

Reflecting on Time, Timing and Timeliness in Public Sector Supply Networks

**Louise KNIGHT
Dr Helen WALKER
Dr Nigel CALDWELL
Professor Christine HARLAND**

**Centre for Research in Strategic Purchasing & Supply (CRiSPS),
University of Bath School of Management,
BATH, BA2 7AY, U.K.**

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Tel: +44 (0)1225 383146

Fax: +44 (0)1225 383223

E-mail: Caldwell

mnsndc@management.bath.ac.uk

Harland

mnsch@management.bath.ac.uk

Knight

mnslak@management.bath.ac.uk

Walker

mnshlw@management.bath.ac.uk

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Abstract

Despite recent research on time (e.g. Hedaa & Törnroos, 2001), consideration of the time dimension in data collection, analysis and interpretation in research in supply networks is, to date, still limited. Drawing on a body of literature from organization studies, and empirical findings from a six-year action research programme and a related study of network learning, we reflect on time, timing and timeliness in interorganizational networks. The empirical setting is supply networks in the English health sector wherein we identify and elaborate various issues of time, within the case and in terms of research process. Our analysis is wide-ranging and multi-level, from the global (e.g. identifying the notion of life cycles) to the particular (e.g. different cycle times in supply, such as daily for deliveries and yearly for contracts). We discuss the ‘speeding up’ of inter-organizational ‘e’ time and tensions with other time demands. In closing the paper, we relate our conclusions to the future conduct of the research programme and supply research more generally, and to the practice of managing supply (in) networks.

Introduction

Time research spans a range of different disciplines, such as the sociology, social psychology, anthropology and philosophy of time (Ancona et al., 2001); within management and organizational research, the study of time has increased in recent years. Organizational research is susceptible to fads and fashions (Gibson & Tesone, 2001), and research topics reflect the academic *zeitgeist*, or ‘spirit of the times’. Investigating time in organizational life is perhaps an area with a certain currency at the present time; it is however by no means a mainstream management research approach – and certainly not in applied work. In this paper, time, timing and timeliness are considered from our experiences of researching in interorganizational public sector supply networks. The work on supply strategy that we present here is unusual in two respects. First, it is applied, in the sense of being the product of working with practitioners. Second, it deals with supply in interorganizational networks, an area dominated by linear, positivistic thinking. This is an important issue in that where we can cite work in the area of interorganizational studies it is very much at the margins of the field. Our research question here is: ‘What can a temporal perspective bring to research in public sector supply networks?’; we address it in terms of both the process and the subject of research.

This paper begins with a review of relevant literature on issues of time in: (a) organizing and organizations; (b) work that is relevant to supply; (c) research design and process. Next, a section on research context describes the supply strategy research programme and the learning study, providing an overview of their objectives and methods. One health service supply network – the English prosthetics service – has been particularly important to both the programme and the study; this network is described in terms of its current structure and a brief history of its development, focusing on the public-commercial sector interface. Then, drawing on this empirical case, we discuss time, timing and timeliness relating to the network, and our experiences of researching it. In concluding, we reflect on the benefits for researchers and practitioners to be gained by adopting a temporal perspective, and suggest particular topics for further investigation.

Conceptions of time in organizing and organizations

Some organizational theorists suggest temporal issues have not been given the attention they deserve. Das (1993: 269) suggests that time is neglected on the agenda of social inquiry due to ‘the unexamined conception of time in terms of the clock and the calendar’. Different types of time have been described, such as clock time, linear time, uniform time, cyclical time, subjective time and event time (Ancona et al., 2001). A distinction can be drawn between clock time and social time (Lee & Liebenau, 1999). Clock time, that is homogeneous and divisible in structure, linear and uniform in its flow, is closely associated with the development of industrial society (Bluedorn & Denhardt, 1988).

Time became a commodity of the production process, and harnessing time was behind management trends such as Taylor’s Scientific Management. Conceived in this way, time is an objective parameter rather than an experiential state (Fabian, 1983), and has been called the ‘linear-quantitative tradition’ (Hassard, 1989), or the ‘Newtonian conception’ (McGrath & Kelly, 1986).

Social time recognizes time as a phenomenon that is subjectively experienced and socially constructed, and which varies between and within societies (Bluedorn & Denhardt, 1988). Different social groups construct time in different ways. For example, Judeo-Christian societies imagine time as a straight line (Cahill, 1998), whereas the metaphor of the cycle dominated primitive concepts of time. Goddard (2001) investigates how social time is perceived and used in organizations, highlighting the need to understand time from the perspective of individuals as well as organizations. Ancona et al (2001) identify aspects of time in organizational research such as how actors relate to time (e.g. experience of time, time dragging) and mapping activities to time (e.g. scheduling, cycles).

To clock and social time, Hassard (2001) adds the compression of time. Clock time is being replaced by 'instantaneous-time' (Macnaghten & Urry, 1998), signified by a throw-away society, temporary jobs, a break down in distinctions between home and work time, and an increasing sense that the 'pace of life' has got too fast.

Economic and organizational history has also been popular with management theorists, some seeing time as linear, some as cyclical. An organization's history has been used for strategic problem-solving (Hopkins, 1999). Chevalier (2002) examines cycles in economic history, and suggests we are about to enter a golden age. George and Jones (2000) suggest that contingency theory and transaction cost theory need to incorporate explicitly the effects of past and future to make their explanations of behaviour more realistic. In contrast to other academic disciplines, Brady (1997) argues that management has no history, partly because of its emphasis on future solutions to current problems. Economic development is seen as linear not circular; we will not come this way again.

A lack of reflection upon lessons from business history may lead to expensive mistakes. Chancellor (2002) puts the philosophy of shareholder value in its historical context, and in the wake of recent scandals (e.g. Enron) suggests, what he calls, this 'fad' has had its day. Fukuyama (1999) controversially distinguishes between linear and cyclical history in different spheres. He argues (p. 282):

"There seem to be two processes working in parallel. In the political and economic sphere, history appears to be progressive and directional, and at the end of the twentieth century has culminated in liberal democracy as the only viable alternative for technologically advanced societies. In the social and moral sphere, however, history appears to be cyclical, with social order ebbing and flowing over the space of multiple generations. There is nothing that guarantees there will be upturns in the cycle. Our only reason for hope is the very powerful innate human capacities for reconstituting social order. On the success of this process of reconstitution depends the upward direction of the arrow of History."

This brief review of some conceptions of time and history in management and organizational research identifies various facets of time and temporal perspectives that may prove useful to the examination of supply networks, which are discussed next.

Conceptions of time in supply networks

Industrial network research led to the conception of markets as networks of connected actors, resources and activities (Ford, 1990; Axelsson & Easton, 1992; Grabher, 1993). Both stability and change characterise business networks (Ford, 1990), and business relationships are often of a long-term nature. Easton & Araujo (1994) discuss market exchange in terms of social and temporal context and industrial networks. They introduce a "picture of firms occupying positions and performing roles in a network of relationships, social and historical entities whose location in space and time matters." (p.81). Experiential learning from past interactions and anticipations of the future merge past, present and future in a continuum. Interdependence, one of the preconditions of networks, benefits from a temporal perspective, considering whether there has been reciprocity between actors in the past, and might be in the future.

Using actor-network theory, Kavanagh & Araujo (1995) present a multi-layered view of time in which different temporal frames co-exist, and are the products of heterogeneous networks combining associations of human and non-human elements. Networked or virtual organizations

are made up of collaborators distributed across time and space. Distributed teams can work together synchronously or asynchronously aided by information and communication technologies.

Hedaa and Törnroos (2001) distinguish between chronology and kairology, a term denoting the theory of appropriate timing for action in different management situations and contexts. Timeliness concerns an opportune time, the 'right time' for action, although an actor may or may not recognize it. Weick (1995: 86) raises the question: "How do you know when an event should be ignored (to let it pass) or something to pursue?" It may only be with the benefit of hindsight that one can identify what would have been the 'right time'.

Time and timing in research design and process

In this section, we draw out the interplay between the treatment of time, the research design, and the outcome in terms of audience. The treatment of time reveals something about the researcher, the intended research outcome, and those being researched, in addition to the topic under discussion. For example, it is accepted that the epistemological stance taken by a researcher affects what assumptions are made about the possibility of generalisability. It follows from positivists' belief structures that time- and context- free generalisations are possible, whereas researchers from a more interpretative perspective believe only time- and context- bound hypotheses are possible (e.g. Lincoln & Guba, 1985).

George and Jones (2000) argue that time should play an important role in theory and theory building. They propose that as human activity is inseparable from time, it is incumbent on theory attempting to explain behaviour in and between organizations to take into account the multi-dimensional nature of time. Avital (2000) suggests a social process is not an isolated event in a vacuum, but in continuous motion, and cannot be stopped for the sake of observation. Pettigrew (1985a; 1987) argued that the majority of research on strategic change is 'ahistorical, aprocessual and acontextual in character'. To address this, he emphasises the recursive influences between the context, content and process of strategic change, and has described a 'contextualist theory of method' (Pettigrew, 1985b, 1990).

One of the most time defining aspects of applied management research is the expectations of 'clients' or project sponsors. Sponsors may not be aware of the influence their epistemological positions have on the outputs they receive; however it is usually them who set 'deadlines', 'milestones' and 'deliverables' that both punctuate, and pin point moments in, time. It may be a unique feature of the work presented here that it has been possible to work with the sectors discussed over a period that might seem excessive in certain 'for profit sectors'. In some senses in this work time has been 'on the researchers' side', and yet as we mention, it did not appear that way to the researchers involved in the process, and as has been stressed, time was not singled out either by the researchers or the researched as a pressing discrete issue. Indeed this paper perhaps only arises out of the ability to absorb and distance experiences and feelings about the action research from individual and cumulative circumstances.

It has been suggested that aspects of time have been omitted to the detriment of organizational research (Zaheer et al., 1999; Goddard, 2001). Zaheer et al (1999) suggest that choice of time scale has a significant impact on the development of theory. Time in organizational theory has important implications that have not been examined in a thoughtful discourse (Goddard, 2001). We are in no way exceptional to have overlooked temporal issues in our research in public sector supply networks. Here we set about examining and evaluating our recent research through a temporal 'lens'. This approach is unusual and novel in supply network research; few researchers have addressed time issues in this field. Prompted by Hedaa and Törnroos (2001) paper and presentation at last year's IMP conference, this paper presents our initial attempts at a more explicit analysis of these issues.

Research Context

Since the mid-1990s, in a collaborative research programme with the National Health Service (NHS) Supplies Authority and subsequently the NHS Purchasing and Supply Agency (NHS PASA), we have studied supply strategy (Harland et al., 1999) and the implementation of strategic approaches to managing supply in health service supply networks in England. NHS PASA is an

executive agency of the UK Government's Department of Health, which provides a policy lead to the English NHS on matters relating to purchasing and supply.

Supply networks are seen as comprising: (1) commercial and public sector organizations linked by economic exchange associated with the production, delivery and performance of goods and services; (2) organizations that have direct influence over the supply process, the end product and its usage, such as regulatory agencies, policy makers, research and development institutions, and trade associations; (3) the relationships between network members (Knight & Harland, 2000). Collectively, organizations in health service supply networks provide products and/or services to the networks' 'end consumer' (Harland, 1996); the consumers may be health professionals, such as surgeons who decide which surgical instruments to use, or patients, in cases where they are more actively involved in prescribing decisions (e.g. for wheelchairs).

Longitudinal data are gathered through action research (Eden & Huxham, 1996), participant-observation (Easterby-Smith et al., 1991: 96-101) and qualitative interviewing (Rubin & Rubin, 1995), and interpreted through abductive reasoning (Coffey & Atkinson, 1996: 155-156; Dubois & Gadde, 1999), to develop theory and practice in supply. Projects and publications within the programme have covered different aspects of supply strategy: some are more practice-oriented, others more conceptual; some relate to supply strategy generally, others to a specific issue such as outsourcing; some provide a network-level analysis, others relate to organizations within networks.

In this work, we have: (i) acquired an exceptional body of longitudinal data relating to a broad range of health service supply networks, and an organization (NHS PASA) which plays a key role within them; (ii) undertaken various network, sector, organization and team level analyses, focused on network structure (i.e. actors, their relations and resource configurations), strategies, issues (e.g. outsourcing and e-commerce) and practices (e.g. developing and implementing supply strategies; managing supply markets); (iii) used theories from other fields of organization studies, for example role theory and social capital, to (re)analyse data. Issues of process, and time, timing and timeliness, are central to all these activities; however, to date, our treatment of them has tended to be implicit.

The study of network learning has also been undertaken in health service supply networks and, since learning is about change over time, it has involved issues of time and an explicit processual perspective. Supply networks have a core purpose, a history, structures and routine operations; however, they are not static, and strategic change in the network that has implications for network-level properties can be seen as network learning – learning by a group of organizations *as a group* (Knight, 2002; Knight & Pye, 2002). Strategic change related to a particular issue, such as the introduction of a new technology or changes to governance arrangements, can be bracketed (Weick, 1979: 120) as a 'network learning episode' (Knight, 2002). Within an episode, changes to network-level properties are learning outcomes, and changing is seen as learning process.

The empirical phase of this research study involved gathering retrospective and real-time data through participant-observation, interviewing and documentation on network learning in the context of, principally, the English prosthetics (artificial limbs) network. Participant-observation began in 1997, as part of the programme described above, and is on-going; interviewing was undertaken between November 1999 and May 2002; documentary sources date from 1986. Five network learning episodes were identified; of these, the CONTRACTING episode is especially relevant to the supply strategy research programme since it relates changing views about competition, competitiveness and the public-private sector interface to local contracting practices and their implications for market structure. In the next section, the prosthetics supply network case is described, with a focus on changes to contracting between the commercial sector and the NHS.

Empirical Case: The Prosthetics Service Network in England

The current, key actors and relationships in the English prosthetics service network are illustrated in Figure 1. In England, most amputees and people with congenital limb deficiencies receive publicly funded care through one of 34 specialist NHS Disablement Service Centres (DSC / Centre). Typically, a Centre is commissioned by a number of health authorities to provide services, and many health authorities send patients to more than one DSC. Prosthetists and technicians

(P&T), most of whom are employed by commercial companies under contract to DSCs, are part of the clinical team, along with NHS employed doctors, nurses, therapists and rehabilitation engineers.

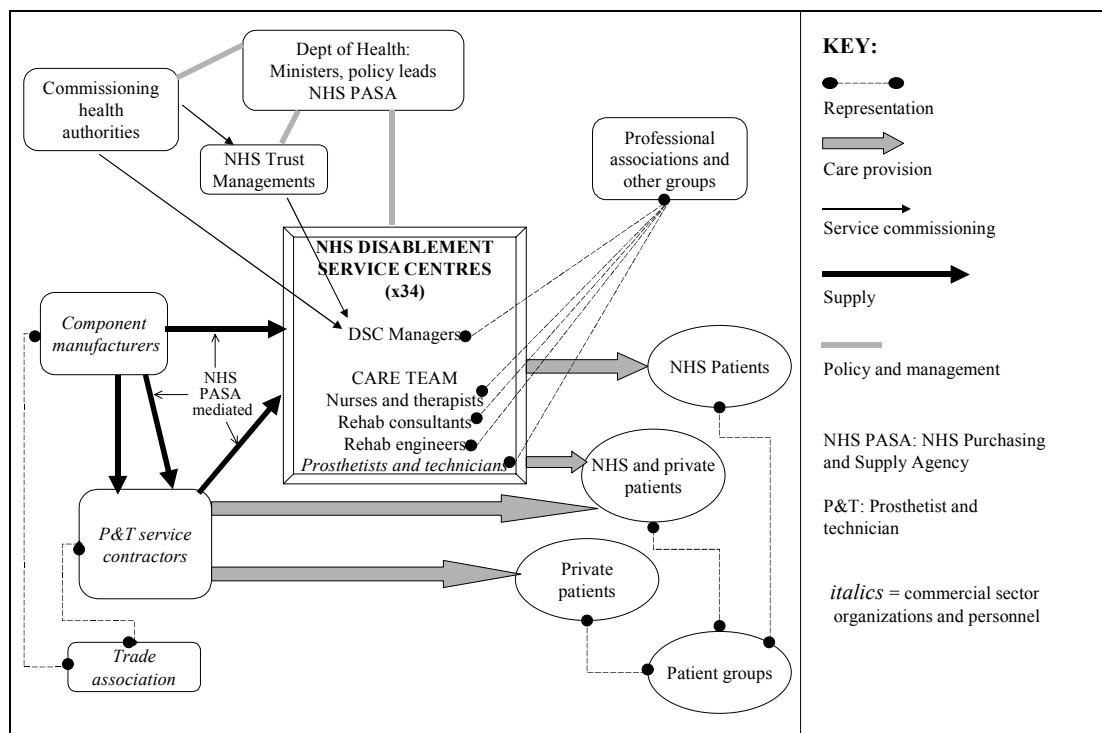


Figure 1: Illustration of the prosthetics supply network in England (Source: Knight, forthcoming)

The Rehabilitation Services team at NHS PASA manages a framework agreement against which Centre staff order componentry, and provides a procurement consultancy service to the 32 Centres which buy-in P&T services. The team advises Centres about contracting for services, but the award decisions rest with the senior management of the hospital Trusts at which DSCs are based. The level of influence that DSC managers have on their hospital Trust’s decision varies widely.

Most of the professions have an active professional association; most suppliers are active members of the British Healthcare Trade Association (BHTA). There are several national organizations that represent limbless people. At a local level, many Centre Managers have set up user groups, to aid consultation and communication.

In the early 1980s, regional ‘limb centres’ were centrally managed by the national Department of Health and Social Security (DHSS). Suppliers of limb-fitting services and limb componentry were remunerated, in effect, on a limb-by-limb, cost-plus basis. Through its three subsidiaries, one firm – Company A – controlled c. 70% of the market for the supply of lower limbs. Relations between those companies and the DHSS were conflict-ridden and, at centre-level, contracting arrangements also promoted conflict between companies’ prosthetists and rehabilitation engineers who monitored and valued work done. The quality of the service in terms of limb fit, function and comfort was poor, and very slow. Suppliers were seen to be making excessive profits, and to have an inappropriate level of control over prosthetists, since suppliers controlled their training and education, which tended to only cover their own company’s products.

In January 1986, a Government-commissioned review was published (McColl, 1986); among other recommendations in its highly critical report, the working party wanted to see: “the close-knit suppliers’ ring opened not only to competition from companies at home and abroad but also to small independent prosthetists who want to set up in businesses of their own (and) the contracts with suppliers re-drawn” (p. 5). This was followed by an investigation of a monopoly in the supply of artificial lower limbs in the United Kingdom by the Monopolies and Mergers Commission (MMC); its April 1989 report found that Company A and a fourth supplier – Company B – both exercised monopolies and “(Company A) conducted its business and might

be expected to conduct of its business in a way which operates against the public interest; (Company B), however, had not” and recommended that “(Company A) should be divided by the divestment” of either or both of two of its subsidiaries (1989: 12).

Over the last fifteen years, the structure of the entire network has changed radically. In 1988, funding for prosthetics services was devolved from the DHSS to local health authorities, and responsibility for managing Centres was transferred to local NHS hospital Trusts. For the first three years, this funding was ring-fenced, but thereafter health authorities and Trusts were free to re-negotiate spend. The NHS Supplies Authority (NHS Supplies), NHS PASA’s predecessor, was established in 1991 and took an active role in co-ordinating competitive tendering for P&T services; each Centre tendered annually, and many came under considerable pressure from Trust managements to reduce their expenditure.

Company A and two of its subsidiaries ceased trading with the NHS in England. With government assistance for their start-up costs many (12-15), new small firms were established by prosthetists. To begin with, they were effectively ‘freelance’ professionals working in a centre. Through repeated tendering rounds, these companies came under increasing pressure to raise quality standards and reduce costs. Gradually, firms merged or ceased supplying services to the NHS. By 1998, there were once again only four commercial suppliers of P&T services to the NHS – Company B (see above); Companies C and D that were formed through mergers of ‘freelance’ companies; Company E, which had long established operations in other countries, initially began by supplying componentry, but later moved in to the service market. All four also manufacture and distribute componentry.

From the mid-1990s, in line with developments in ‘best practice’ in contracting and partnership working in the public (Huxham & Macdonald, 1992) and commercial (Lamming, 1993) sectors, the NHS Supplies/NHS PASA team has promoted a focus on value for money rather than lowest cost, introduced an ‘annual fee’ style of contract in which suppliers are paid a monthly lump sum to cover all staff expenses and low cost componentry, and high cost componentry is reimbursed at the cost listed in NHS PASA’s framework agreement. There have also been other local and sector-level attempts to engender closer working between Centres and suppliers. In some Centres, this has worked well, but elsewhere there is still considerable mistrust in some quarters between professions, and between commercial and NHS people.

Through competitive tendering, the level of spend on these contracts has reduced dramatically, from £53.3 million in 91/92 to £36.4m in 99/00, which reflects reductions in suppliers’ costs and their margins. If margins drop too low, suppliers may be motivated to quit the market; together with the sudden shifts in market share that can arise when several centres competitively tender P&T services at the same time, this has potentially important implications for the long-term stability and sustainability of the market. Centre Managers, NHS PASA and the BHTA have been working together to identify what can be done to mitigate the risks at the supply market level of local contracting decisions; any actions that are taken need to be pursued in the context of the EU public procurement regulations and competition legislation.

In 1998, the NHS PASA team facilitated the establishment of the ‘Prosthetic Strategic Supply Group’ (PSSG), which includes representatives from all the different types of organizations in the network mentioned above. Its aim is to identify, prioritise and facilitate change within and across organizational boundaries to improve network performance. NHS PASA personnel chair and co-ordinate the Group’s activities, which include quarterly meetings and sub-groups established to address specific issues. For example, the PSSG has recently issued guidance for commissioners and other stakeholders, within the framework of key phases of amputee care. Another sub-group has developed a contracting template, initially designed by NHS PASA, to support outcome-based performance management.

Discussion

Issues of time in the empirical case

There are a variety of ways in which time can be analysed and interpreted in the prosthetics supply network. Temporal issues are related here to patterns of time and timing in the routine

operations of the network (i.e. its 'steady state'), and changes across levels and over time, some of which are one-off events, whereas in others we can discern time-related underlying patterns, such as cycles. We consider how developments occur over time (e.g. the 'unfolding' of a network learning episode), and when the time is right for action. The aim of Table 1 is to show the many different 'angles' we can take in the analysis (levels, actors, processes, etc). Different aspects of change in the network are given, contrasting routine, evolutionary change and formative change events. The complex, recursive influences between these different angles and aspects of change are also alluded to in Table 1. 'Change events' punctuate network history, but discontinuities are also apparent between and within aspects of network routine and evolutionary change; for example, between the routines of patient care and of management, or between prosthetists' career patterns and developments in contracting and clinical practice.

The prosthetics network has a long history; the publicly funded artificial limb service was established to meet the needs of the amputees from the First and Second World Wars. BLESMA – the British Limbless Ex-Servicemen's Association – is still the largest patient group. One supplier was established over 100 years ago. We could take our analysis back that far, but we don't; instead we take the late 1980s when the McColl (1986) and MMC (1989) reports were published with recommendations which led to major changes which shaped the network today as our starting point for the case (this is not an arbitrary choice – it reflects what was said in interviews).

We can identify a number of time-related factors that influence the pace of the unfolding of change. For example, contracting cycles between suppliers of P&T services and Disablement Service Centres; government spending reviews which determine central investment in health; the speed with which suppliers can evaluate a business proposition, make a decision and implement it; the annual financial cycle in trusts, and between trusts and commissioners. These factors serve as opportunities for managers to make decisions about the allocation of resources and to adopt new ways of working, and so align practices and values, culture etc. Substantial changes can occur when, and only when, certain factors align. Some things come about when the 'time is right'.

The drivers for fundamental changes to network structure are government organization of the service (specifically) and changes in the NHS generally (e.g. clinical governance and multi-disciplinary team working). The impact on the NHS Centres is direct and immediate, but its effect on suppliers is indirect and there is a substantial time lag before changes to the supply market become apparent. At a local level, the structure of the network is determined each time a P&T service contract is tendered; this is also when there are opportunities for fundamental change in the way suppliers work in Centres. With each round of contracting since devolution, the typical duration of the service contract has lengthened. Ten years ago contracts were tendered annually; now, 7 and 10-year contracts with a 2 year option to extend are commonplace. Thus, from one perspective, the rate of change is slowed.

The cycle of number of contractors in the field – from 4 to c.15 to 4 in the space of ten years – prompted some to worry about / work on market structure. (The 'irony' of the return to the exact starting point in terms of numbers of contractors is not lost on network actors. A feature of this work has been the 'seen it all before' comments: that if one works for long enough in the public sector, the cyclic nature of initiatives becomes apparent.) But there were other prompts working in tandem: through its supply strategy research, CRiSPS were advocating that supply strategies should include sector-level management of supply. Some of the teams in NHS Supplies (especially Rehab) were recognising and working on opportunities to do this. In April 2000, the NHS Purchasing and Supply Agency replaced NHS Supplies. Where the latter was responsible 'only' to provide a logistics and contracting service for the NHS, NHS PASA is formally remitted to take a policy lead on supply. A 'new' time or gateway to change came about then through several things coming together / aligning, to enable new ideas and actions, and lead potentially to strategic change in supply.

	Network 'routine'	Evolution / progressive developments	Events: sudden, one-off changes
Patient care	<p>Long-term relationship between Centres and patients. Ideally, patients have pre-amputation counselling, which can have significant impact of care outcomes.</p> <p>New patients are managed differently to established limb wearers.</p>	<p>Transition from conventional limbs to modular limbs and associated reconfiguration of workshop facilities etc.</p> <p>Speed of service unheard of elsewhere in other hospital trust based NHS services: patients typically wait five to ten working days for an appointment. Some centres provide emergency, same-day service, but this response rate is at the expense of patient-prosthetist continuity of care</p>	<p>Company A (supplier to privately funded patients) importing silicone cosmesis production technology from USA.</p> <p>Government announcement of £4million over 3 years to fund improving cosmesis.</p>
Prosthetics profession	<p>Duration of education and level of experience of newly-qualified prosthetists: Companies used to train their best technicians to be prosthetists – newly qualified prosthetists were middle-aged men with considerable experience of the service. Now newly qualified prosthetists (NQPs) are typically young, relatively inexperienced graduates. Apart from impact on culture within the service, Centre Managers and service suppliers have to do more post-qualification training and provide more support for NQPs, which has significant implications for staffing levels and work patterns.</p> <p>When the P&T contractor at a Centre changes, prosthetists transfer to their new employer; apart from having to get used to different management styles, several changes of employer in a career can be detrimental to prosthetists' pensions.</p>	<p>Progressive development of prosthetists' status as professionals through establishment of professional association, designation as Profession Allied to Medicine (now called Allied Health Profession), changes to clinical practices.</p> <p>Government policies re clinical governance and allied health professions mean that prosthetists must now spend more time doing CPD and also keep better patient records. Also spending more time on 'softer' aspects of patient care, such as pre-amputation counselling. Demands on their time partially offset by new process technologies such as CAD/CAM.</p>	<p>Establishment of undergraduate course at Salford University to replace company dominated college courses (as recommended in the McColl report).</p>
Centre management	<p>Annual budget cycle.</p> <p>Reviews with Trust management, and commissioners.</p> <p>Twice yearly Centre Managers' Forums.</p>	<p>Adoption of annual fee style contracts to buy-in P&T services.</p>	<p>Relations with new commissioning bodies (Strategic Health Authorities) established in April 2002.</p>
CONTRACTING	<p>Contract terms.</p> <p>Regular management meetings and performance reviews.</p> <p>BHTA and PASA meetings.</p>	<p>Views of what the supply market should look like and how that might be achieved.</p> <p>Views of how competitive tendering and contract management should be done at a local level.</p> <p>Views of how commercial companies and public sector should work together.</p>	<p>Company merger that brought the number of suppliers to NHS of P&T services back to 4.</p> <p>Sudden changes to supply market structure which occur when many centres tender in the same year.</p>

Table 1: Examples of time issues in the prosthetics network.

However, things change at different rates, which can lead to (temporary) misalignment. For example, whilst there is widespread support for new initiatives such as integrated care pathways, multi-disciplinary teams, patient involvement, etc., these developments require important changes in relationships, with some parties being entrusted to take on new responsibilities and others ceding traditional positions of power. The pace at which relations adjust, competence for new roles is developed and resources are allocated is often not in step with timetables set out in government policy.

Turning to electronic communication (and other) technologies much has been made of these speeding up and (though less well reported) slowing down business and public services. In prosthetics, patients can now easily access information on the www; CAD/CAM reduces the amount of time needed to make stump sockets; componentry stock levels can be reduced; communication within and between parts of the network becomes cheaper and quicker. One of the arguments deployed against some actors' moves to bring P&T services in-house is that commercial firms can respond faster in 'routine' management (e.g. arranging cover if a prosthetist is on long-term leave) and in introducing change (e.g. capital investment in equipment such as CAD/CAM). However opposing forces to this speeding up process emerge, not everything is getting faster: longer-term contracts mean that opportunities for radical changes may be fewer; the ageing population and improved medical treatments mean that there are more amputees who need care for longer; the emerging management of strategic change at sector-level is more complex and takes more time than local change; collaborative relations inherently take longer to develop than traditional, arms-length relations.

Issues of time in the research process

The supply strategy research programme began in 1995 and is contracted to continue until at least 2006. During the course of its various projects, we have followed developments in many networks, and have worked particularly with the PASA Rehabilitation Services team and the networks in which they are engaged. Initially, the programme's focus was on developing and implementing supply strategies in supply networks; we assumed a more rational planning approach to strategic change, focusing on supply strategy, structure and infrastructure (Harland, 1996). Another project in the programme addressed emergent, sector-level consequences on supply market structure of local, fragmented contracting decisions (Knight & Harland, 2001). Building on this, more recent projects, one of which is ongoing, have investigated types and levels of supply interventions (Walker et al., 2001; Harland et al., 2002); these relate network structures to supply actions and activities at multiple levels of analysis. We have also considered supply practice, and resources such as competence and social capital which influence and are developed through practice (e.g. Harland & Knight, 2001a, 2001b). As the programme has progressed, through new interpretations of the developing empirical 'dataset' informed by an increasingly wide range of prior research, we have recognised the complex, dynamic and emergent character of network structures and practices and found ways of contending with this in our research. However, whilst the research is longitudinal, our interpretation of data has not been strongly informed by a temporal perspective – we have collected and analysed data over time, but we have not explicitly addressed time in our analyses.

In the network learning study, Pettigrew's (1985a; 1987) context-content-process model of strategic change provided the necessary structure for an integrative view of network context and learning episodes, and learning context, content and process within episodes. From detailed reading of early interviews it was possible to identify current issues that interviewees considered important, but it was only through participant-observation and further interviews that it was possible to confirm the initial selection of episodes, and to set their temporal boundaries. Given inevitable resource constraints, researchers may be inclined to rely on interviews and limit participant-observation. Our work in the prosthetics network indicates that this would impoverish the analysis. With 'snapshot' / intermittent data one's attention is drawn to the more high profile turning points which are documented and/or much talked about; whereas, **"it was only over time, and through insights from participant-observation, that it was possible to recognise the presence and significance of less visible, informal relations and interactions between people in**

the network that seemed highly important, and to identify individuals who could not be regarded as high profile and yet were apparently highly influential.” (Knight, forthcoming: 168). The high level of participant-observation over a long time scale allows us to trace how changes to practices, values, etc. unfold over time and to draw tighter associations between different events, actions and interactions, and so develop a more cohesive and coherent narrative of the case. The term ‘unfold’ is used intentionally. ‘Trajectory’ is widely used in discussing technological innovations, but this suggests a linearity and sense of direction which has not been apparent in the research; conversely, ‘emergence’ underplays network actors’ agency in influencing the direction of the developments (whether or not they intended to do so).

When researchers first access a new network, they inevitably rely heavily on clock/calendar time; in an initial ‘orientation’, we seek to understand the time of, and the time between, key events. As demonstrated above, in the description of the empirical case and of the research programme and study, dates are important within narratives. But we cannot rely on clock time or causality to make sense of learning and change in networks. There is such a multiplicity of factors affecting each development that it is impossible to ascribe clear relations between ‘inputs’ and change processed and outcomes. At most, we can treat factors as related in time and suggest links.

A temporal perspective highlights how patterns and meanings shift over time; the significance of past events and prospective future developments is not static but evolving. For example the merger, in 1998, of two companies that meant that there was once again four suppliers of P&T services to the NHS ‘refreshed’ memories of the pre-McColl ‘era’, and brought back into people’s current experience the threat of having a monopoly in the future. We identify these cycles, or participants’ perceptions of cycles, as endemic; however the duration of such episodes – many years – does not fit well with the typical timescales for research projects. The linear, Newtonian view of time (Hassard, 2001; Davies, 1995) helps us to describe cases in narrative form but is of limited relevance to the detailed analysis supply structures and practices and learning outcomes and processes. Notions of time and timing as relative (Lee & Liebenau, 1999: 1037) and subjectively experienced (George & Jones, 2000: 659) have more to offer.

Management writers and organizational theorists often miss a time dimension in their work, writing as if there is one ‘hard’ chronological clock time to be objectively measured (Lee & Liebenau, 1999). This temporal ‘blind spot’ ignores different aspects of time such as social time, subjective experiences of time, the history of organizations (from boom to bust), the fads and fashions of management theory and practice, product and career lifecycles, and the speeding up of organizational life.

Applied research projects have clients in one form or another. In the work discussed here, outputs for the sponsor include written reports, which serve as milestones within interventions. Such outputs – and others, such as presentations, ‘awaydays’, briefings – serve to punctuate, to define into discrete chunks, that part of organizational time that includes the research team. The influence of narrative intention on narrative outcomes cannot be denied, and has been explored with regard to the treatment of time by Rowlinson and Clark (2002). In appreciating temporality, perhaps the more significant findings of our longitudinal research have been that the very length of the programme has enabled the research to go beyond the rhythms and punctuations imposed by the traditional deadlines and milestones of shorter research programmes.

Conclusions

We have reflected on time, timing and timeliness in studying public sector supply networks, using the example of the English prosthetics supply network. Some time insights may only be possible in longer-term research projects, but that does not negate the importance of their consideration.

Data collection and analysis in other cases and strands of our research programme will benefit from a time perspective. The cyclical aspects of supply networks are of interest. As well as the speeding up or ‘compression’ of time (Hassard, 2001) in public sector supply networks, things are also slowing down. Individual transactions using e-procurement and purchasing cards may speed up time in supply networks, but very long contracts (e.g. 30 year PFI deals) are being signed which

will slow change in supply markets, potentially ossifying market structures – this paradox seems worthy of further exploration.

Hedaa and Törnroos (2001) introduced the concept of kairology – an opportune time for action – in business networks. In earlier research we have investigated how to decide appropriate types and levels of supply interventions. This practitioner-oriented approach is being considered for adoption on a national basis across the NHS. Consideration of *when the time is right* for supply interventions is also important for practitioners, and requires further investigation. How do we know when we reach a good point for action, where action is timely and appropriate? Actions may be too fast (e.g. the Dangerous Dogs Act was introduced in response to public outcry) or too slow (e.g. negligence actions against tobacco companies may be too slow for cancer sufferers), or actors may miss the moment, only recognizing an opportunity with the benefit of hindsight. Looking at the timing of activities in networks could be beneficial to practitioners.

Supply network research benefits from a time perspective, when it is not limited to a linear ‘clock’ time view, but with an awareness of ‘social’ time subjectively experienced by different actors interacting within public sector supply networks. The ‘chronos’ approach to the case would emphasise the linear, rational planning view of strategy and strategic change management, whilst the ‘kairos’ view reflects the complex, more emergent character of changes and changing. In complex networks, whilst there is always some scope for planning and implementing strategic change, there is also a need to recognise the limitations mandated by the complexity of networks. Individuals and organizations that are charged with supporting strategic change in supply in networks may find the notion of learning useful for being alert to opportunities as and when they arise. In particular we have sought to suggest that studying time can provide insights to the kairos of ‘unplanned’ and ‘unled’ strategic change that are not apparent to those involved and wrapped up in either the ‘time’ of the day to day work world or the apparently more urgent ‘time’ of the strategic initiative.

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