E-commerce, Location and IT aspects of Kent Cancer Centre Network

R. Cooley, A. Jackson, R. James
University of Kent at Canterbury
Kent Cancer Centre Network

E-commerce and UK National Health Service

The internet has facilitated the reorganisation of various parts of the
commercial world, and e-commerce is the term used to describe the
products of this reorganisation. The National Health Service (NHS), for a
variety of reasons, some political some economic, some "Old
Conservative" some "New Labour", but not as a result of improvements in
networking, has also experienced reorganisation in recent years. This
paper first revues the pressure for change on the NHS's provision of
services for sufferers of cancer within Kent and then relates the
possibilities for beneficial reorganisation to those changes in the
commercial world, which can be attributed to the internet.

Why Reorganise Cancer Services?

Cancer kills 150,000 people a year in Britain and its incidence is
increasing. It is estimated that one in four of the population of Kent will
die of the disease. Although survival rates for common cancer, (breast,
prostate and colon), have improved by more than 10% between 1971 and
1990, this performance still leaves survival rates which are low by
European Standards. As reported by Ian Halliday (1995)Britain has a
lower per capita spending on health that many other industrialised
countries and has a smaller per capita number of cancer specialists. The
average per capita spending in OECD countries in 1995 was £1663, in
the UK it was £814.

 The rather bleak statistical description in the previous paragraph
suggests that lack of finance might be a major cause of poor medical
outcomes. However, a recent and influential NHS report dealing with
cancer services, the Calman-Hine Report (Expert Advisory Group on
Cancer, 1995) focused on improving the management and treatment of
cancers through ensuring that all patients have access to the highest
clinical standards and to effective treatments through the establishment
and accreditation of cancer units. The report also recognised the
importance of palliative care and the need to ensure access to high
quality palliative care in the same way as to cancer care. Recognising
that specialisation was essential to improve standards and that the
incidence of rarer cancers was such that local hospital based staff saw
too few cases to become expert in their treatment, the report
recommended a reorganisation. It specified an organisational structure
for cancer services based on a "hub and spoke" model: the "hub" being
specialist oncology services, and the spokes represented by units dealing
with "simple treatments". The report also dealt with the need for
integrated patient care pathways and protocols agreed between all
medical staff. Further, it stressed the need for national evidence to guide
treatment.

The notion of hierarchy embed in image of "hub and spoke" has
been rejected in subsequent years, and the phrase "hub and spoke" has

been replaced by "network". In Kent, the "Kent Cancer Centre Network",
or KCCN, has been set up to take responsibility for the provision of
Cancer Services to 1.7 million people. Thus as an organisation, it co-
ordinates those services previously responsible to individual hospital
trusts. Major resources are located at the Kent and Canterbury Hospital
Trust and at Maidstone Hospital Trust; and there are four acute hospital
trusts also providing treatment. The Canterbury and Maidstone Hospital
Trusts are not command centre that exercises panoptic control over the
other hospital's cancer units. On the contrary, the aim is to provide a
service, which will offer the best and most convenient treatment
irrespective of location, with patients not "owned" by a single node in the
network, but being the responsibility of the entire network. The culture of
the network is intended to be one of collaboration. It has its own budget
and is answerable to a "Policy Board" drawn from across the County. The
organisation of the Network cuts across the entrenched pre-existing
structures, and this naturally leaves a series of management problems to
be solved. There are problems of finance, accreditation, of staff
management, of professional regulation and Computer-based information
systems. Setting up the Network requires the redesign of currently
unconnected hospital based computer information systems.

Business Process Re-engineering

In the commercial world, ideas about the design of information systems
have been used as a stimulus for rethinking the structure of an
organisation. Such an undertaking is commonly referred to by J.H.
Hoffer (1996) and other authors as "business process re-engineering",
and it involves determining which of an organisation's activities are
central to its continued successful existence. In its malign forms, it can
be used to settle political scores, rather like a commercial version of
China's "cultural revolution"; but in its benign form it is an opportunity
to consider the appropriateness of an organisation's constituent
components for achieving its goals. Underlying this recipe for
reorganisation is a belief that the components of the organisation, and
indeed the organisation itself, have a proclivity to unconsciously lapse
into a kind self-serving state in which, despite explicit claims to the
contrary, their actual goal becomes their own self-preservation and
aggrandisement.

For the Kent Cancer Centre Network an opportunity to rethink its role
has arisen from political action which precedes rather than follows
information systems considerations. What is central to its concerns is, of
course, the welfare of those suspected of having cancer or diagnosed as
suffering from the disease. There is a national initiative already
underway to produce an accurate description of all the appropriate
treatments and possible responses to those treatments that might
happen to patients suffering from all the common cancers. This sequence
of possibilities is called a "patient pathway" and it can be used as a basis
for "re-engineering" cancer services.

The information system functions required to support this version of a
cancer service will have to encompass the obvious functions associated
with prescribing treatment, booking appointments, keeping medical
records, maintaining financial information and providing data for quality
assurance purposes. The significance of re-engineering this round the
patient pathway is that booking an appointment, for example, cannot be
treated as an activity constrained by "bricks and mortar". Successive
appointments might be in different locations. Nor can the closely
interwoven responsibilities of medical staff, nursing staff, radiological
staff GPs and the patients and their families be neglected in designing

flows of information and the maintenance of medical records.

E-Commerce and the NHS

Business process re-engineering as a source of inspiration for
information systems design predates the wide availability of internet
access. This also, and with more compelling force, suggests ways of
redesigning information systems. Its ubiquity, ease of use and low
marginal and average costs of connection dissolve the barriers to data
communication. Obviously, it facilitates co-operative interaction, such as
buying and selling, between distant parties. Before the spread of the
world wide web standards, the communicating parties were likely to be
commercial or administrative organisations involved in what is now
referred to as "business to business" commerce, but now communication
between companies, (the "dot coms"), and retail customers is
commonplace. A closely related form of communicative interaction occurs
when commercial organisations are linked in a supply chain, in which
one producer matches its output and deliveries to a customer's input
requirements, not by waiting to receive an order for goods, but by having
"electronic" access to the customer's stock control system. This
illustrates the cohesive ability of the internet; but paradoxically, the
ability to facilitate intimacy between organisations, simultaneously,
permits the fragmentation of organisations. To a much greater extent
than previously, close, reliable and effective communication is not
dependent on a unified management structure. Given appropriate
motivation, monolithic organisations can atomise into linked, co-
operating and self-governing units co-ordinated by internet
communication. Though it would not be entirely accurate to describe the
NHS as a monolithic organisation, it does claim to be the largest
employer in the UK with a payroll of over a million, and it does ultimately
dance to the tune of the Minister of Health in London. It is thus fair game
to analyse it using the distinctive patterns provided by e-commerce.

Structure and Networking in the NHS

The NHS set up its own network, NHSnet, in 1992, (Grindrod, 2000). Its
purpose was primarily administrative rather than clinical (NHS
Management Executive, 1992). It was to link the NHS with remote
application providers who could supply financial, payroll, patient
administration, pathology and other services. It was re-orientated
towards use for clinical purposes by the in-coming Labour
Administration in 1997,(Department of Health, 1997), and now connects
93% of NHS Trusts and 97% Health Authorities, 30 % of General
Practices and 100 third party commercial suppliers. The network is
managed by British Telecom and it competes with one other company,
Cable and Wireless, to provide connections. Although NHSnet was seen
as an economical way of providing data communication services, it is
recognised that the internet is not a viable alternative. The need for
security, the need to assure levels of service and the need to manage
risks, all highlight the need for a managed network.

The introduction of NHSnet was not the catalyst for the the atomising
effect of e-commerce. On the contrary, it was envisaged as a means of
facilitating a quasi atomisation, referred to as the "internal market", that
was prefigured by a conservative policy initiative of Mrs. Thatcher's third
term of office as prime minister, (Department of Health, 1989). Politics
rather than technology was the catalyst. The "internal market" initiative
took the form of an anglicisation of the ideas of the American, Alain

Enthoven. He had proposed the idea of separating the purchasers from the providers of health services. He suggested that Health Maintenance Organisations should purchase services for groups of not less than 50,000 patients. In the UK version, GP practices, (the so called "fund holding" practices), took on the task of purchasing services from hospitals on behalf of as few as 5,000 patients. Area Health Authorities also took on the role of purchaser (Ian Halliday, 1995). In response to becoming fund holders, GP practices and Hospital trusts created their own point-to-point networks to handle accounting transactions. These have now been dismantled, as the current Labour government has abandoned the internal market based on fund holding GPs in favour of a negotiating system based on rather larger cluster of primary care providers. It is with this background that Kent Cancer Centre Network has to develop its information systems strategy.

KCCN and E-Commerce

That the components and the work of the KCCN require a network based information system is tautologically clear. The system must also be able to guarantee service levels and security; and it will most probably make use of browser based systems and do its best to avoid dependency on proprietary software. A general analysis of the information needs associated with cancer has been undertaken by the NHS Executive, (NHS Executive, 2000). The discussion below considers the design and functions of a system in the light of the patterns of e-commerce as described above. It does not attempt a general systems analysis, nor does it extend the discussion of e-commerce patterns to include the general commercial transactions that involve the host Hospital Trusts.

The "business to business" model of interaction corresponds directly to the needs of the various units in the KCCN. Treatment has to be scheduled across the network and patents' health records must be accessible at all locations at which they are treated. For audit and other purposes, data on patient treatment and outcomes will have to be captured and integrated irrespective of location. The relationship between the KCCN and General Practices also fits the "business to business" pattern. This is where the "patient pathways" start, and the ability of individual GPs to make appropriate referrals will be vital if improvements in cutting out delays before treatment are to be realised. GPs, rather than specialist, maintain a long-term relationship with patients, and clearly need to be fully informed about all treatment at the secondary level. There needs to be shared access to clinical data.

Turning now to the "business to customer" pattern: for KCCN the population of Kent in general and patients and their family and carers could be considered to be, in one sense or another, customers. However the relationship is not the standard one of e-commerce. Of course, there is a similar need for information, but the non-commercial nature of the NHS, the continuing nature of the relationship of patients to the KCCN, and the duality of responsibility between KCCN and GPs make a significant difference. However, from the point of view of the information systems strategy, the lack of a universal system of internet access is the dominant feature. All information that could reasonably be transferred electronically will need to be available in other forms. Nevertheless, internet access is far from unusual, and may well very shortly be widely available through digital television connections. With an increase number of patients with internet access, Kent Cancer Centre Network could provide patient support services along the line of the services currently provided by the patients' club run by Kent and Canterbury Hospital Trust called the Optimist Club, which provides information and

acts as a forum for mutual support. It could be a localised versions of national and international interest group web services. Services with a similar structure could also be provided for various health service professionals.

The non-commercial nature of the NHS can be expected to vitiate the e-commerce tendency to atomise organisations, but this may be compensated for by political initiatives. The growing number of organisations involved in e-commerce in the USA, (Efraim Turban, 2000), and the growing currency of the term e-health in Europe, (eg this year's European Health Informatics Association conference was called "E-Health"), could well lead to copycat innovations. Already, the NHS has started "NHS Direct" (A.Cathain, 2000)", which provides access to health information over the telephone and in person at locations such as railway termini. "NHS Direct", viewed as an organisation in a supply chain, fits between the potential patient and the GP. It might also be worth considering a body, which was solely concerned with the quality of referrals. The quality control might be either a manual or a service provided by expert system software. Such an organisation and "NHS Direct" would potentially be users of and contributor to electronically held patient data.

The creation and use of Electronic Health Records, which is the object of current policy(Department of Health, 1998), has the potential to encourage, or at least permit, other organisational changes for it holds out the promise of breaking the link between collecting data and the ability to access, use and extend that data. Implementing systems to support the proposed Electronic Health Record will have to overcome many extremely difficult problems, some of which have similarities with problems associated with finance and payment in e-commerce systems,(Treese and Stewart, 1998). There will be a need for security during transmission, to control access to data and to ensure its security. It is possible that some equivalent of "SET Secure Electronic Transaction", the organisation created jointly by Visa and Mastercard to support secure systems for internet payments, will be needed to provide digital authorisation certificates to allow access to data. But more importantly, some structure will have to evolve to actually maintain the data. In the short term, KCCN envisages that it will hold all relevant records. But just as the creation of KCCN as the answer to patients being treated across the County, there will need to be some innovation to allow patients to move about the Country or internationally without losing access to their patient records. But even on a local scale, efficient ways of sharing data with other hospital services are necessary. One way of facilitating this would be to create specialist data-base organisations whose business it is to look after patient records and the rights of the patient and of medical professionals and institutions which would have contributed data that formed part of the record. Such health record data-base maintenance organisations could either be in the private or the public sector, but some form of competition might be useful to ward off bureaucratic sclerosis.

Conclusion

The current reorganisation of cancer services in Kent provides the opportunity to rethink the requirements of an information system. Many of theses will not necessarily differ from those of the institutional systems that will be replaced. But clearly, the geographical dispersion of the network and locations of treatment will be new. The management and information systems ideas associated with "business process re-engineering" will be important but there will be a range of problems

associated with the atomising tendency of network connections.
Solutions to these may well be based on models provided by e-commerce.

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  R. Cooley is a Lecturer of Computer Science: A. Jackson is an NHS manager currently seconded to a research post in the Kent Institute of Medical and Heallth Studies: R. James is Director of the Kent Cancer Centre Network and Professor of Oncology..