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**SWP 20/95 ST.JAMES'S HOSPITAL AND LUCAS
ENGINEERING SYSTEMS LTD - A
PUBLIC/PRIVATE SECTOR COLLABORATION
IN BPR PROJECT B - THE RE-ORGANISATION
OF PURCHASING AND SUPPLIES**

VALERIE BENCE
Cranfield Centre for Logistics and Transportation
Cranfield University
Cranfield
Bedford MK43 0AL
United Kingdom

Tel: +44 (0)1234 751122

Fax: +44 (0)1234 751806

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**ST JAMES'S HOSPITAL AND LUCAS ENGINEERING SYSTEMS LTD -
A PUBLIC/PRIVATE SECTOR COLLABORATION IN BPR
PROJECT B - THE RE-ORGANISATION OF PURCHASING AND SUPPLIES**

Manuscript 13
Valerie Bence CCLT

This Working Paper is the second in a series of three examining Business Process Re-design (BPR) within the National Health Service (NHS). Together with Manuscript 12a it examines an innovative collaboration in BPR between St James's Hospital, Leeds and Lucas Engineering Systems Ltd (LES). These two organisations (one public sector and one private) worked together to design and implement what are essentially manufacturing methodologies to within an NHS hospital, already undergoing huge changes.

Two projects were undertaken by joint Lucas/St James's teams, Manuscript 12a outlines Project A - the re-design of part of the hospital admissions system. This paper examines Project B and describes the re-organisation and rationalisation of Purchasing and Supplies throughout the hospital. The BPR project team examined the ordering, storage and delivery of non-pharmaceutical supplies. This resulted in a move from a haphazard ordering and storage system towards a structured materials management process, with both cost savings and improved resource use. The re-designed system has gone on to provide considerable savings to the Trust. This paper outlines the rationale behind the collaboration; looks at how the final projects were chosen; the design of new systems and processes and their implementation. Materials Management and the "Kanban" system of replenishment will be explored within the context of the NHS.

Manuscript 12a outlines in detail the methodology used and sets the historical context. A third Working Paper (Manuscript 14) will draw on these two projects (as well as others within the NHS) to assess the transferability of the use of BPR from private to public sector organisations. It will also attempt to conclude whether the problems, processes and outcomes of using BPR are broadly similar across the two sectors or if there is a distinction to be made in its use and application as a management tool.

INTRODUCTION

St James's University Hospital in Leeds is one of the biggest teaching hospitals in Europe and one of the largest acute service units in the NHS. Granted Trust status in April 1991, it employs over 5000 people and sees 450,000 patients a year (see Appendix 1). Operating income from the internal market totalled £125.8 million (93/94) with 70% of the income coming from the contract with Leeds Healthcare. For 1994/95 the Trust has negotiated contracts with 12 Health Authorities and 130 GP Fundholders.

St James's provides services both locally and to the wider Yorkshire community against the background of national, regional and local objectives and priorities required to meet the ever changing demand on services. In spite of increases in activity by the hospital, admissions are also increasing, reflecting this rising demand (see overleaf).

	ADMISSIONS		
	1991/2	1992/93	1993/4
IN-PATIENT	17444	17198	15641
DAY CASES	16136	21893	27237
ACUTE	36459	37793	39490
WAITING LIST		8723	8820
TOTAL	70039	76884	82368

(acute admissions increased by 4.5%; day cases increased by 24.5% in 93/94)

Health Authorities want the best value for money service, best use of resources and high patient throughput. In addition the Government wants 2% more activity in the financial year 1994/95 plus a 1% cost improvement programme.

In view of the constraints and demands placed on the hospital and their commitment to improving both quality and value for money, St James's began an innovative collaboration in 1991 with Lucas Engineering Systems Ltd (hereafter LES), the aerospace and automotive group. One approach to change management and BPR is the Systems Intervention Strategy (SIS)₁. This comes from a technological background and is better understood and more successfully applied by engineers and "hard" systems designers - a "hard" system will have well defined physical boundaries, for example, a manufacturing plant. SIS usually consists of three phases;

- i) Diagnosis - describing and measuring the current system, identifying objectives and constraints and formulating alternatives.
- ii) Design - generating and modelling options.
- iii) Implementation - evaluating against measures, designing implementation strategies and carrying them through.

Because of their background in manufacturing and industry, this was very much the approach taken by LES and these three phases were used for both projects.

Initial contact between the two organisations was made during a Working Party on Electronic Data Interchange and the National Health Service. A member of St James's Supplies staff encountered work done by LES, who were keen to investigate the transferability to the public sector, of some of the techniques that have led to increased efficiency in car manufacturing plants.

Lucas, a leader in such systems, had developed their methodologies during their restructuring in the late 1980s and were now looking beyond the manufacturing sector.

At an initial meeting possibilities were discussed of transferring the methods used in industry, to within the hospital organisation in order to improve the efficiency of working processes. LES gave a presentation to St James's at Board level. This overview was not project specific, but did interest the Board enough for LES to be invited back to do a two day workshop for senior hospital managers. This investigated possible areas for collaboration using the Lucas approach to the management of change (involving Business Process Redesign).

The aims were:-

- * to review LES redesign methodologies,
- * to discuss whether and how these principles could be applied to specific change projects at St James's and/or compliment current initiatives,
- * to discuss relevant case examples of the application of the methodologies in order to identify tangible benefits.
- * to make specific decisions on how to progress the change programme.

Following the workshop, the Board gave the go-ahead for work with LES and proposals were invited from within the hospital, for possible projects. Careful selection was necessary since there had to be an element of cost saving to pay for the project, which would hopefully go on to generate revenue for St James's. Selection criteria were developed based around, the need to choose something with a good chance of success; something that would test the thesis that these systems could be transferred from industry; and was health related and financially viable. There were also issues surrounding Trust Status (management changes); the Patients Charter (performance measurement); and customer care (quality) to consider.

It did not take long for a number of potential projects meeting the required criteria to be identified. Both partners were learning from each other and whilst in most areas it appeared that manufacturing techniques for process change could be transferred, it was becoming apparent that there were to some extent a "separate set of rules" for the NHS. This was because of the nature of the organisation, internal and external constraints and the pace, extent and speed of change.

Two projects were identified with different objectives. A re-organisation of the Purchasing and Supplies function would hopefully meet the cost saving requirement, whilst a re-appraisal of the admission procedure was more of a cross-functional experiment, but both involved systems investigation and a process approach.

Thus the final decision was:-

PROJECT A - Elective Admissions (not emergency)

PROJECT B - Purchasing and Supplies - (Non-pharmaceutical goods)

Two groups of hospital staff were selected (on voluntary secondment) to work full-time on the projects. It was made clear early on what the starting base was, what the aims were and why they were doing it. The projects began with a weeks off-site training, in order for LES to familiarise St James's staff with the theories and methodologies to be used and for the teams to look at time scales and deadlines. There was a definite date for the projects to end, with well defined milestones, so both teams would have weekly progress meetings with their managers, plus presentations on findings and monthly meetings with the hospital's Director of Organisational Development.

Producing the hospital's Application for Trust Status acted as a catalyst for many changes and part of this involved spelling out how much and how far medical staff would become involved in hospital management. The 15 Clinical Directorates (similar to Business Units) evolved from this and the reorganisation covered all aspects of clinical activity at the hospital. Headed by clinicians, day to day management is undertaken by full-time Operations Managers (see organisational chart in Appendix 2).

Following project selection and staff training, specific process issues were refined in discussion with Clinical Directors. However, it is important to remember that St James's went into the exercise knowing what the particular process problems were but not knowing what the outcomes would be or how the process of change would evolve. Both projects represented a potential risk with large investments committed in time, money and people - and the hard work was just beginning.

PROJECT B - NON-PHARMACEUTICAL SUPPLIES

The objectives on the Purchasing and Supplies project were much clearer than for the admissions team (Project A); they were to repeat the success that LES had achieved elsewhere in similar circumstances. Purchasing and Supplies fell easily into the Lucas framework, as this is a key business process fundamental to most organisations, public as well as private. Thus, it was felt that the methods used in this area would be more easily transferable from the manufacturing sector.

OBJECTIVES

Although the aims were defined, again the team did not know what the end result or specific outcomes would be. They had however, identified objectives and a structure to work within in order to look at the purchasing process, these were:-

1. to reduce the costs of operating the purchasing system
2. to improve availability, storage and delivery of materials to the point of use (wards etc)
3. to decrease lead times within the system (therefore stocks held)
4. to reduce the number of suppliers and product costs
5. to rationalise product variety
6. to make enough money to pay for the project and eventually make cost savings.

BACKGROUND

Historically St James's Supplies function had evolved with little planned growth, things continued to be done in the way that they had always been done and were geared towards saving money. About five years ago Supplies was devolved down to operating units, essentially three supply teams, to cover:- St James; Seacroft and the Community Hospital. This arrangement was confirmed by the Audit Commission Report in 1991 - which set up the NHSSA (NHS Supplies Authority, see page 12). The NHSSA was able to buy in bulk at the lowest prices and it operated on three levels National, Divisional and Local - St. James's supplies were on the Local level.

In 1991 St James's took the option open to 1st wave Trusts to retain the right to have their supplies staff employed directly by the Trust, instead of by the NHSSA, but they could still use the NHSSA as a supplier and warehousing facility.

The benefits of this were that:-

- St James could retain and pay their own supplies staff,
- it allowed them to purchase direct from the best supplier

- it gave them the ability to gain on economies of scale (as NHSSA gave no reductions for bulk purchases which gave St James no advantage for size),
- they had identified high on-costs with the NHSSA service (some items were on national contract to the health service and they would have to pay the NHS contract price plus approx 10% on-costs - with no room for negotiation).**

The Supplies Manager had a fairly new supplies team consisting of approx 24 people and had intended to implement changes to the system, to improve the quality of the service provided and reduce costs if possible, but not at the expense of quality. He wanted to concentrate on value for money and was looking for a way to do this - make changes whilst keeping everything running - a very difficult task. Collaboration with LES would facilitate this but with the advantage of it being on a structured basis, within a formal project and with the benefit of advice and support from Lucas.

A project team was set up in a separate room, physically remote from the Supplies department and consisted of:

- the Supplies Manager
- a charge nurse from Coronary care (who wanted to move into management)
- 2 Lucas Engineers.

These four people were taken out of their full-time posts for a period of three months, a considerable investment in time and resources. The Supplies Manager brought expertise from the department itself and a background in Finance whilst the Charge Nurse had technical knowledge from the customers perspective (customers being departments, wards, clinicians and nurses - the end users of the purchases). The LES engineers brought Project Management knowledge and methodologies plus the enthusiasm to transfer what were essentially manufacturing techniques into the public sector. Following off-site training they worked within the same three phase process as Project (A), Diagnosis, Design and Implementation.

Phase One was to identify workable objectives, outline proposals and, in the case of the Supplies Project, work on areas for savings. Phase Two was analysing and proving that it could be done and Phase Three was implementing the necessary systems. At the end of each Phase, Board approval was necessary before the team could move on.

*** NB. St James's Hospital merged with Seacroft Hospital in April 1995 and as such has become a 5th Wave Trust (instead of a first). There were concerns that St James's would lose the advantages of not having to be part of NHSSA, but at this point it seems that provision has been made for them to retain their current supplies structure.*

PHASE ONE - DIAGNOSIS

The fully computerised order system showed that St James's was currently purchasing over 14000 product lines from more than 1600 different suppliers. Problems soon became apparent:-

- too many products - they were not buying effectively
- too many suppliers
- too many people interfering in the purchasing system
- too much information in the system.
- too much inventory.

LES's expertise helped to isolate possible areas to tackle. They initially looked at high spend areas and identified selected product ranges for further investigation. Within the 15 Clinical Directorates each ward/department had their own budget. Previously each one ordered whatever they wanted from Supplies as it was needed. Storage was on an ad-hoc basis in individual wards, with stock being spread over many areas, leading to duplicate orders and overstocking for many items. This decentralised purchasing system had simply evolved over time and every budget holder had the freedom to spend within their budgets, ie. medical reps would sell to individual ward sisters. As a result, single items (like syringes) had many different suppliers and the main function of Supplies had been to process all orders raised by all budget holders, on as many as 10-12 different requisition systems (depending on what was being ordered). Thus, the main problem to be addressed was how to stop people having the freedom to chose - which products and which suppliers to use.

Having done the analysis and identified the problem, they had to look for a mechanism which would take into account the needs of Directorates, individual budget holders and the Supplies function and at the same time be transferable for all purchases (old and new). That would be the task of Phase Two.

At the end of Phase One the recommendations were:-

- * to reduce the product range and the supplier base, therefore ultimately reduce purchasing costs.
- * to alter the system of providing goods to wards and departments - storage and delivery etc.
- * to review the ordering system and processes within the Supplies function itself.

These recommendations were accepted and the team moved onto Phase Two - proving what they had said and designing solutions.

PHASE TWO - DESIGN AND PHASE THREE - IMPLEMENTATION

These two phases will be considered together, as once the recommendations were proven to be necessary and/or desirable, implementation was the next logical step and followed quickly. Three areas had been identified as requiring new systems and process design and the next task was to set about proving the need to change the status quo, eg:-

- A) that reducing the product range and supplier base would reduce costs.
- B) that altering the system of ordering, delivery and storage of goods for wards and departments was desirable and/or necessary.
- C following on from B) a review of processes within the Supplies itself in order to implement these changes - a move to Materials Management.

A) Reducing products and suppliers.

The team began by choosing 4 or 5 different product ranges and concentrating on a few high spend departments, eg X ray, renal unit, anaesthetics. Main products and suppliers were analysed and data gathered, for example, the hospital was purchasing 18 kinds of disposable gloves, from disposable plastic costing 50p per 100 to surgeons gloves costing several pounds per pair. A member of the team did a breakdown of where and when the different types were used, spoke to different departments and users, looked at suppliers and arranged trials. The need for some variety was accepted and in the end three types of gloves were decided on - sterile examination gloves, non-sterile and surgeons. None of these were the cheapest on the market but thought to be the best value for money.

Thus, the link between reducing suppliers and costs was shown by looking at such specific examples. The team also investigated possible savings gained by rationalising suppliers eg, anaesthetics bought six perishable items for anaesthetic machines (tubing ect) from six different suppliers at a cost of £45,000 per year. In Lucas's manufacturing experience if all products are sourced from, if possible, a single supplier, then considerable discounts can be negotiated - was this transferable to the hospital? The team went to all six suppliers, they could all provide all six items! One was chosen, discounts negotiated and all items were delivered at the same time in a single drop operation with a saving of £13,000 per year.

The next area to tackle was control over product choice. The Director of Pharmacy and Supplies used a Drug Audit Group for the selection of Pharmaceutical Supplies and this model became one of the recommendations of the Project team for the selection of non-pharmaceutical products. The CEO and the Board accepted this and authorised the formation of a PRODUCT SELECTION GROUP (PSG). This would be chaired by a Consultant and nominations were invited from all interested parties, the Clinical Directorates, technical people (physics, pathology) and from Finance, in all 10-15 members.

Meeting monthly, their brief was to examine the whole range of non-pharmaceutical supplies (the 14000+ products currently in use) group them together and rationalise, giving recommendations on the best value for money items. They would then have the mandate to impose their recommendations hospital wide, for example only the three types of gloves identified in the project analysis can now be ordered, exceptions can be made, if a purchaser can demonstrate a special or even one-off need for a product, then this can be examined by the PSG.

B) Storage and delivery system to wards and departments.

The team examined what was actually being ordered and put the products into three categories (again borrowed from manufacturing):-

RUNNERS - stock items used all the time

REPEATERS - items used occasionally, with known suppliers

STRANGERS - new items, could be one-offs.

All items ordered by budget holders were put into these three categories (by using the computer order data) and patterns for each ward/department were analysed. The existing system was that each ward would decide what it needed and place a requisition through to Supplies. If it was a stock item (RUNNER) a certain order system would be used and the items obtained mainly from NHSSA, if not another sort of order would be raised to individual suppliers - how it was ordered depended on what it was.

What was needed was a procurement system designed around the three groups, Runners, Repeaters and Strangers - this would eliminate the Ward sister having to worry about stock levels. The recommendation was for a Materials Management system to be introduced, which would eventually be hospital wide, controlled by the Supplies function. The old order system had resulted in fragmented stockholding, vast overstocking and bad use of storage space on wards. The need was for purpose built, high density storage and LES recommended a Kanban(*) system of continual replenishment (see page 15).

Upon further investigation, the team found haphazard storage on wards and £200,000 worth of overstocking, this was money tied up in inventory. Once identified, the solution was to stop orders being placed for the next three months to use up the overstocking. With the money freed in this way, each ward invested in high density shelving and converted the main store room for an effective storage system.

()Kanban - based on the Japanese storage bin replenishment system, where stock is ordered as it is used.*

One major problem was to get over people wanting to hold large quantities of inventory "just in case". The Materials Management system was first introduced to one floor of Gledhow wing, now all wards in this wing have their stock managed by Supplies and it has proved very effective.

C) Reorganisation of the Supplies function itself.

The organisation of the department was looked at in the light of the need to expand for Materials Management (but keep within budget constraints). There had been 24 people in the existing Supplies function, 7 or 8 had been buyers processing orders from budget holders, supported by the computer system. Fewer requisitions and orders should reduce the buyers workload, therefore all staff were interviewed and some moved to become Materials Managers with new responsibilities.

The new role entailed close liaison with budget holders on the wards and departments to set appropriate initial stock and re-order levels for all items. In addition, weekly visits were made to the wards to check stock levels and re-order as necessary around the three category groups; **Runners**, ordered weekly, **Repeaters**, with known sources, ordered less often possibly three or six monthly. **Strangers**, were slightly different, these non-stock items are ordered only when required, ie furniture or something for special patients and this can still be done by the budget holders.

Within the Supplies function, buyers had previously been organised around budget holders eg one dealing with all X-ray purchases etc. Following rationalisation of the product range and suppliers, LES recommended that the remaining buyers (after the move to Materials Management) should develop their expertise around product groups. This has been implemented (see Appendix 3).

All this was quite a change for personnel, budget holders could no longer place orders (except for one-offs), however they could still see sales representatives and request the purchase of new items, with the agreement of the PSG. With Supplies staff taking responsibility for stock levels on the wards, there is no money tied up in overstocking or problems over where items are held. Goods should be in the store room bins as they are required and replaced as they are used. Some budget holders saw this as a freedom from tiresome administration, others as a loss of power.

Supplies staff now have new responsibilities, Materials Managers take direct responsibility for ordering, stocking and delivering to wards as and when needed, as well as the initial negotiating of stock levels.

Buyers have developed expertise in specific product areas and built relationships with fewer suppliers. NHSSA and suppliers are the central stores function, with stores at the hospital responsible only for the receipt of goods and distribution to wards and departments as they arrive (usually in ward boxes).

Project B has been very successful and has resulted in considerable cost savings. Almost two years on, it would seem that the brief has been met, the CEO required that this project should ultimately pay for the BPR project collaboration with LES, and this has been done. Future savings on product rationalisation benefit the hospital directly. The project team and the PSG continue to monitor all product orders and the emphasis is on value for money with the most appropriate product being used for quality, safety and customer satisfaction, not necessarily the cheapest.

SUMMARY OF ACHIEVEMENTS FROM SUPPLIES PROJECT

A diagrammatic summary of the old and new purchasing systems is given in Appendix 4.

The Supplies project team met its aims and achieved the following results:-

1. It established mechanisms to review current suppliers and product range.
2. It removed some suppliers and products from use.
3. Reduced stockholding inventory at ward level and transferred funds to buy a "custom" storage system.
4. Created Materials Managers - by reducing number of products therefore buyers necessary.
5. Established mechanisms for assessing new products and controlling the introduction of new products - PSG.
6. Established "technical" support for Supplies.

The new Materials Management system is almost hospital wide and continues to make savings.

PROBLEMS WITH PROJECT B

Few problems were identified during the running and implementation of Project B. Difficulties that were encountered have been outlined below:-

a) Personnel Issues

It is necessary to involve and keep staff informed at all stages of process redesign. This was essential in the Supplies Department itself, where there were worries over the changing roles of buyers and the introduction of Materials Managers. There were inevitable worries over jobs.

b) Political Problems

- Unwillingness to consider corporate views or needs (which could influence the ability to bulk purchase).
- Protectionism/ring fencing - unwillingness to share scarce resources. This can be "played off" to get a toe hold, the divide and conquer principle well known to company sales representatives.
- Parochialism - (It's my budget, I'll do what I want), risk of establishing "mini-trusts".
- There are some areas within the hospital where it was difficult to make progress, eg large powerful Directorates such as Pathology. This has eight different departments all with different responsibilities, who still want to purchase and order independently, retaining the old system - basically a resistance to change.

c) Cross-functional Communication

Adjustment to individual budgets became necessary during the move from the old to the new ordering process, ie - to prevent ordering whilst overstocking was used up, which released funds for the purchase of necessary shelving equipment for Materials Management. This meant that close liaison between Supplies, budget holders and the Finance function was essential.

NATIONAL HEALTH SERVICE SUPPLIES

Supplies in NHS jargon are the consumables needed to keep a hospital going - mostly high volume, high turnover "stock items" and in the past many hospitals suffered from an over abundance of "SLOBS" - an americanism for SLow moving and OBsolete Stock".

NHS Supplies has undergone many changes in the last 30 years. In the 1960s large scale buying was the norm, with regional or sub-regional contracts on a wide range of products including food, drugs, uniforms, bed linen and works materials. Bulk purchase of usually the cheapest goods and economies of scale were common and centralised storage was unknown.

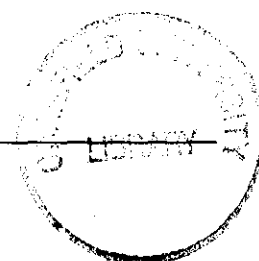
The NHS was also linked to contracts with other Government departments for products already purchased on a large scale, such as vehicles, cleaning materials, office machinery, stationary and catering equipment. The Ministry of Health, later the DHSS and more recently the Department of Health also managed a range of contracts for products specific to the NHS, eg drugs, surgical instruments and patient appliances. At this stage there was very little, if any, user consultation eg food tasting sessions would be attended by supplies officers only, with no representation from the catering staff. The late 1960s, early 1970s saw a detailed review of NHS supplies via the Hunt Committee Report, which called for more involvement of NHS Supplies staff at central level and for Specification Working Groups to examine (nationally) various commodities, from bandages to bedside lockers.

In 1974 the service was substantially re-organised, along with local government. This was an attempt to rationalise a previously misshapen structure and create coherence. Formal authority filtered down through clearly defined hierarchies, the main co-ordinating mechanism was process standardisation - every region, every district was modelled on the same basic pattern. The main charge against this re-organisation was that it created too many layers impervious to efficient management, which in turn created problems over accountability. It would never be easy for such a "machine bureaucracy" ² - large, complex, and over administered to respond to the changes demanded in the 1980s and 1990s.

An external Royal Commission in 1979 prompted more change for the 1980s. There were moves towards a more decentralised service, authority was devolved from areas to districts, general managers were introduced and given targets, along with the power to achieve them.

This period also saw the beginning of increased pressure for closer relationships with suppliers, with the emphasis moving from traditional public purchasing strategies to partnerships - sometimes even with the private sector! The policy for long term relationships between purchasers and suppliers had long been practiced by major companies and industry - the NHS could no longer ignore this. With the move towards competitive tendering and market orientation in the NHS of the 1990s, current procurement arrangements place long awaited emphasis on customer service with direct links between supplier performance and product users.

1991 saw the arrival of the NHSSA (National Health Service Supplies Authority) as the central agency for purchasing. This followed an Audit Commission Report which arose out of a desire to strengthen the newly introduced NHS Trusts and to weaken Regional Health Authorities, who until then had been largely responsible for the organisation of NHS supplies.



This new nationally managed supplies organisation would deal with the largely autonomous Trusts, most of which had their own supplies departments. This was in effect the creation of an internal distribution company and was an attempt to stimulate the supplier/customer relationship in the new internal market now open to competitive forces.

The NHSSA is responsible for an NHS spend currently exceeding £2 billion per year - but is not by any means in a monopoly position. Not all hospitals immediately welcomed the NHSSA, some district hospitals were wary of having these changes imposed upon them - and saw it as an attempt to control their supply chains, whilst others were unhappy about the whole concept of devolved financial control. Indeed some First Wave Trusts (including St James's) willingly took the option to opt out of full membership of NHSSA (see page 5).

An NHS Trust Federation Report in 1994³ confirmed that after more than two years most Trusts were "disappointed" with the service from NHSSA and indicated that 38% of Trusts are looking beyond NHSSA for at least some items. Suppliers (and customers) realised the benefits of direct contracts with Trusts and the Report points out that "with many Trusts developing their own sophisticated logistics systems, they will not even need NHSSA's warehouses". St James's tackled these issues by looking closely at all their purchasing processes and the introduction of Materials Management and the Product Selection Group is their individual response to the complex issues facing public sector purchasing today.

Most hospitals accept that changing their purchasing structure would overcome some inherent problems, such as:-

- a power struggle for the control of purchasing between nurses, clinicians, the supplies department and finance.
- competition between Trusts and sometimes even with the NHSSA to obtain the best price from individual suppliers,
- best use of MIS and databases, other IT issues
- improved supply chain management.

These are all logistics issues and even if late in the day, it is now recognised that progress in this key area is essential for the smooth running, cost effectiveness and enhanced service provision of all organisations.

KANBAN

Historically in most cases - including St James's, ward sisters had been responsible for ordering stock and until recently at least, many had a budget but may not have been directly accountable. Often ordering methods had not changed for many years (except for new product introductions) and those placing the orders did not always compare costs of similar items (or other suppliers) and were even less aware of costs incurred by inventory holding. What was important to them however, was not to find themselves in a "stock out" situation and with the flow of stock to the wards often slow and unpredictable, over-ordering was normal to be on the safe side and was also used in case barter or transfer was necessary with other wards, to overcome any out of stock situations which could arise on high turnover items.

This was borne out by the huge amounts of overstocking found on pilot wards during the Purchasing project at St James's. With stock in many locations, most wards were able to use up their stockholding over a period of three months, and thus saved enough to furnish and establish central stockrooms for each ward. This would be customised storage to facilitate the implementation of a Kanban system.

Kanban - the Japanese word for card, is a tool for implementing Just-in-Time (JIT) production. The theory of JIT has been in existence for many years and was first introduced in Japanese automotive plants. Whilst popular, it has not been universally accepted in the West, where many manufacturers found it "difficult to let go of the security blanket provided by inventory"⁴. For many organisations (or even departments within organisations) inventory provides the comfort of knowing that materials will always be there when needed. As outlined, the Project team found vast overstocking of both often and rarely used items, with duplicate stores and lending and bartering between wards - many items were held Just-in-case!

The JIT concept encourages the use of a limited number of suppliers, and a consequent reduction in inventory levels, since with JIT production (and delivery) there is no need to hold inventory in anticipation of forecast demand. Instead materials are provided only as they are used or needed. It soon becomes obvious that in order to work satisfactorily this method is founded on enhanced communication with selected suppliers and the building of trust and confidence - trust on the part of the end user that goods will be replenished and confidence on the buyers part that suppliers will restock as required. This in turn must lead to closer partnerships between them.

Inventory can be used by manufacturers to compensate for shortcomings in a production system. By reducing inventory waste is eliminated and opportunities for improvement are exposed.

Amongst the pitfalls of excessive inventory holding are:-

- Admin - high inventory requires additional staff for control and management of the stock holding - but does not really add value.
- Space - excess warehouse and/or storage space is required to house excess inventory - for manufacturers this space would be more effectively used in production. At St James's storage was haphazard and led to duplicate ordering, consequently,
- Inventory accuracy - problems arise when accounting for large amounts of inventory, it is difficult to keep track of.
- Degeneration of materials - the longer material sits on a shelf the more prone it is to damage or degeneration. It was difficult on wards to ensure that everything was used in order - eg oldest first, money can be wasted on expired or obsolete items.
- Hidden quality problems - with high inventory holding, quality problems can go undetected for long periods of time.

Whilst there is no such thing as JIT purchasing there are purchasing strategies to support JIT production - one such is the Kanban system. In its most common and original form Kanban was a card containing product information. It would identify a part number, delivery and workcell location, description, quantity, suppliers name etc. It has come to mean a method of inventory holding usually in the form of bin replenishment. For example, a Kanban quantity (a kind of economic order quantity) would be decided for each product held in stock, once determined all containers for that item should contain the same quantity - once the card or re-order number is reached it is automatically replenished.

This was one of the first jobs for St James's Materials Managers who liaised with ward staff to determine what would be the re-order quantity and period for each item used on the ward. For example, Runners would be re-ordered and stocked to the required levels on a weekly (or more often if necessary) basis, Repeaters at set levels ect. This is a visual system - it is always possible to see how much of everything is left and it should never be possible to go below re-order level - as there should always be a new bin/container ready for use.

Reorganisation of the Purchasing and Supplies Department played an integral part in laying the groundwork for successful Kanban implementation. It needs the adoption of new, often "revolutionary", ways of doing business - at least very different from the status quo.

For St James's the collaboration with LES was a real opportunity to change the old purchasing philosophy. In becoming Materials Managers, the old Buyers had real control over order levels, stock quantities, and relationships with end users and suppliers. Instead

of just ordering goods in response to a document for set budget holders, a Materials Manager could work on building a relationship with suppliers around product groups, gain expertise in their particular area and negotiate best value for money deals.

BENEFITS of the new system were:-

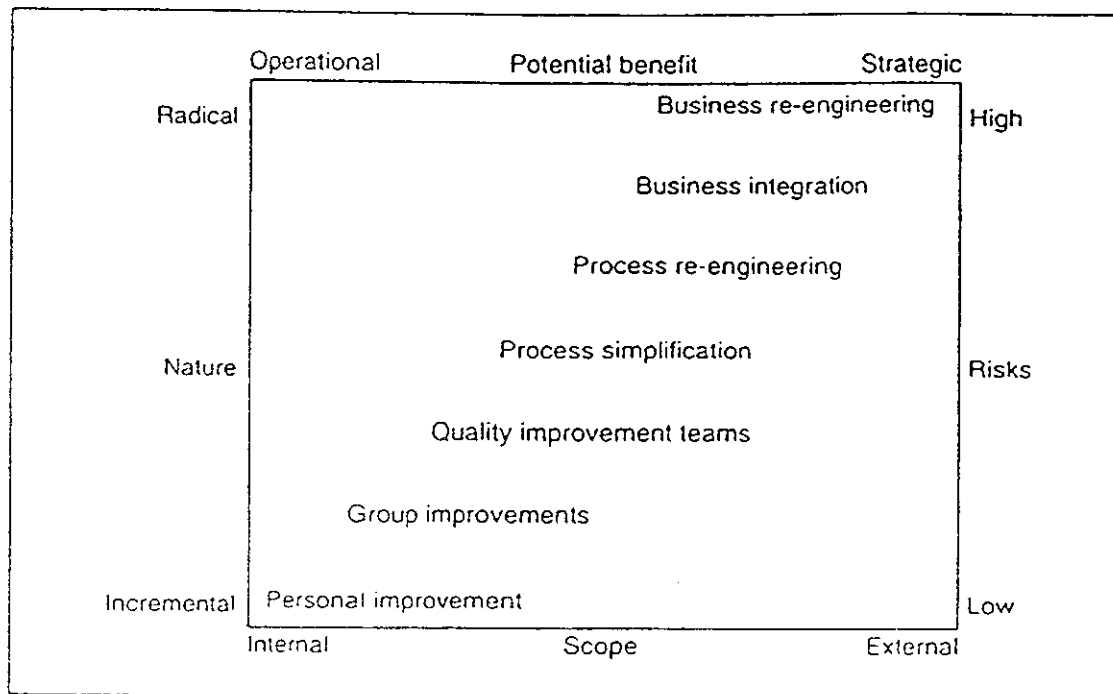
- * flexibility - goods ordered as and when needed or used,
- * quality - best value for money products,
- * no stock outs or overstocking,
- * partnership, with Materials Managers as the facilitators,
- * reduced lead times for deliveries,
- * increased inventory turnover,
- * less storage space required, centralised, customised storage on each ward. Kanban is point of use delivery - everyone knows where stores will be.
- * transactions decreased - fewer requisition documents and administration.

In theory the Kanban system virtually guarantees parts availability - in the case of the Purchasing project, this storage and delivery system is almost hospital wide and has provided admin, budgetary and inventory savings.

ELEMENTS OF BPR AND LOGISTICS

Manuscript 14 will further explore the transfer of BPR from its origins in industry and manufacturing systems design to that of business, administrative and organisational processes. It is sufficient here to reiterate that from roots as diverse as Kaizen (a process oriented philosophy of continuous improvement from Japan) TQM (a holistic philosophy of management) and logistics approaches outlined below, such as time based competition and lean production, BPR can be slowly introduced or fully embraced by almost any organisation. A more complete representation of process improvement activities is presented in Figure 1 overleaf.

Here, the axes differentiate between the radical and incremental types of BPR, the potential benefits and risks to be gained from change programmes and the scope of the programme. For example; the scope of change in the bottom left hand corner is restricted to personal improvement. This type of change, where an individual within a function seeks to improve his or her part of a process is essentially small in scale, internal in scope, low in risk and operational in outlook.



Source: Childe, S.J., Maull, R.S. and Bennett, J.⁵

At the other end of the scale BPR takes the radical approach of re-designing the organisation and its processes and is strategic in nature. The focus is on internal and external growth and although high risk has the potential for substantial gain.

The Purchasing project lies in the centre of the matrix and encompasses Group Improvements (medium risk, incremental change and is operational in nature) Quality Improvement Teams (investigating process change in various functional areas, considering customer/supplier relationships as well as own processes) and extends to Process Re-engineering (reducing the numbers of activities, organisational and job redesign, new operational systems and introduces strategic benefits).

This approach is probably the best that can be hoped for in a public sector organisation, since such radical rethinking as advocated by Hammer's "Neutron bomb"⁶ approach would be impossible within such traditional, hierarchical, functional based public organisations such as local authorities, hospitals, and police forces. Any changes and process improvements which increase efficiency; cut down on non-value added activities and improve overall competitiveness and service must be welcomed - and if they also bring cost savings and budget improvements, as in the project under discussion, so much the better.

Focusing business activities around information flows represents one way of improving or redesigning processes - and goes some way to understand why BPR initiatives are often built around IS/IT departments. Information Technology is in itself an enabler to re-

engineering processes, but the focus of attention should be on simplifying the processes before determining the IT requirements, but "process integration is more fundamental than linking computers and unifying databases, it is a management philosophy".⁷

For many companies the move to improve processes is not only cost driven, the logistics concepts of time based competition and lean production are of major importance in BPR. Time based competition is by its very nature process oriented, in that it aims to radically reduce the time required for part of or an entire process to be carried out. Stalk ⁸ outlines the subsequent benefits as increased productivity and efficiency, reduced risks and increased market share - or perhaps in the case of a hospital - shorter waiting time, improved patient throughput etc. This will be further explored in Manuscript 14, but an important element is the need to distinguish between adding-value operations and adding-cost operations, in order to eliminate waste (time and cost).

A good overview on this is given by New ⁹,

"We accept as adding value operations those things which it is reasonable to expect a customer to pay for, in the sense that they transform in some way the material being processed.....cutting, mixing, processing, assembling, packing, configuring, dispatching - everything else adds no value, only cost eg....moving again, counting, finding, chasing, storing, reworking, batching, inspecting, recalling, recording. The objective is clear; keep the things which add value, get rid of the things which add cost."

Lean production is defined by Womack et al ¹⁰ as transferring "the maximum number of tasks and responsibilities to those workers actually adding value... and it has in place a system for detecting faults that quickly traces every problem, once discovered, to its ultimate cause". This concept assumes a detailed understanding of how processes operate (as in process mapping undertaken by the Project teams) since without it no attempt could be made to identify added value.

The questioning process is at the heart of strategic planning and to some extent BPR. This is also engrained in the Japanese ethos eg Toyota's Five Why's ¹¹, which arose from the need to make improvements in existing technology by questioning. An example involves an operation in the manufacturing of sunglasses. After the temple and frame were moulded they were passed over by a small open flame to remove the "flash" left by the moulding process. The team that encountered this problem challenged this activity as not adding value and thus the need for the procedure in the following way....

Q. Why is it necessary to flame treat?

A. Because there is a plastic parting line that would cause discomfort to the wearer.

Q. Why is there a parting line?

A. Because the mould faces do not meet.

Q. Why don't they meet?

A. Because they are not maintained flat.

Q. Why aren't they maintained?

A. Because no-one ever questioned it before, we simply corrected the outcome.

Q. Why??

Five Why's usually get to the root of the cause of a process problem and can enable the elimination of non-value adding steps in a manufacturing or administration process. This kind of questioning is at the core of BPR projects where teams first have to get to the very basics of how and why people do things the way they do, "because it has always been done that way" is no longer good enough.

BPR AND PURCHASING

"BPR provides an opportunity to review the **purchasing process** rather than the **purchasing function**".¹²

A British business spends on average 55% of its total production costs on buying in goods and services, with the figure for many manufacturers rising to over 80%. Another 10-20% can go on storage, handling, distribution and other supply chain costs ¹³.

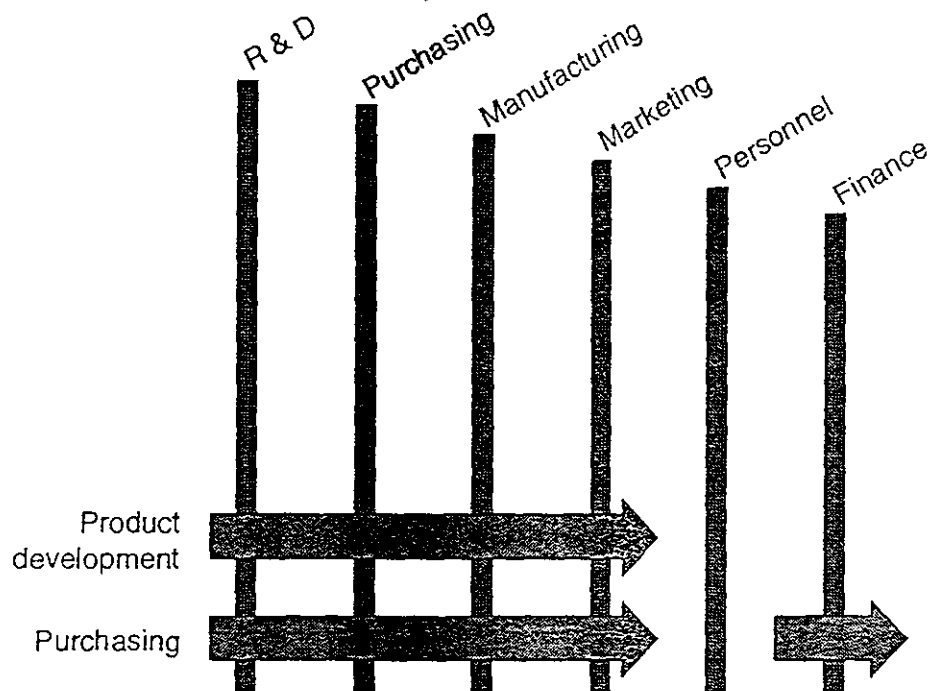
Other research in 1993 ¹⁴ among managing and finance Directors showed that 1 in 5 did not know what their organisations spent on buying in goods and services. This undoubtedly indicates room for improvement in most organisation's purchasing, regardless of whether it is a function or process!

Some organisations are beginning to acknowledge that purchasing and supply chain management plays a strategic role in reducing bottom line costs and over the past few years, purchasing has moved from merely procuring goods and managing prices to become a key business process for all organisations. It touches most of the organisation but in the past strenuous efforts were made to contain it within its functional boundaries. Process innovation and redesign investigates interfaces between purchasing and internal departments, and purchasing and external suppliers.

Such innovations have led to many organisations adopting JIT, partnership sourcing or supplier quality improvement programmes which are now standard commercial practice.

Historically (and this applies to public and private sector organisations) the purchasing function did not have total control over the purchasing process - other departments would specify products, nominate suppliers and even place contracts (see below)

Management functions (vertical) versus
business processes (horizontal)



Source: Evans, E. 12

As already shown the re-engineering of a function such as purchasing, can have many drivers, such as lead time issues, cost reduction, service improvement, or as in the case of St James's the need to rationalise the products and suppliers used - with the desired end result to reduce costs.

Other organisations have used innovative approaches when addressing purchasing issues, among the best known are:-

- Marks and Spencer used BPR to eliminate unnecessary paperwork in their buying process,¹⁵
- Wal Mart changed to continuous stock replenishment and introduced supplier shelf management ¹¹
- Ford Motor Co. instituted "invoiceless processing" and achieved dramatic improvements for its order fulfilment process ¹⁶

These are specific examples but many organisations who have accepted and employ supply chain concepts to their purchasing and logistics processes have probably used elements of BPR to achieve improvements in lead times, defect rates, inventory levels and costs.

The key issue with BPR is that it provides an opportunity to review the purchasing process rather than simply the function - it is higher risk but St James's found it to be an opportunity well worth taking, and now enjoy better relationships with both end users and suppliers; more efficient storage and delivery of goods; better value for money products being used and an improved bottom line showing year on year cost savings.

CONCLUSION

Case work undertaken with St James's Hospital aims to fill the demand for *real* cases and not just give academic advice on how to "do" BPR. Following a real case from inception, through design and implementation, analysing the problems and benefits and discussing the next steps, will hopefully prove a valuable learning experience for anyone in the field of purchasing, supplies, procurement or materials management. Although the case investigates process and system change via BPR, within a public sector organisation, there are many areas that would be of interest to students and managers of different levels and in many diverse industries, who could learn from this interesting and innovative collaboration. It shows just what can be achieved when tried and tested industrial methodologies such as the "kanban" delivery system, is applied in a new context and highlights the very real financial and organisational benefits that can be gained from product and supplier rationalisation.

In today's competitive market organisations must be lean and flexible and this form of stock delivery and storage, and materials management is the way that St James's have moved beyond traditional purchasing and procurement methods to embrace some of the best new ideas offered via LES, from manufacturing and industry. They should realise the benefits for many years.

Following examination of the St James's projects and others within the NHS, some questions regarding the use of BPR in this area will be further explored in Manuscript 14 ie;-

- how transferable is BPR from private to public sector
- are the problems encountered inherently the same
- how important is organisational culture as a barrier or an enabler in such projects
- what lessons can be learned for other public sector organisations contemplating using BPR.

NB. The author gratefully acknowledges the help given by staff at St James's Hospital, Leeds, during the research for this Working Paper.

APPENDIX 1

INDUSTRY NOTE

The 1979 election victory by the Conservative Party in the UK has had a profound impact upon the structure and culture of public sector organisations. Many profitable state industries were privatised whilst a new strategy was adopted for public sector services (previously run around the welfare ethos) based on the creation of "internal markets"; budgetary devolution and competitive tendering (internal and external). These new markets are best illustrated by the health and education sectors and the UK public sector is now characterised by a competitive contract system and devolved responsibility for performance at individual business unit level (hospital, Health Authority, school).

The State remains the primary source of funding, thus the UK Government gives Local/Regional Health Authorities funds to purchase or commission health care on behalf of their population. Health Authorities then commission hospitals or Trusts to fulfil a series of contracts, delivering set amounts of operations/admissions over a given time, eg 1993 St James's was contracted by Leeds HA to provide 4695 in-patient episodes of general surgery, a set number of maternity deliveries etc.

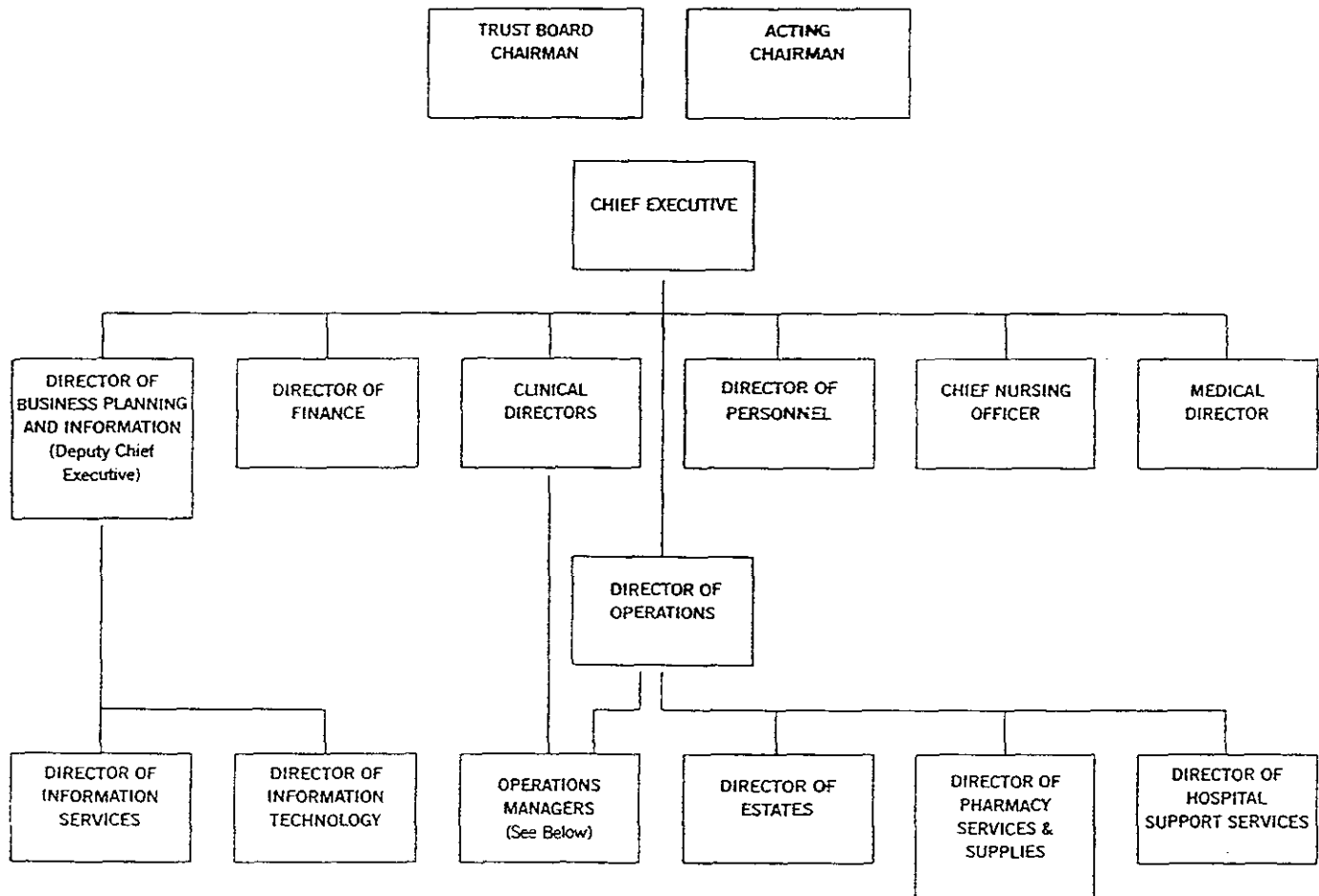
Local Health Authorities are the customers and patients are seen both as customers and the "products" of the system. The waiting list represents the order book - and the objective is "order fulfilment" - a successful admission and operation for patient, giving customer satisfaction and fulfilling contractual obligations for the LHA. Therefore, since processes influence the order book, if they are not carried out correctly or efficiently, people could go and buy the "product" elsewhere. The hospital needs to ensure that its processes are as effective as possible so that all customers (General Practitioners, Health Authorities and patients) are happy with the product.

It is important to remember this background, especially the funding implications (which are fairly new to the NHS) when considering this case. The modern NHS, like all other businesses, has many financial constraints; income generation, budget performance, return on assets and contract targets. It must also strike a balance between its customers and other stakeholders. Over the past 4 years the organisation has had to undergo major changes in moving towards market orientation. Project B as outlined in the case, sits more easily into this culture, since the hospital still needs to be able to gather and collate information for contracts and costs, this would be impossible if the central functions were dismantled. Projects such as A, if it were extended, would fragment the organisation and information for purchasers, patients and Local Health Authorities would be spread over up to 15 Directorates. This was not a potential problem for Project B and may have contributed to its success.

ST JAMES'S UNIVERSITY HOSPITAL TRUST

Corporate Management Structure

July 1994



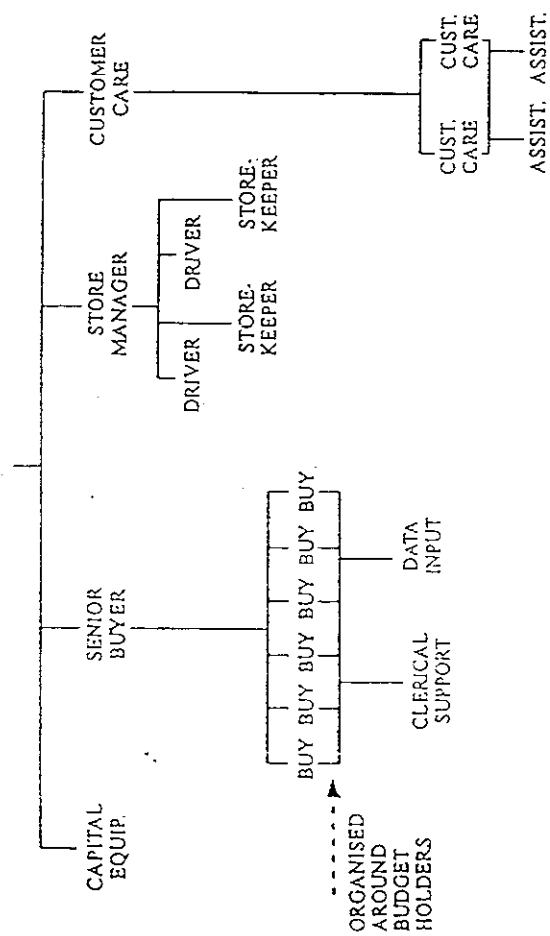
CLINICAL DIRECTORS

Accident & Emergency
 Anaesthetics
 Children's Services
 Elderly Services
 General Medicine
 General Surgery
 Intensive Care
 Orthopaedic Surgery
 Pathology
 Radiology
 Renal Services
 Plastic Surgery
 Special Surgery
 Theatres
 Women's Services

OPERATIONS MANAGERS

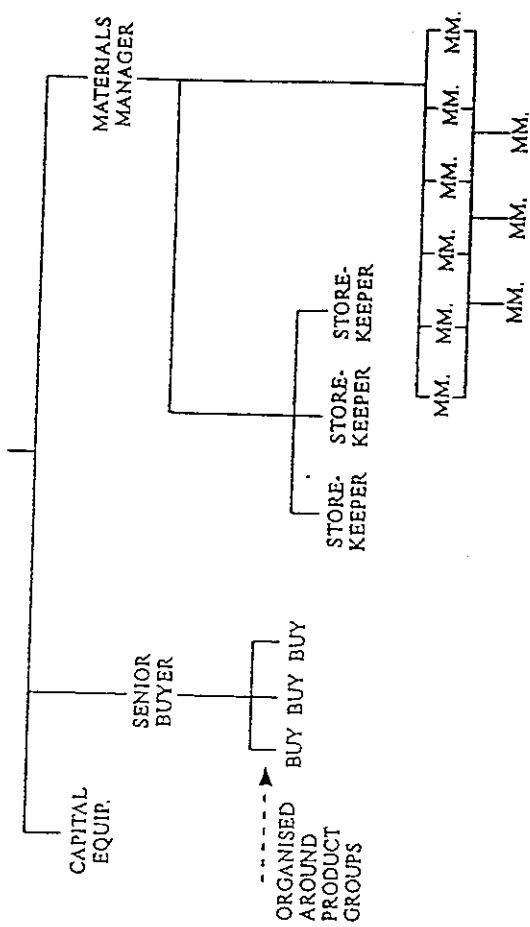
Children's Services
 Elderly Services
 General Surgery
 Medical Services
 Operating Theatres
 Renal Services
 Special Surgical Services
 Women's Services

EXISTING SUPPLIES STRUCTURE



TOTAL STAFF = 20

ULTIMATE SUPPLIES STRUCTURE

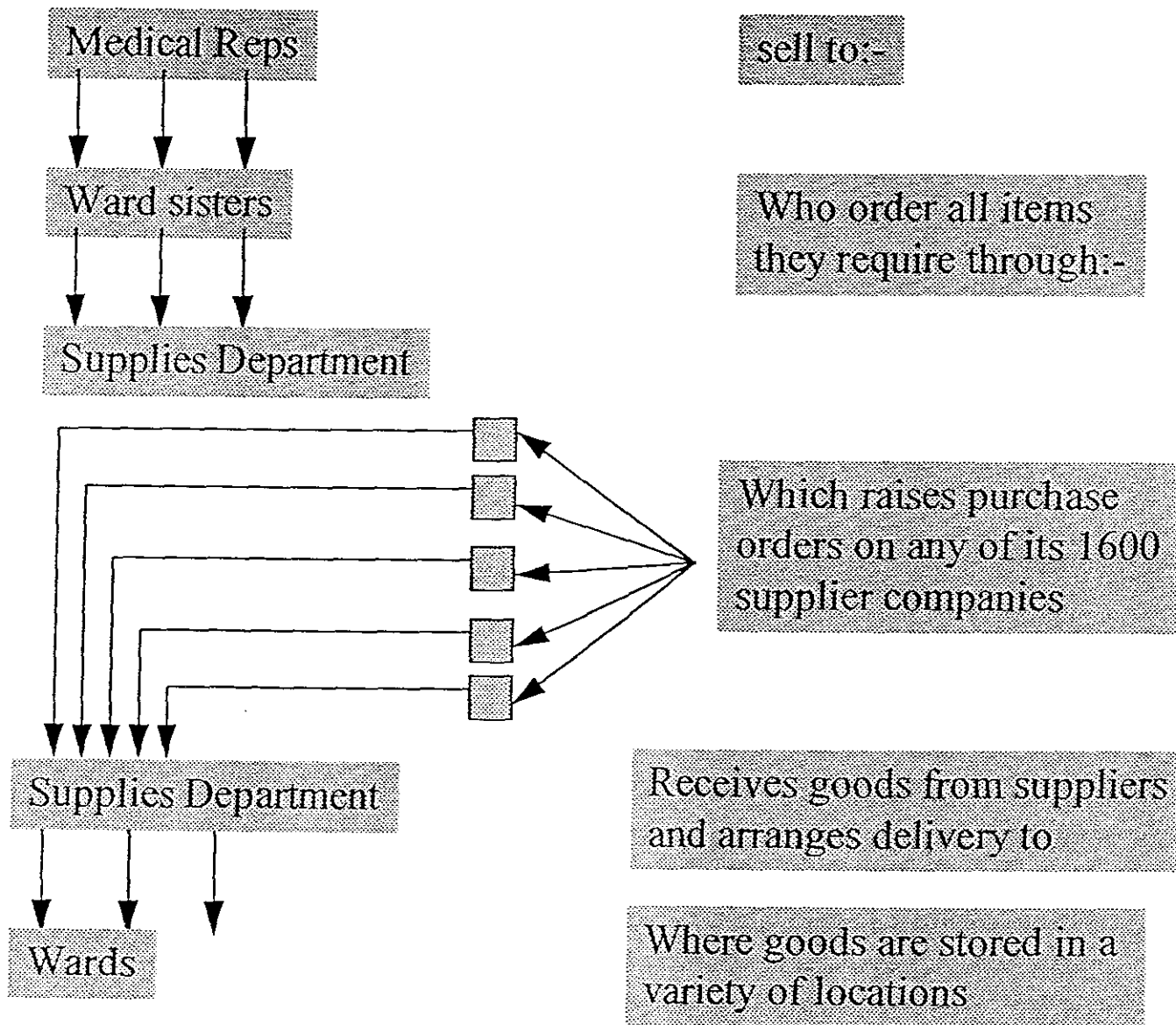


TOTAL STAFF = 18

HEALTH CARE SUPPLY

Case Study: St James's Hospital, Leeds

1. OLD SYSTEM



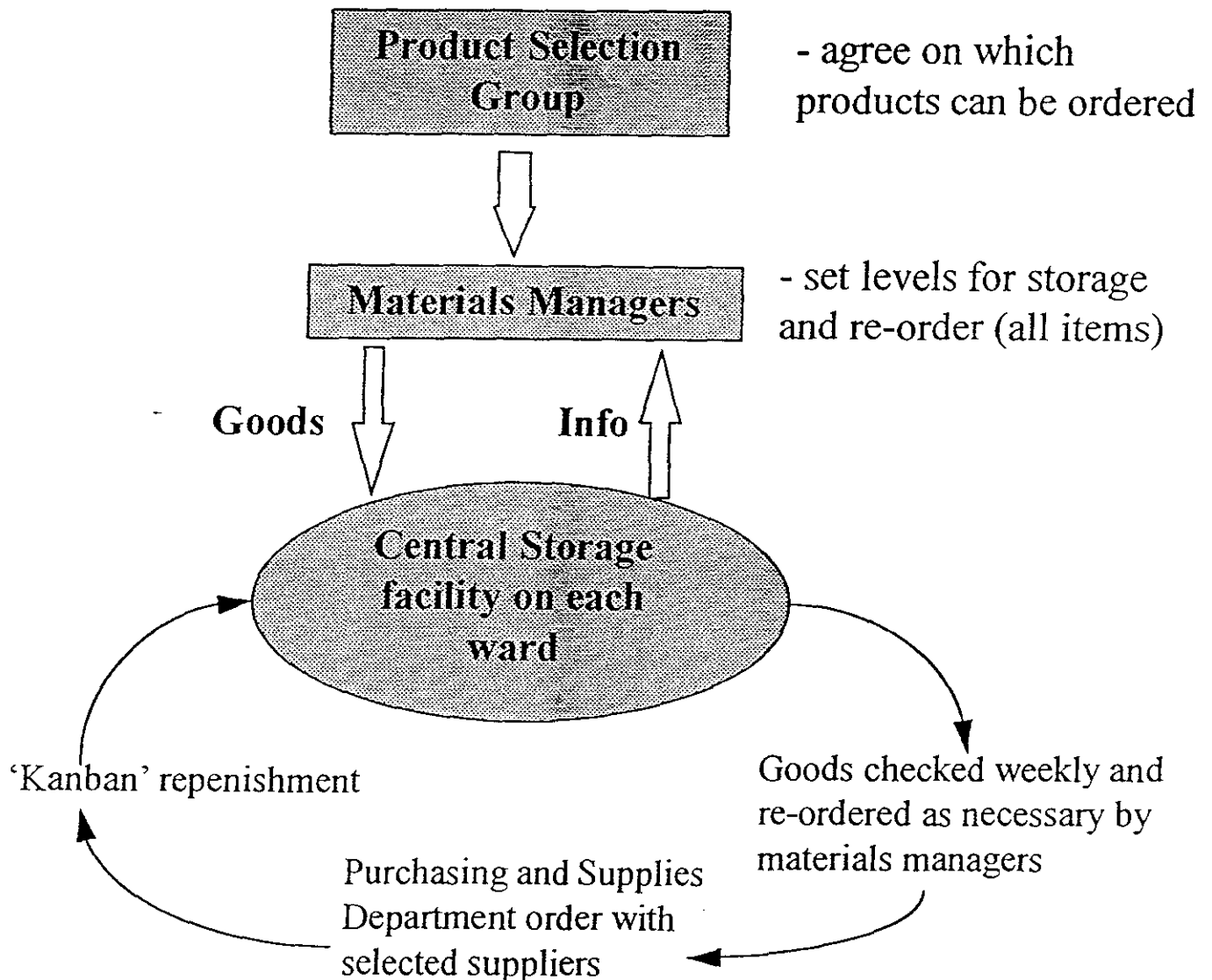
RESULT?

Overstocking, obsolete/time-expired inventory, money tied up in excess inventory, stockouts, bartering/exchange between wards

HEALTHCARE SUPPLY

Case Study: St James's Hospital, Leeds

2. NEW SYSTEM



RESULT?

Continuous replenishment of goods according to use means low inventory levels, few stockouts.

Preferred suppliers means lower unit costs of supplied goods

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