

WHY INFORMATION SYSTEMS PLANS DO NOT GET IMPLEMENTED: A CASE STUDY OF A UK HOSPITAL

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ABSTRACT

The progression of implementation of an information systems strategy in a UK acute hospital is described. The case study describes the IS strategy, the conditions that led to its development and its content. It then follows the progression of attempts to implement the strategy over five years. At the end of five years, little of the strategy has been implemented. Reasons for this are discussed structured around the following questions: Why was the IS strategy produced? What external environmental changes influenced implementation?, How did internal organisational change affect implementation? In what ways was the IT strategy naïve? Was the IS strategy exercise at the hospital of any value? Lessons for both researchers and practitioners are presented. It is concluded that, far from being a irrelevant exercise, the development of the IS strategy at the hospital provided a catalyst for organisational learning and culture change which enabled the hospital to avoid some IT investment mistakes which other hospitals did not.

1. INTRODUCTION

Strategic Information Systems Planning (SISP) is the process of analysing information systems requirements in the light of business strategy and direction and planning their implementation. Until recently SISP has been viewed by both practitioners and researchers as a formal process. Information systems (IS) needs are derived top-down from the business strategy, current systems are analysed and technological opportunities investigated. The results of this exercise are published as a strategic plan that is then implemented. Strategic planning is similar to designing a machine which is then built and set in motion. This discrete, periodic process results in a plan for one year, three years, five years or even longer (Earl, 1989; Lederer and Gardiner, 1992; Fitzgerald, 1993; Elliot and Melhuish, 1995; Lederer and Mahaney, 1996; Lederer and Salmela, 1996; Gottschalk, 1999). More recently, SISP literature has recognised the dynamic nature of IS planning and moved away from the planning school (McBride, 1998; Hackney and Little, 1999; Samela,

Lederer and Reponen, 2000), reflecting the changing nature of strategic planning literature and the diversity of planning approaches.

However, regardless of whether SISP is discrete or continuous, an outcome at some point will be one or more written documents which describe the plan and provide a blueprint for implementation. The IS plan then represents a design which is then built. Evidence suggests that the transition from design to build occurs in a minority of cases (Min et al, 1999). One study (Lederer and Sethi, 1988) found that only 24% of projects identified in IS plans had been implemented after 2 years. In another, 42% of projects had been implemented after 5 years (Gottschalk, 1999). Implementation is doing what the organisation planned to do. Since this does not occur for so many IS plans, it is important to ask why. What is the justification for the effort of IS planning and should it be done at all?

In order to understand reasons for non-implementation, it is necessary to consider the intent of the IS plan. It may be that the purpose of the plan, whether explicit or implicit was not that it should be implemented. An SISP exercise may be part of a management ritual (Walsham, 1993). The intention of the IS plan may be politically driven. A plan might be produced to meet the requirements of an external authority, such as Central Government; it might be intended to stamp the authority of a new manager; or it might be produced to indicate a rite of passage. Musgrave (2000), in case studies in the UK Probation Service, found that the purpose of producing IS strategy documents may not be concerned with their implementation. She examined sixteen IS strategy documents, many of which arose from a need to implement a nationally initiated system and were a response to the prerogatives of a national strategy. Only seven contained action plans with dates.

If the intention is that the IS plan is implemented, and there is no hidden agenda, non-implementation may be due to inadequacies in the content of the plan, in the management of the plan, or organisational change rendering the plan obsolete. King and Teo (2000) identified content issues that may affect implementation. These include, no overall hardware plan, inadequate assessment of current IS, failure to take into account organisational goals and strategies and lack of specific priorities. Furthermore, King (2000) suggests that senior management involvement, user involvement and the comprehensiveness of the IS plan are key to the efficacy of SISP. In another study, Gottschalk (1999) found that the highest indicators of implementation success were the responsibility and accountability of senior managers for the implementation and user involvement in implementation.

In addition to content and process, organisational and environmental change may inhibit implementation. External changes in law, markets, technology and economics or internal changes in leadership, organisational structure and politics may invalidate the basic assumptions on which the IS plan was based. The turbulent environment increases the likelihood of IS plans being ignored or, if implemented, resulting in irrelevant or out-of-date IS.

This paper describes a case study in a UK hospital, based on the participation of one of the authors as an advisor, and a series of interviews with leading organisational participants over a period of several years, which illustrates how an IS plan became obsolete and was not implemented. Based on the case study, some key questions are discussed and the value of the IS strategy is questioned. It is concluded that, far from being a irrelevant exercise, the development of the IS strategy at the hospital provided a catalyst for organisational learning and culture change which enabled the hospital to avoid some IT investment mistakes which other hospitals did not.

2. CASE STUDY: ST JOHN'S HOSPITAL

2.1. The Hospital

St John's Hospital is a District General Hospital with 398 beds and provides medical and nursing services, which includes both general surgery and medicine, and others specialist services in urology, orthopaedics, cardiology, gastroenterology, rheumatology, maternity and paediatrics. All these services are supported by diagnostic imaging, laboratory, ambulance, pharmacy and therapy services, which are all on site. As the

major hospital in a tourist area, it deals with many visitors in the holiday season, generating a large amount of non-booked admissions work.

2.2. The Information Systems Strategy

In 1990, in response to the Government's white paper, 'Working for Patients', an information strategy group was set up. This group, consisting of clinicians, finance, personnel and general managers together with the resource management director, considered the hospital's information needs and reported in April 1991.

The strategy identified the need for St John's to be self sufficient in information and its supporting technology. An in-house information department was to be developed, staffed by IT professionals and managed by a senior professional. The hospital committed itself to the phased implementation of an integrated hospital information system.

The document focused on the medium term, 1992 - 1996. The objectives identified were to be self-sufficient in information by March 1992, and to have an integrated Hospital Information System (HIS, see Glossary below) by March 1993. Wards would have a single terminal providing access to pathology, nurse information system (NIS), patient administration system (PAS), case mix, child health administration, radiology, and ward-based ordering. The strategy recognised the need for acquisition, disaster planning and data protection standards, the idea of a single point of data collection, and the need to base IT requirements on sound business cases. A need for a benefits realisation program was outlined. The strategy stated that the hospital would only consider proven solutions from suppliers with established track records. Information needs were outlined and current systems and current improvements discussed.

During 1991, outpatient and waiting list modules for the existing PAS were to be implemented, a pathology system was to be replaced by a new system, and operational requirements document produced for radiology and pharmacy systems. New ledger and personnel systems were to be installed. A case mix management system was to be installed and project plans for a NIS were to be submitted to the hospital board in April.

The strategy identified PAS replacement as a priority and confirmed the intention to implement existing planned systems. The need for training was discussed. It further identified available funds for medical audit and identified links with case mix.

While the strategy identified the need for an integrated HIS, it also suggested that without a phased approach the costs would be prohibitive and that progression with NIS and Case Mix could not be delayed. It recommended the employing of consultants to identify existing HIS systems and options for a HIS system. Consultancy work would be completed by September and the course of action determined by March 1992.

As far as networking was concerned, the report referred to a network strategy produced in 1989 which recommended a Token ring fibre optic network. The strategy recommended that this was revisited by consultants, funded from the resource management initiative.

The strategy identified the need for a training facility, to be established in a ward which would be vacated in May 1991. Long term developments, assuming a fully operational HIS by 1995, included GP and Public Health links. A section on finances, identifying sources of funding, and recurring revenue and capital changes for existing and future systems was left blank.

2.3 The Implementation

In order to progress the strategy, a business case had to be developed and submitted to the region, which in 1991 still retained control of spending. The Resource Manager built a business case for a hospital-wide information system, incorporating theatre, order communications, case mix, nursing, a local area network and a computer room. The bid was submitted to Wessex region in October 1991. Wessex Region reviewed the business case. Region asked for the computer room and the network to be presented as two separate bids. The computer room was seen as constituting capital and estates. The review was still in progress in October

1992 when Region put aside £21 million for a regionwide PAS replacement. The replacement was to cover 8 units including St John's. This required a revision of the PAS business case, which was aimed at bidding for some of the £21 million. Since the function of Region would be rendered obsolete as the NHS was reorganised into Hospital Trusts (providers) and Local Health Authorities (purchasers), there was a tendency for Region to hold onto the control of IT resources as long as possible:

'There was a lot of Regional politics involved because they still wanted to control PAS replacement' RM Manager

During this time, Poole, Bournemouth and Swindon, while part of Region, set up a competing bid for HIS money from a central fund. There was disapproval of this move by region who put in a rival bid to the same funding source. St John's was involved with the Poole consortium and therefore applying to two sources for HIS funding. Both bids subsequently failed.

By the end of 1992, St John's had approval for building a computer room, together with some new offices. Approval was given by region in principle for the LAN. However subsequently, technical questions were raised:

'there was infighting at Region about who was responsible for what, because jobs were about to go (when Regional Health Authorities were removed and their responsibilities devolved to Hospital Trusts and Local Health Authorities), so people were demonstrating their responsibilities' RM Manager

In April 1993, St John's Hospital became a Hospital Trust. A small Regional function remained, running large mainframe systems on behalf of a number of Hospital Trusts. At the same time, an outpost of the NHS management executive was set up in the region. This organisation represented the provider side and dealt with capital expenditure above a certain level.

St John's business case for PAS now hit further problems since Region were no longer responsible for its approval. This responsibility now lay with the Trusts Outposts who created new rules for business cases. Full and detailed costing were now required for a range of options, including 'do nothing'. This required further work since some options, which St John's had considered inherently unsuitable, had not been costed.

In May 1993, requests for proposals for Case Mix and Nursing systems were lodged in the EC Journal, as required in public sector procurement. At this point, approval for LAN money was withdrawn. Region indicated that the business case would have to be approved by Trusts Outpost. The Outpost would not accept a separate business case for LAN, since, it suggested, there are only benefits from what you put on LAN. A combined PAS, LAN business case was now required. Again a 'do nothing' option was required. Each option was to be supported by full benefits analysis, SWOT and risk analysis.

In February 1993, nine clinical audit workstations were bought with clinical audit capital which had to be spent by the end of the financial year.

In May 1993, the business case for PAS was being redeveloped. Workshops were run to identify benefits, using a top-down approach. External consultants were called in to help develop alternative options and to cost up options. Detailed cost-benefit analysis was carried out, involving, for example, the analysis and timing of nursing activities to work out exactly where time savings and thus cost savings could be made through computerisation. Other options were generated, although it was clear what the sensible and preferred options was. A new business case for PAS and LAN was completed by October 1993, with the aim of having a PAS replacement, covering existing functions, live by April 1994.

A replacement PAS system was bought and went live in October 1994. The LAN went out to tender, but bids came out more expensive than expected, which led to further delays. Work finally started on the LAN in August 1995 and finished in November 1995.

However, PAS remained a centralised system, not available on the network. The intention was to decentralise it and make it widely available over the network. Before this was done, a study was initiated on to how PAS could be used effectively. This developed into a full-blown review of secretarial and clerical processes:

It was felt that the cost of some of these processes was relatively high compared with other hospitals. With support from Management Services, the PAS manager reviewed all processes associated with contracting, audit and the use of PAS. The aim was to identify efficient uses of PAS in a way which was described as 'starting with a clean sheet of paper', a process not dissimilar to business process re-engineering. This exercise led to the development of an information strategy that focused on information needs for management control, clinical, communications and commercial. An information strategy was being developed in place of the forgotten information technology strategy.

There was no Case Mix procurement. There was no capital to purchase Case Mix and stories of the failure and inadequacy of Case Mix within hospitals were filtering through. Furthermore it was considered of little use having a Case Mix system if PAS could not support its data requirements. In the absence of case mix, contract data was extracted from PAS into ASCII files and loaded into spreadsheets or statistical packages. Such low technology solutions to contract analysis depended on a limited set of staff who could extract and manipulate the information and made it more difficult to justify the purchase of a large case mix system. There was considerable emphasis on alternative solutions to computing needs which made the best use of existing systems and simple tools:

'We can produce a marvelous case mix so that you can drill down to individual patients but I'm not sure that's necessarily helpful. What [clinical services managers] need to know [in terms of information] we can produce very well and relatively quickly from standard PAS and spreadsheets at low cost.'

Up to 1995, St John's had maintained computer links with Region. Terminals linked to Region's mainframe supported a finance system. However, in 1995 a new finance system was installed at St John's which rendered the hospital independent of Region in IT support.

A nursing system was not procured. Firstly, Care planning was seen as a key issue that could be addressed by simple card indexes. Nursing management systems were seen as too large and inappropriate for the job. Secondly, the review of business processes involved looking for how specific processes were supported by existing systems. Some aspects of nursing systems could be covered by the personnel system. Thirdly the review of processes was leading to the development of a process-based view of nursing which saw patient care as multi-disciplinary. There was a move away from an exclusive nursing system to consider multi-disciplinary patient care systems.

In 1997, St John's hospital trust merged with the local community health care trust. In April 2001, this trust merged with a larger neighbouring trust. The latter merger would have significant effects on the upgrading, procurement and location of operation information systems. In middle 2001, the operational systems remained unchanged from 1995. However, there had been a large investment in new infrastructure including new PCs and networking infrastructure throughout the clinical area. The clinical audit focus had moved to the provision of knowledge bases and data to support clinical governance delivered over an Intranet. New government initiatives and a focus on electronic patient records meant there was a need for the development of new IS strategy to meet a technically and organisationally changed environment. That is another story.

3. ANALYSIS

The St John's IS strategy document portrayed the viewpoint, culture and expectations of management at St Johns in April 1991. A technically ambitious document which envisaged an integrated hospital wide information system, covering everything from patient admissions to ward ordering by March 1993, it envisaged computing terminals being wheeled around patients beds and plugged into the network so that computerised processes could occur next to the patient. There was an expectation that the strategy would be implemented. Yet by the end of 1995, a Local Area Network, first planned six years before had only just been installed. There was no hospital-wide information system and several major planks of the strategy, such as case mix and nursing information systems had been discarded. The gap between the planned and the actual was wide (See Table 1) and the IS strategy was a forgotten document. Even the primary author of the strategy could no longer remember what was in it.

Planned	Actual
	1991 (April) IS Strategy Document
1991 (July) Network implementation	1991 (July) Costs Benefits Analysis
1991 (July) Outpatient and Waiting List Modules for existing PAS	1991 (Oct) Case Mix Operational Requirements Prepared
1991 (Nov) New Pathology System	1991 (Oct) Business Case for HIS as a total package submitted to Region
1991 (Nov) New Ledger and Personnel Systems	1991 (Oct) Region asks for network to be taken out of business case
1991 (Dec) Case Mix Implementation	1991 (Dec) HIS Specification of Basic Requirements prepared by consultant
1992 (Sept) Complete HIS Consultancy work	1992 (Oct) PAS requirement submitted as separate bid - region-wide PAS replacement
	1992 (Autumn) LAN, PAS and Computer room requirements submitted as separate bids
	1992 (Oct) Consortium bid to HIS central
	1993 (Jan) St John becomes a trust. Region 'washes hands of bid'
	1993 (Feb) Clinical Audit Workstations procured
1993 (March) Integrated HIS	
	1993 (May) Pre-implementation audit
	1993 (May) LAN blocked
	1993 (May) EC Advert for PAS, Case Mix, Nursing
	1993 (Oct) New business case for PAS and LAN
	1994 (Oct) New PAS goes live
	1995 (Jan) New LAN Contract let
	1995 (May) Work on LAN starts
	1995 (May) Process study including SWOT.
	1995 (Nov) LAN Implementation completed

Table 1: St John's information systems implementation: ambition and achievement

This clear non-implementation of an IS plan raises a number of questions which are discussed in the following sections.

3.1. Why Was the IS Strategy Produced?

- Government initiatives, particular with regard to the computer support of resource management has heightened awareness of IT in the hospital and its inadequacies. Hospitals could bid to be pilots or early implementation sites for large IT projects such as HIS.
- The appointment of a resource management (RM) manager with a specific brief to procure case mix to support resource management raised the profile of IT amongst senior management and clinicians

- Some money was arriving at the hospital, earmarked for specific projects such as clinical audit. This money had to be spent by the hospital on specific systems, although the senior staff did not understand what the system was for or how it should be used. Concerning PAS, for example, the RM manager said: *'We did what every hospital does: you go out and buy the system then you say, "well, how are we going to use this, what benefits will we get?'"*
- Organisational changes in the NHS would mean that the hospital, when it became a trust, would become responsible for its own IT management and procurement.
- IT within the hospital was creaking at the seams. Few IT systems were in place beyond PAS. Paper systems abounded and problems, such as: missing case notes, laborious medical records processes; and duplicated and incomplete information, were very apparent.
- Nationally, the profile of IT in the NHS was being raised with the development of central initiatives and strategies

3.2. What External Environmental Changes Influenced Implementation?

- The removal of regional health authorities led to changes in who held the purse strings for major hospital IT investments. Different paymasters laid down different rules for proposals.
- The transition to the new NHS organisational structure was very slow.
- As a result of a prominent Hospital IT procurement failure and its associated scandal, it became more difficult to procure finance for large projects.
- Stories of failures of prominent IS such as case mix systems at other hospitals circulates on the grapevine and in the press. Failures of large scale projects such as HIS made following hospitals more wary of taking on such implementations.
- Delays caused by the external environment and the demands for alterations in proposals provided time for reflection which resulted in a questioning as to whether some of the IT systems suggested by the strategy were actually needed.

3.3. How Did Internal Organisational Change Affect Implementation?

- The attaining of Trust status caused organisational disruption which slowed down IT projects.
- Organisational attitudes changed and there was a move from separate disciplinary teams to multi-disciplinary teams dealing with patient. The attitude was implicitly that, for example, nurses nursed in isolation and therefore needed a NIS, clinicians dealt with treatment matters and needed a case mix system. A change of attitude towards patient care resulted in the recognition that a NIS was inappropriate and hence it was abandoned.
- Attitudes of IT staff, in particular the RM manager, changed as a result of developed understanding of the issues involved in the strategy. For example, the focus moved from one on the technology to a focus on information management and information requirements. This led to reconsidering the need for case mix and to looking for alternative approaches.

3.4. In What Ways Was the IT Strategy Naïve?

- Understanding of the technology and the technical problems associated with hospital IS implementation was inadequate. This led to wildly optimistic implementation dates being suggested in the IS strategy document. It also led to a utopian vision of a seamless integrated information systems operating across the hospital which was impractical

- The IS strategy was built on an assumption that the managers at the hospital would have the resources and power to implement it. The power and financial control which managers envisaged arriving on their desk with Trust status did not appear for a long time.
- No attention was paid to financing the suggested systems, as indicated by the absence of any mention of finance in the strategy.
- The strategy was internally focussed and insular. It made no mention of the changing external environment in the NHS and the potential effect on hospital IT.
- The strategy was focussed on the 'here and now' and did not consider possible technology changes and new technology opportunities. While it would have been difficult to predict the effect of the Internet, for example, some consideration of external networking (e.g. EDI) might have been expected.

3.5. Was the IS Strategy Exercise at St John's of any Value?

The absence of implementation does not mean that the strategy exercise was not worthwhile. Success can be judged on other basis' including: building a new IS culture, learning, avoiding implementing unnecessary systems and removing existing unnecessary systems, political cohesion, obtaining political commitment to IT generally (Fitzgerald, 1993).

- The exercise brought closer cooperation between clinicians and managers and a better understanding of IT needs.
- It produced a greater understanding of concepts of information management by the IT managers, and acted as a catalyst for organisational learning.
- It acted as a sounding board for questioning beliefs about IT needs.

4. LESSONS FOR PRACTITIONERS

The case study suggests that practitioners should be wary of launching straight into implementation once a strategy is established. A period for reflection should be built in to timetables to enable some questioning of the assumptions on which the strategy is built. Non-implementation may not be diagnostic of a lack of success. A strategy which identifies systems which should not be built and suggest appropriate technology for alternatives may be very valuable. IS/IT strategies should focus on the information management needs and not the technologies. The starting point should concern establishing information flows and information requirements. Technology to support this should follow on. The IS strategy should explicitly consider external technical and managerial environment as well as internal. Changes in technology and business environment will have significant influences on IS direction within the organisation.

5. LESSONS FOR RESEARCHERS

Analysis of why IS strategies fail may require interview and in-depth discussion. Such discussion with participants reveals the weaknesses in arguments and enables underlying attitudes and cognitive maps (see McBride and Hackney, 2001) to be teased out. Questionnaires may be based on the assumption that the participant is an oracle of truth and know what he/she is talking about. This may not be the case in that participants are influenced by their own environment and have a limited and probably biased view. Identification of the influences and biases requires careful and critical analysis of interview texts by the researcher.

The factors that affect IS strategy implementation may be complex and varied. They may form a network of interacting influences whose effect and even presence varies over time, Such complex networks are unlikely to be teased out from simple questionnaires subjected to statistical analysis. The content of St John's IS

strategy covered all the issues suggested by King and Teo (2000) for a proactive strategy and met the key criteria of responsibility and user involvement with the organisation (Gottschalk, 1999), and yet resulted in non-implementation due to a complex network of factors occurring with the NHS and the hospital trust itself.

Furthermore, the case study suggests that IS strategy development cannot be separated from organisational context, and IS strategy implementation cannot be separated from organisational change. Inevitably, any study of IS strategy and implementation will be a study in organisational change.

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GLOSSARY

HIS (Hospital Information System): A fully integrated information systems which incorporates all hospital administrative functions and information needs.

NIS (Nursing Information System): A system for managing nursing activity including rostering and the planning and delivery of individual patient care.

PAS (Patient Administration System): The principle system for controlling patient admission into a ward, discharge from a ward and outpatient visits.

Case Mix Management System: A management information system which draws together information from many hospital systems to give an entire picture of a patient's progression through the hospital including theatre visits and all procedures, to support clinical audit and management costing.

Operational Requirement Document: (also known as Statement of Need). A definition of the functional and managerial requirements for an information system that is to be procured.

Medical Audit: The analysis of procedures and outcomes for given patient conditions in order to improve medical practice.

Region (Regional Health Authority): Formerly a regional department of the NHS responsible for managing several hospitals within a geographical area. Disbanded when hospitals were given trust status.

Hospital Trust: Self-governing hospital or group of hospitals responsible for its own budget provided direct from government and from purchasers.

Purchaser: An authority responsible for ordering health services from a provider. Usually a local health authority, general practitioner or group of practitioners.

Provider: Hospital or simple organisation providing acute services for a purchaser.

Trust Outpost. Residual organisation left after the disbanding of Regional Health Authorities which administered residual functions which for practical reasons could not be immediately devolved to Hospital Trusts.

Contracts. Agreements between purchasers and providers which defined the number and cost of specific procedures to be delivered within a given time period.

EC Journal. The *Official Journal of the European Communities* (OJEC). Journal in which contract notices for public procurements must be published.