objectively or unproblematically knowable and a researcher whose identity and values are inevitably implicated in the research process;
- *Critical*, which assumes that the social order is inherently unstable, and that the purpose of research is at least partly to help the oppressed challenge their position in society;
- *Recursive* (or integrative) which assumes that subject and object, micro and macro, social structure and human agency are reciprocally related, and that the purpose of research is to explore the flux between these various dualities over time.

Healthcare is traditionally a positivist field of enquiry. But the limits of technological determinism – the assumption that technology X will predictably produce impact Y notwithstanding barrier Z, and that the role of the researcher is to measure Y and overcome Z – are increasingly recognised (Greenhalgh, Potts, Wong, Bark, & Swinglehurst, 2009). In recursive traditions, researchers do not study 'technologies' and 'contexts' separately but technologies-in-use. In other words, context is not simply a given external milieu whose properties can be measured from afar and controlled for (positivist), nor is it merely a conceptual frame through which the technology is given meaning (interpretivist). Rather, context is a complex and emergent outcome of the interplay between social actors and their organisational and technological infrastructures, generated and regenerated when human actors use technologies in particular ways for particular purposes.

In this paper, we seek to develop and align recursive approaches to the study of big IT. We argue that social structures, human agency and technologies each exist in a recursive relationship with the other two, and that all three co-evolve in complex and often unpredictable ways over time. We describe two different recursive approaches, structuration theory and actor-network theory (ANT), and highlight their strengths and limitations for addressing the questions we posed above. We then introduce strong structuration theory (SST), which potentially overcomes some of the limitations but which has not previously (to our knowledge) been applied to the study of technology programmes. We suggest how the latter might be enhanced by concepts from Dant's notion of materialist interaction and then combined with selected aspects of ANT to produce a new way of conceptualising, theorising and empirically exploring the co-evolution of technologies and the social order.

Our own backgrounds are relevant here. TG is an academic general practitioner with a first degree in social and political sciences who researches innovation and change in healthcare organisations. RS is a professor of sociology who developed SST as a means of enhancing structuration theory's potential for guiding empirical research in diverse fields. Both authors are committed to building bridges between theoretical approaches to address empirical questions.

Structuration theory and technology structuration

In his theory of structuration, Giddens sought to bring together objectivist social theories (which assume that a hard social reality exists independently of individual actors and is to a large extent deterministic of their actions) and subjectivist ones (which assume that no social reality exists except the one that individuals construct in their interpretations and perceptions) (Giddens, 1984). Social actors are knowledgeable, active agents who may either reproduce social structures faithfully or choose to change them by