The development of an integrated system for the management of pharmaceutical and surgical consumable products across a group of private hospitals:

INNOVATION REPORT.

Submitted by

Constandina, Dena van den Bergh

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Eng D

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University of Warwick

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ABSTRACT

Continued pressure to reduce costs and manage healthcare delivery in risk-based reimbursement environments, has, internationally, resulted in hospitals adopting different methods to manage pharmaceutical and surgical consumable products. An initial review of systems of management of these products showed that the trend is to manage them separately. Pharmaceutical products are managed using dedicated resources and structures in each hospital, which may be difficult to establish and sustain in smaller, non-academic hospitals. Amongst other factors, the absence of a classification system and a lack of utilisation information hindered the development of management systems for surgical consumable products. In addition, traditional materials management processes applied to these products, often do not adequately address the impact that these products have on clinical care. In this study, the decision was made to develop an integrated system for both pharmaceutical and surgical consumable products and to adopt a systems approach in which all hospitals in the group were included as a single system.

The study was multi-methodological with the design being contextual and qualitative and the research strategy, exploratory and descriptive. A multi-phased, action research approach was used, comprising of three (3) cycles, two (2) in which the integrated system was developed and enhanced and a third in which it was independently tested in 19 newly acquired hospitals.

The result of the three (3) cycles was an implemented integrated system across 43 acute-care hospitals in the group comprising six (6) processes namely: a product selection process, information technology (IT) support system, a hospital implementation process, measurement and management tools, pharmacy capability and a supplier strategy and interface process. These processes included several key unique features, such as one (1) product selection team for all hospitals, a surgical classification system based on functional therapeutic uses, a single IT system and utilisation review capability for all products, extending the role of pharmacy departments in hospitals to include the management of surgical consumable products and an integrated quality assessment process for both types of products. By the end of the three (3) cycles (September 1999), the product selection process covered 66,5% of value of product spend, the percentage reduction in the number of products used was 68% and the value of products purchased that complied with specified products and suppliers was 90%. Ongoing and further application showed that the integrated system could be sustained in existing hospitals, applied to a further four (4) newly acquired hospitals and expanded to include specialised pharmaceutical and surgical consumable products in cardiac catheterisation laboratories. By September 2003, the total spend on pharmaceutical and surgical consumable products had reached R1,7 billion. The product selection process covered 67,6% of total spend, the compliance value reached 95% and there were additional financial improvements realised.

Following a further literature review, limitations and improvements to the approach were identified and further adaptations were added as concepts in the graphic representation of system. One (1) of these was to show the integrated system as an open system. The second adaptation highlighted the systems-based input-process-outcomes feedback concept that is critical to continuous improvement of the system. In the final progression, a systems approach to strategic planning and management was incorporated in order to provide a structured approach for adapting to the rapid and ongoing changes in healthcare and aligning the system of management of pharmaceutical and surgical consumables to the overall business strategy.

Overall, this research study succeeded in bringing new perspectives and an innovative approach to the management of pharmaceutical and surgical consumable products by developing and implementing an integrated system for both products, establishing essential processes with key unique features and tools, and the application of a systems thinking approach. Four (4) areas of further research are suggested, namely testing the integrated system in other contexts, improved methods of measurement of quality of care, extension to other areas of healthcare and use of the systems approach in other areas of the business.

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GLOSSARY/ABBREVIATIONS

The following definitions and abbreviations were utilised during this study:

AHL

Afrox Healthcare Limited - a leading provider of private healthcare in Southern Africa, including an acute care hospital division and a healthcare services division.

APMS

Afrox Pharmacy Management Services (see also under HHD).

ASHP

The American Society of Hospital Pharmacists, now known as the American Society of Health Systems Pharmacists.

CEO

Chief Executive Officer.

CFO

Chief Financial Officer.

CIS

Clinical information systems.

CME

Continuing medical education.

CPOE

Computer-based prescriber/physician order entries

DDD

The abbreviation for Daily Drug Dose, which is defined as the quantity and frequency that a drug must be taken in 24 hours.

DOH

The abbreviation for the Department of Health.

DTC

Drug and Therapeutics Committee. Also know as pharmacy and therapeutics committee (PTC).

DUE

Drug Usage Evaluation. Also known as drug utilisation review (DUR).

DUR

Drug Utilisation Review. Also known as drug usage evaluation (DUE).

EBM

Evidence-based medicine.

FIP

Federation Internationale Pharmaceutique also known as International Pharmaceutical Federation.

GPI

Group purchasing information – a database of purchases of pharmaceutical and surgical consumable products across AHL acute-care hospitals.

HHD/APMS

Home and Hospital Dispensaries – the pharmacy management company owned by Afrox Healthcare Limited which later changed its name to Afrox Pharmacy Management Services (APMS).

HMO

Health management organisation.

IT

Information technology. Also known as computer systems.

MAC

Name for the AHL hospital billing system.

MOC®

Managing Organisational Change – a structured methodology developed by the company ODR for use in implementing major changes.

ODR

A research and consulting company in the United States of America specialising in the study of how people respond to change.

PAR

Participatory Action Research.

Per diem

This is a financial term used in the healthcare environment meaning that a fixed amount is paid per day regardless of the procedure or the products and services used.

PEMG

Port Elizabeth Medical Group.

PharMs

Name of the stock management system developed by APMS and managed through the pharmacy department at each hospital.

PTC

Pharmacy and Therapeutics Committee. Also known as Drug and Therapeutics Committee (DTC).

RPSBG

Royal Pharmaceutical Society of Great Britain.

SA

South Africa

UK

United Kingdom.

USA

United States of America.

PREFACE

This submission covers the innovation report for the study.

The submission is divided into nine (9) chapters, namely:

- Chapter 1 describes the links between the business objectives and the research aims of the study and outlines the review of international systems of management of pharmaceutical and surgical consumable products;
- In Chapter 2, the research objectives, design and methods are described;
- Chapter 3 provides an overview of the three (3) action research cycles of the study in order to determine what is needed to develop and maintain an integrated system for the management of pharmaceutical and surgical consumable products;
- The progression of the integrated system over the action research cycles is described through graphic representations in Chapter 4;
- In Chapter 5, the integrated system is compared to international systems through further literature examination;
- Applications of the integrated system since the three (3) action research cycles are described in Chapter 6;
- Reflections of the business objectives are covered in Chapter 7;
- A further progression of the integrated system is described in Chapter 8 and benefits discussed; and
- In the final chapter the innovations of the study are summarised and focus areas for further research highlighted.

CHAPTER 1

CONNECTING RESEARCH AND BUSINESS PRACTICE

1.1 INTRODUCTION

Transformational processes in organisations are often initiated by some force that alerts people to the need for change. Examples of these force factors include underperformance, decreased productivity or changing market conditions (Fletcher, 2003:8).

In this study, the force factor that initiated the need for change was Afrox Healthcare's (AHL) acquisition of the six (6) hospitals in the Port Elizabeth Medical Group (PEMG) in 1998. This acquisition provided a critical mass of 25 hospitals, which made AHL a significant player in the private healthcare industry. The thinking in the organisation began to change from running a number of single entity hospitals to the question of " *…how do we make the whole greater than the sum of its parts?"* The consolidation of hospitals into a larger group had the potential for delivering significant economic benefits to the organisation through the realisation of opportunities for synergy and leverage.

Independent studies have shown that most change initiatives and reengineering projects fail (Armenakis & Harris, 2001:169). Failure rates have been shown to be around 70% in studies of reengineering, and in studies of corporate transformations, up to 50% do not survive the initial phase (Champy, 1995:29 and Kotter, 1995:59). Furthermore, studies of merged or acquired companies

showed that merger objectives were only met half of the time, and synergy and leverage objectives relating to cost reduction were the least achieved (Feldman & Spratt, 1999:9).

In approaching the opportunities and problems presented, rather than use a conventional reengineering approach, I chose to connect business practice and research. From a business perspective, my aim was to achieve the main business objective of leverage. As research practitioner, I set out to develop new perspectives and bring new thinking to the opportunity/problems and thereby contribute to wider learning. The approach offered the challenge of using the new perspectives and thinking to create new ideas, act on them and test them out in practice.

To meet this challenge I used an action research paradigm that included a participative collaborative process, as well as independent critical review and conceptualisation by the researcher (myself). Details of the research methodology will be provided in Chapter 2.

1.2 DEFINITIONS

Within the context of exploring opportunities of leverage for the larger group, the focus of this study was to explore opportunities relating to the management of pharmaceutical and surgical consumable products.

Pharmaceutical products, also referred to as drugs or medicinal drugs, are defined as any chemical compound that may be used on or administered to humans or animals as an aid in the diagnosis, treatment or prevention of disease or other abnormal condition (Dorland's Illustrated Medical Dictionary, 1994). Examples include antibiotics and pain medicines (analgesics).

Surgical consumable products, also known as medical consumables or medical/surgical devices, are defined in this study as products other than pharmaceutical products or medicines that may be used on humans or animals as an aid in the diagnosis, treatment, monitoring or prevention of a disease or other abnormal condition (UK Medical Devices Agency (MDA), 2003:5). Surgical consumable products do not achieve their primary intended purpose through chemical action within the body of man or animals, nor are they dependent upon being metabolised for the achievement of their primary intended purpose (U.S. Food and Drug Administration, 1998:1). Examples include bandages, wound closure products, prosthetics, surgical gloves and catheters. Instruments, apparatus and machines were not included in this study as surgical consumable products, since they are standard fixed items rather than consumables, i.e. used up during the course of diagnosis or treatment of a patient.

In keeping with the combined business and research approach, I will firstly present a summary of the rationale for the study in AHL. As background to the research aim, I will then present an overview of the international and national perspective of the management of these products. Key differences in my approach compared to other studies will be highlighted and discussed. Finally I will show the combined business and research approach in a concept map of the study.

1.3 RATIONALE/MOTIVATION FOR THE STUDY IN AHL

AHL, listed on the Johannesburg Stock Exchange (JSE) as Ahealth, is a leading provider of private healthcare in Southern Africa. The group holds approximately 34% of the South African private healthcare market through a diverse portfolio of healthcare-related services and investments. The acute care hospital division, which accounts for almost 80% of turnover (Jankelow, 2000:5), forms the core of the business and is the focus of the study. (The abbreviation 'AHL' will from here

on refer to the acute care hospital division only). The said division began with three (3) hospitals in 1983 and through a series of acquisitions has progressed to over 60 hospitals to date, of which 18 are same-day surgical centres linked to hospitals (see Figure 1.1).

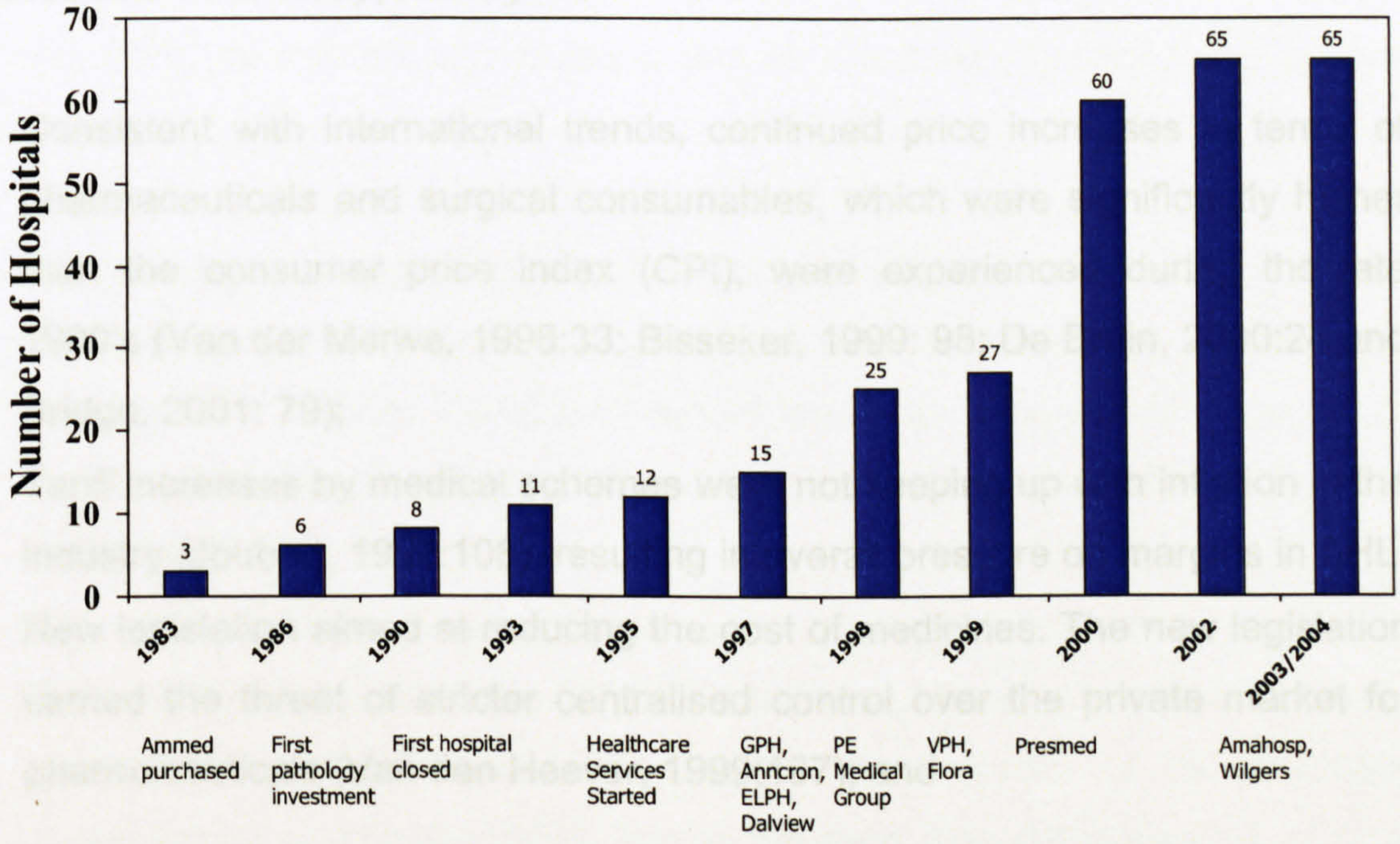


Figure 1.1: Growth in number of acute care hospitals in AHL: 1983 – 2004

In June 1997 I was appointed as managing director (MD) of the pharmacy management company of AHL, known as Home and Hospital Dispensaries (HHD) Pty Ltd. An analysis of hospital turnover at the end of 1997 indicated that pharmaceuticals and surgical consumables made up almost 45% of total group hospital turnover. The total purchases for these products amounted to R 236 million, and of that R 124 million and R 112 million were spent on pharmaceuticals and surgical consumables respectively. There were 28,000 individual products within the two (2) categories of which approximately 6000 were pharmaceuticals and 22,000 were surgical consumables. This ratio was duplicated in individual hospitals where approximately 10,000 to 15,000 different

products were used, depending on their size and number of medical and surgical specialties offered.

In addition to the opportunity to leverage the total group usage, there were several external changes (driving forces) that directly influenced my decision to proceed with this study, namely:

- Consistent with international trends, continued price increases in terms of pharmaceuticals and surgical consumables, which were significantly higher than the consumer price index (CPI), were experienced during the late 1990's (Van der Merwe, 1998:33; Bisseker, 1999: 98; De Bruin, 2000:24 and Bridge, 2001: 79);
- Tariff increases by medical schemes were not keeping up with inflation in the industry (Joubert, 1997:106), resulting in overall pressure on margins in AHL;
- New legislation aimed at reducing the cost of medicines. The new legislation carried the threat of stricter centralised control over the private market for pharmaceuticals (Van den Heever, 1999:167); and
- Medical insurance companies (referred to as "*funders*" in SA) had begun to introduce new reimbursement systems such as fixed fees (fixed fee per procedure or per diagnosis) or per diem fees (a set fee per day regardless of the procedure) that placed a risk on hospital providers, both with regard to price and the utilisation of pharmaceuticals and surgical consumables (Tuft 1997:31 and Van der Merwe, 1998:34).

In AHL, an important medical aid moved its hospital reimbursement to a per diem method in January 1998. This represented 5% of total group turnover at the time. By 2003, per diem and fixed fees accounted for 40% of turnover (Afrox Healthcare, 2003c) and is expected to reach over 70% in 2005 (AHL, 2004).

Arising from the question of how to make the whole greater than the sum of its parts, a strategic planning workshop was held to review current practices in the management of pharmaceuticals and surgical consumables and set a strategy for the way forward.

Arising from the internal and external factors described, the following actions were taken:

- Due to the total value of pharmaceutical and surgical consumable products and their combined impact on costs in per diem and fixed fee systems, the management system developed would need to integrate both types of products. Further discussion of this decision will be presented in section 1.4 of this chapter;
- AHL withdrew from the pharmaceutical buying group known as United Hospital Supply Corporation (UHSC), and brought both pharmaceutical and surgical consumable procurement under the umbrella of its pharmacy management company (HHD). It was believed that rationalisation of both suppliers and products would best be achieved through direct contact with suppliers and would allow AHL to leverage more successfully.
- The pharmacy management company and procurement departments were merged and re-engineered to provide capacity to develop and deliver a strategy to manage pharmaceutical and surgical consumables across all hospitals.

As MD of the newly combined HHD, I redefined the role of the company, and proceeded to develop systems and processes that met both professional standards and business and financial goals in relation to pharmaceutical and surgical consumable products and pharmacy services across the group. The company was later renamed as Afrox Pharmacy Management Services (APMS).

The need for dedicated resources for the project was recognised and consequently a project team, with myself as leader, was established and the following project goals were determined:

- To identify synergy opportunities and leverage the total group spend in pharmaceutical and surgical consumable products;
- To develop the capability of managing product selection and usage for both types of products by pharmacists, nurses and doctors across all AHL hospitals; and
- To manage and support the implementation of this process to ensure that quality and optimal therapeutic outcomes, meet financial targets and maximise leverage opportunities.

As research practitioner, I conducted a literature review, which served as a baseline and background for the study in order to determine the research aim.

1.4 INTERNATIONAL AND NATIONAL PERSPECTIVE

This section describes an overview of the findings of the literature review conducted at the start of the study (Submission 1) and provides a more general overview of management systems used for pharmaceutical and surgical consumable products. The second literature (Submission 3) was a specific comparison between the developed system at the end of the action research cycles and international developments. Further discussion of this review will be presented in Chapter 5.

Since the international and national trend was for hospitals to manage pharmaceutical and surgical consumables separately, I will discuss the management of each of these types of products in turn.

1.4.1 Pharmaceutical product management

Increasing pressures on pharmaceutical product expenditures, as well as the variation and proliferation of products, resulted in hospitals adopting different methods or a combination thereof to manage rational drug use (Martinez Bengoechea et al., 1997:89; Hogerzeil, 1995:2 and ASHP, 1983:1384). The trend identified in the review of international countries, i.e. United States of America (USA), United Kingdom (UK), the Netherlands, Germany and Australia, indicated that pharmaceutical product management occurred through hospital formularies, pharmacy and therapeutic committees (PTC's) and drug utilisation reviews (DUR's) for each individual hospital (Crawford, et al., 1993: 1371; Hogerzeil, 1995: 2; Fijn, et al., 1999: 76 and Thurmann, et al., 1997:434). As a result, committee structures and resources were replicated in each hospital and individual formularies developed for each. Smaller, non-academic hospitals were often not able to maintain these structures and resources (Thurmann, et al., 1997:434).

In South Africa (SA), the only published survey of hospital pharmaceutical services indicated that while 46% of all hospitals and 10% of individual private hospitals reported using a formulary of some kind, in most cases this referred to a list of drugs available, which is a formulary in its most limited sense (Summers, 1991: 70). In 1998, a number of formularies were launched for general practitioners in the private healthcare community in SA. However, the use of these formularies was described as " ...*in a state of transition* ..." and little work had been done to measure their effectiveness (Watson, 1999: 134).

1.4.2 Management of surgical consumable products

Internationally and nationally, the management of surgical consumable products (in the public sector) was through the general materials management and hospital procurement departments. Systems, such as those used for pharmaceutical products, were not used for rationalising surgical consumable products, despite increasing costs and new regulations to govern safety and efficacy of these products (Kachieng'a & Boonzaier, 1999: 151 and Andrews, 2001:19). International data indicated that the inventory of surgical consumable supplies may cover 10,000 to 15,000 items in a hospital and is estimated to account for between 25% and 30% of a hospital's budget (Willock & Motley, 1998:46; Eskew, 2002:24 and UK Medical Devices Agency, 2003:1).

In SA, the purchase of surgical consumables was done through buying consortiums or a tender process with little information available to assess efficacy, cost-benefit and cost-effectiveness (Kachieng'a & Boonzaier, 1999: 152).

1.4.3 Differences highlighted from the international and national perspective

The review of the international and national perspective showed that whilst I could use concepts from the systems of management of pharmaceutical products in hospitals, the approach to the study contrasted with existing "best-practice" in the following two key areas:

- The decision to develop a system of management that integrated the two (2) categories of products, namely pharmaceutical and surgical consumable products; and
- The application of the systems thinking approach.

I will briefly discuss these concepts as further background to the study. A more detailed discussion of these differences will be provided in Chapter 5.

1.5 THE CONCEPT OF AN INTEGRATED SYSTEM

As stated in section 1.4.3, the decision to develop an *integrated* system was the first of two (2) key differences highlighted from the initial review of international systems of management for pharmaceutical and surgical consumable products.

The following four definitions of "*integrate"* were used in the study:

- " *... to form into one whole, to join with something else, to make part of a larger unit* ..." (Dictionary.com, 2004);
- " *...to combine two or more things in order to become more effective* ..." (Cambridge International Dictionary of English, 2004);
- "*... to bring together and blend into a whole, to unite with something else to create a whole* ..." (Wordsmyth English Dictionary, 2004); and
- " *... to form, co-ordinate, or blend into a functioning or unified whole* ..." (Merriam-Webster Online Dictionary,2004).

In the context of this study the concept of an "*integrated* " system was applied as follows:

- Combining the management of pharmaceutical and surgical consumable products into one (1) system;
- Identifying and bringing together different processes into a whole, i.e. one (1) management system; and
- Combining and co-ordinating all hospitals in the group into one (1) "unified whole" – using the systems thinking approach.

The application of each of these concepts will be described in the summary of the three (3) action research cycles in Chapter 3 and reviewed further in Chapter 5.

1.6 APPLICATION OF A SYSTEMS APPROACH

The second key difference highlighted from the international review was the decision to use a systems approach to the study.

Senge (1990:12) stated that sustaining any profound change requires a fundamental shift in thinking in which there can be true commitment to a shared picture of the future. However, he added that "*... vision without systems thinking ends up painting lovely pictures of the future with no deep understanding of the forces that must be mastered to move from here to there ...*". The systems thinking approach was an important aspect of the conceptualisation of the integrated system, and a key new perspective that I introduced as the research practitioner.

The application of the systems approach provided a new conceptual model, or mental image of the organisation and introduced the concept of processes in the study and highlighted the need for interaction within and between subsystems.

A summary of the key ideas related to the systems approach is presented in Table 1.1, and compared to the international approach in public and private hospitals (representing existing knowledge). Justification of each of the differences was provided in Submission 3 of the study based on a detailed review of the systems thinking literature.

Table 1.1: Comparison of the systems approach to the international approach applied to the management of pharmaceutical and surgical consumable products

APPLICATIONS OF THE SYSTEMS APPROACH WITHIN THE INTEGRATED SYSTEM. (Detailed discussion of each of these applications were described in Chapter 4 of Submission 3)	GENERAL APPROACH IN HOSPITALS INTERNATIONALLY AS DERIVED FROM THE LITERATURE REVIEW (Detailed discussions with references to substantiate these statements are provided in Chapter 4 of Submission 3)
The development of a system which first views *all* hospitals in AHL as a whole and results in a process driven approach that focuses on the overall purpose of synergy realisation.	Hospitals within a group or a region are predominantly viewed as individual units and systems of management are duplicated in each unit. This results in an activity or problem focused and narrow view.
The approach that views a hospital as a system recognises the interrelatedness of different departments and the impact and role they play in the management of product usage. Boundaries are integrated and collaborative.	There is increasing recognition of the need to view a hospital as a system, however the application of this concept has not generally been applied in the approach to the management of total product usage. Separate activities are initiated in different departments resulting in a fragmented approach and turf battles.
The systems approach identified the interrelatedness of the management of pharmaceutical and surgical consumable products and a mind shift that resulted in the development of the integrated system for the management of both types of products.	Pharmaceutical management systems exist in isolation from the management of surgical consumable products despite increasing recognition of the similarities of systems required for their management.
The adoption of the concept of leverage within systems thinking. The application of systems thinking to leverage product usage across the total group of hospitals. The ability to leverage resources and infrastructure across all hospitals and across both pharmaceutical and surgical consumable products.	The individual hospital and individual departmental (silo) approach limits opportunities for leverage. There is duplication of management systems in each hospital and within hospitals, resulting in no leverage of resources and infrastructure across pharmaceutical and surgical consumable products.
The use of the systems input-feedback-outcomes approach provides a continuous feedback mechanism and facilitates the availability of integrated information across the system and subsystems.	The independent approach in separate hospitals and departments provides a limited view. There is poor information flow from one (1) hospital and/or department to the next.

APPLICATIONS OF THE SYSTEMS APPROACH WITHIN THE INTEGRATED SYSTEM. (Detailed discussion of each of these applications were described in Chapter 4 of Submission 3)	GENERAL APPROACH IN HOSPITALS INTERNATIONALLY AS DERIVED FROM THE LITERATURE REVIEW (Detailed discussions with references to substantiate these statements are provided in Chapter 4 of Submission 3)
Recognition that the macro system (AHL group of hospitals) and the subsystems (hospitals, departments, etc.) are open systems that are impacted by and impact on the environment, including funders, suppliers, the private healthcare sector, communities, etc. (Cycle 2 and Submission 3)	Follow a problem-oriented, analytical approach in individual hospitals and departments. Try to control individual subsystems as closed systems.

Most business are not process-oriented but rather focused on tasks, jobs, people and structure (Hammer & Champy, 1993:35). The goal to create leverage and realise synergies from a systems approach provided an overall purpose and also drove a process approach to the study rather than a traditional analysis approach to the problem/opportunity. The word "*analysis*" comes from the root meaning "*to break into constituent parts*" (Aronson, 1996:1). By using systems thinking, I was able to focus on the whole and on the feedback relationships between what was being studied and the other parts of the system rather than focus on tasks or individual components.

The benefits derived from and limitations of the systems thinking approach will be discussed further in Chapter 5.

1.7 CONCEPT MAP FOR THE STUDY

The study followed three (3) key phases as shown in the concept map in Figure 1.2, namely:

- An initial literature review provided the background to the study and formed the basis of the establishment of the research aim (Chapter 2);

- This was followed by three (3) action research cycles of reflecting, planning, acting and observing. At the end of each cycle, I presented the outcomes from a business perspective (Chapter 3). As the researcher, I also reflected further on each cycle and presented the results in terms of the broader research aim (Chapter 4); and
- In the third phase of the study, I conducted a second detailed literature review to justify and understand the limitations of the developed system, highlight differences from the international approach and identify improvements and additions to the system (Chapter 5).

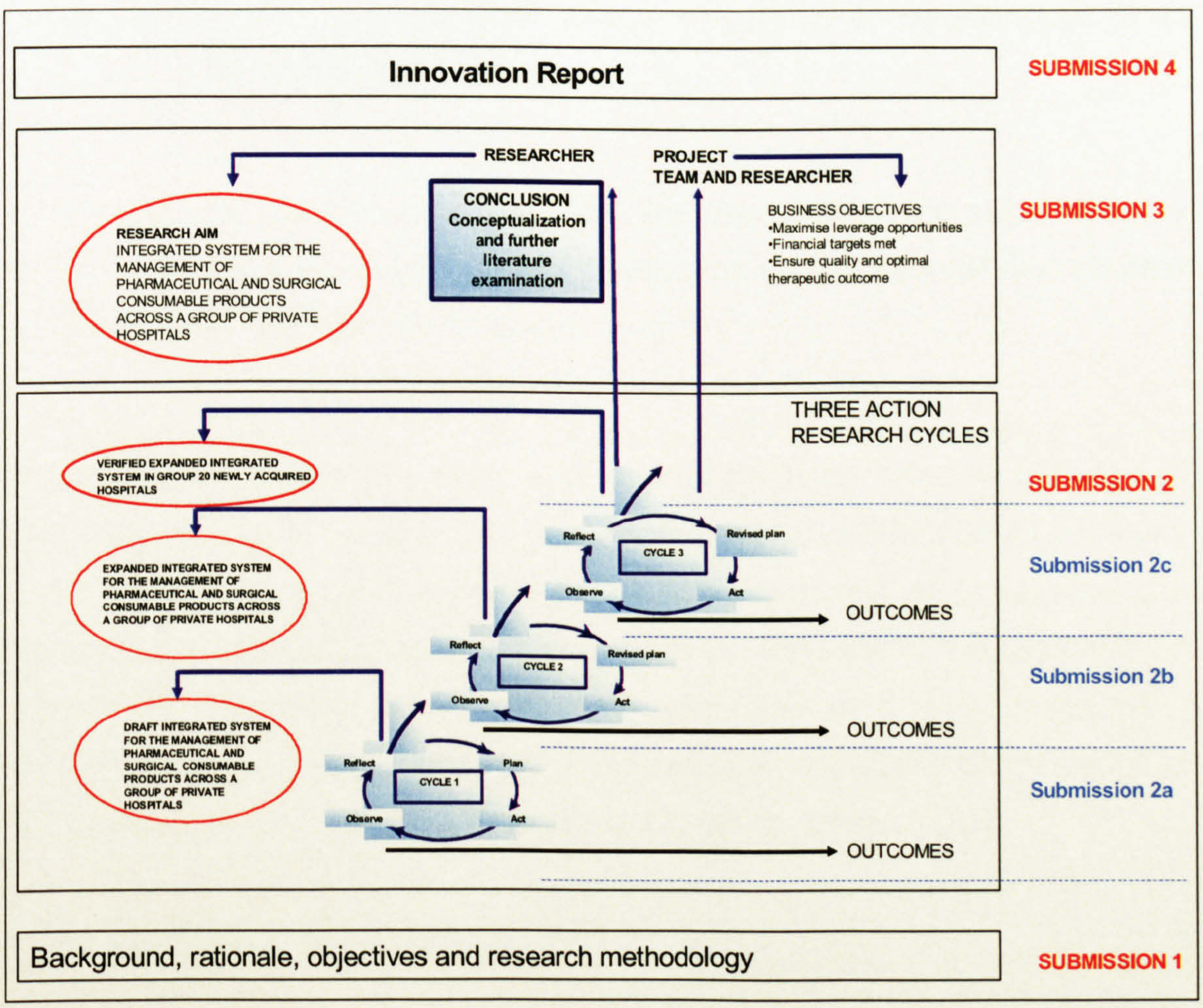


Figure 1.2: Concept map used for the study

In this submission, which constitutes the Innovation Report, I will subsequently:

- Describe the applications and outcomes of the integrated system after the action research cycles (Chapter 6);
- Reflect on the achievement of the business objectives (Chapter 7);
- Further progress the conceptualisation of the integrated system (Chapter 8).

Finally, I will present the conclusions of the study and focus areas for further research (Chapter 9).

CHAPTER 2

RESEARCH OBJECTIVES, DESIGN AND METHODS

2.1 INTRODUCTION

In this chapter I will present the research questions, aim and objectives of the study, followed by an explanation of the research paradigm and a summary of the research design and methods used in the study.

I formulated the research questions, aim and objectives of the study from the review of the business objectives and a reflection on international and national perspectives as described in Chapter 1.

The study was a reflective study with multi-phased (arranged in cycles) and multi-methodological designs. The generic paradigm used throughout the study was that of action research, with the design being contextual and qualitative and the research strategy exploratory and descriptive. Because of the emphasis on implementing the integrated system at the same time as it being developed, I also used change management methodologies as a core methodology related to the business change, which I incorporated into action research (AR).

2.2 RESEARCH QUESTIONS

I formulated the following concepts that served as the main research question of the study:

What will an integrated system for the management of pharmaceutical and surgical consumable products across the group of hospitals in AHL consist of?

In order to develop and implement the system, I conducted the study through three (3) action research cycles. The rationale for this methodology will be discussed later in this chapter.

As the study was conducted using action research, the sub-questions are presented within the three (3) action research cycles with a concluding final question.

Cycle 1:

- What processes and information technology (IT) support will contribute to the development of a system for the management of pharmaceutical and surgical consumable products in AHL?
- How would the developed system perform when implemented across the hospitals in the group?

Cycle 2:

- What support elements will address the gaps identified during the implementation phase of cycle 1?
- How will the adapted system perform in the existing AHL hospitals?

Cycle 3:

- What will be the results of implementing the adapted system in 19 newly acquired hospitals?

Concluding question:

- Will the existing knowledge framework add to the development of a system for the management of pharmaceutical and surgical consumable products in AHL?

2.3 AIM AND OBJECTIVES OF THE STUDY

The overall aim of the study was the development of an integrated system for the management of pharmaceutical and surgical consumable products across the group of acute care hospitals in AHL.

The objectives of the study were respectively formulated within the three (3) action research cycles as follows:

Cycle 1:

- To explore what processes and procedures will contribute to a successful product selection method for pharmaceuticals and surgical consumables;
- To develop the information technology (IT) support that would be required as a component of the integrated system for the management of pharmaceutical and surgical consumable products; and
- To implement and evaluate the developed system across the hospitals in AHL.

Cycle 2:

- To identify the gaps resulting from the implementation of the system in Cycle 1;
- To develop support elements for the identified gaps; and
- To verify the adjustments by retesting the system in AHL hospitals.

Cycle 3:

- To implement and evaluate the improved and integrated system in 19 newly acquired hospitals in AHL.

Concluding objectives:

- To examine the processes and outcomes of the action research cycles against the literature;
- To assimilate the concepts derived from Cycles 1, 2 and 3 and the literature examination in order to further conceptualise the integrated system; and
- To present the justification, limitations and recommendations of the study.

2.4 CHANGE MANAGEMENT

The ODR MOC® methodology was the main change management methodology used for the business change and included a set of structured procedures, diagnostic tools and comprehensive techniques that have been researched and formulated by ODR® Inc. (Conner, 1995). Details of the methodology and the specific tools used during data gathering were described in detail in the relevant cycle where such were applied.

Two (2) other change management concepts, as presented by Zuber-Skerritt (1996:96), were utilised in the study, namely:

- Lewin's three-stage model of organisational change (unfreeze, move and refreeze); and
- Change management steps by Beer et al. were incorporated into the research methods.

The incorporation of these into the adapted research paradigm is illustrated in Figure 2.2 of this chapter.

2.5 RESEARCH PARADIGM

I adapted and developed an action research paradigm, based on the descriptions of Whyte (1995), Dick (2000) and Zuber-Skerritt (1995, 1996, 2000 and 2001), and also included Karlsen's action research model (Karlsen, 1991), which will now be discussed.

2.5.1 Action research

The generic paradigm used throughout the study is action research, and was firstly chosen because emphasis is on the implementation of change while at the same time developing a system that is replicable in the context of the group. Action research is a strategy that brings about change through action, developing and improving practice and at the same time, generating and testing theory (Dick, 2000:67 and Greenwood, 1994:13).

This choice was secondly influenced by the decision to conduct the study across all AHL hospitals involving multiple levels and disciplines of staff. Action research is a dual commitment to studying a system and concurrently collaborating with members of the system on what is mutually regarded as a desirable direction (Zuber-Skerritt, 2001:3).

To accomplish this goal, active collaboration from both the researcher and participants is required, and thus the importance of co-learning as a primary aspect of action research is emphasised (O'Brien, 1998:2). In this study, I collaborated with members of the project team in each cycle, and at various stages with consultative forums consisting of members of staff from the hospitals.

The cornerstone of action research is based on the concept that knowledge is derived from practice, and that practice informed by knowledge is an ongoing process (O'Brien, 1998:6). The following five (5) steps, as suggested by O'Brien (1998:6) were used in each of the three (3) action research cycles at various stages:

- Developing a plan of critically informed action to address a desired change or improvement;
- Acting to implement the plan;
- Observing the effects of the action and conceptualising, theorising and generalising the action/experience;
- Reflecting on the effects as a basis for further planning, and testing the concepts in new situations; and
- Engaging in successive cycles of gaining knowledge through new concrete experience, reflection, conceptualisation and testing.

2.5.1.1 Participatory action research (PAR)

Participatory action research, as described by Whyte (1995:289), is the dominant action research paradigm used in the study. Because the focus of the study is on organisational problem-solving rather than social transformation in the broader sense, the northern tradition rather than the southern tradition of participatory research, as described by Brown (1993: 252) was predominantly used and included both consultative and collaborative participation.

Babbie and Mouton (2002:66) describe consultative participation as when people are *"... asked for their opinions and consulted by the researcher before interventions are made ..."*. This was achieved through consultative forums that will be described in the various cycles of the study.

Collaborative PAR is defined as researchers and local people working together on projects that are designed, implemented and managed by researchers (Cornwall & Jewkes, 1995:1669). Collaborative participation was established through the various project teams. Because the size of most companies poses a problem in carrying out PAR, in most projects dealing with large organisations the actual reflection work is done by a small work group (Grundy, 1986:29). A core project team was in place for the duration of the study and was added to or adapted in each cycle. The details and rationale of how the collaborative project team changed and the use of consultative forums was described in each cycle.

As in action research, PAR uses four (4) primary steps, namely reflection, planning, action and observation (Zuber-Skerritt, 1995:13). These research steps exist interdependently and follow each other in a spiral or cycle. Figure 2.1 illustrates the spiral action of action research used in this project as described by Zuber-Skerritt and others (Zuber-Skerritt, 1996:95 and O'Brien, 1998:6).

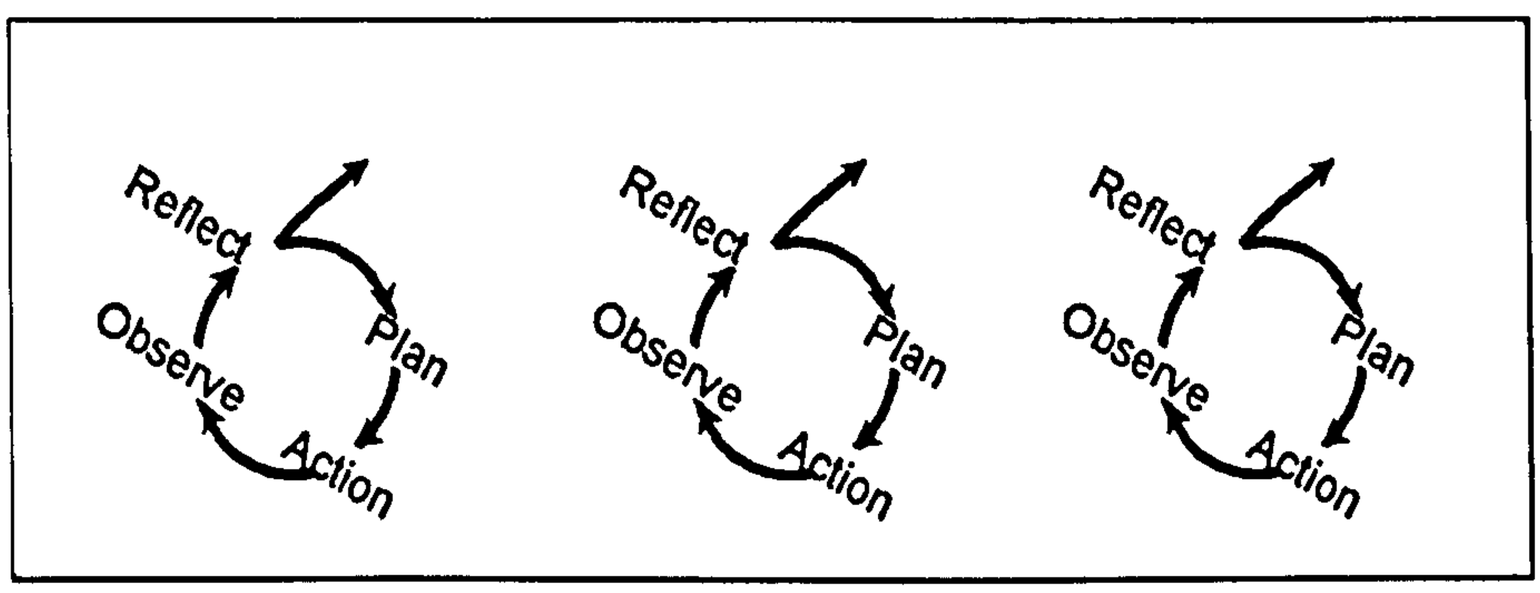


Figure 2.1: The spiral action of action research (Zuber-Skerritt, 1996: 95 and O'Brien, 1998:6)

Reflection in PAR is the step where the research participants examine and construct, then evaluate and reconstruct their concerns (Grundy, 1986:28). Formal reflection was undertaken at regular intervals by myself, as well as through steering committee meetings, project team meetings and consultative forums.

Planning in PAR is constructive and arises during discussions among the participants. After each process of reflection, the project team, through a participative process with key representatives of stakeholders, developed action plans to address the next steps (Eldin & Levin, 1991:131). The integration of the ODR MOC® methodology provided the change evaluation component as suggested by Whyte (1995:289).

Action in the cycle occurs when the plan is put into place. The action is deliberate and strategic. It differs from other research methods in that the action or change happens in reality and not just as an experiment or "... *just to see if it works* ..." (Grundy, 1986:28). In this study "action" was implemented and measured across all hospitals in the group. This was a deliberate and strategic choice rather than doing a pilot, since the aim of the research was to develop a

system for the management of pharmaceutical and surgical consumable products for the group as opposed to one (1) hospital.

Observation in PAR is the "research" portion of PAR where challenges outlined in the plan are observed for their effects and the context of the situation (Kemmis & McTaggart, 1992). As with the action phase, observation ranged over the total group of hospitals.

2.5.2 Adapted research paradigm

Because change management was an important component in the implementation of the system across all hospitals, I combined the ODR MOC® methods as described in section 2.4. with the model of emancipatory action research and organisational change presented by Zuber-Skerrit (1996:99). The adapted model is illustrated in Figure 2.2. The specifics of the steps used and how these methods were used interchangeably, were discussed in the relevant cycles.

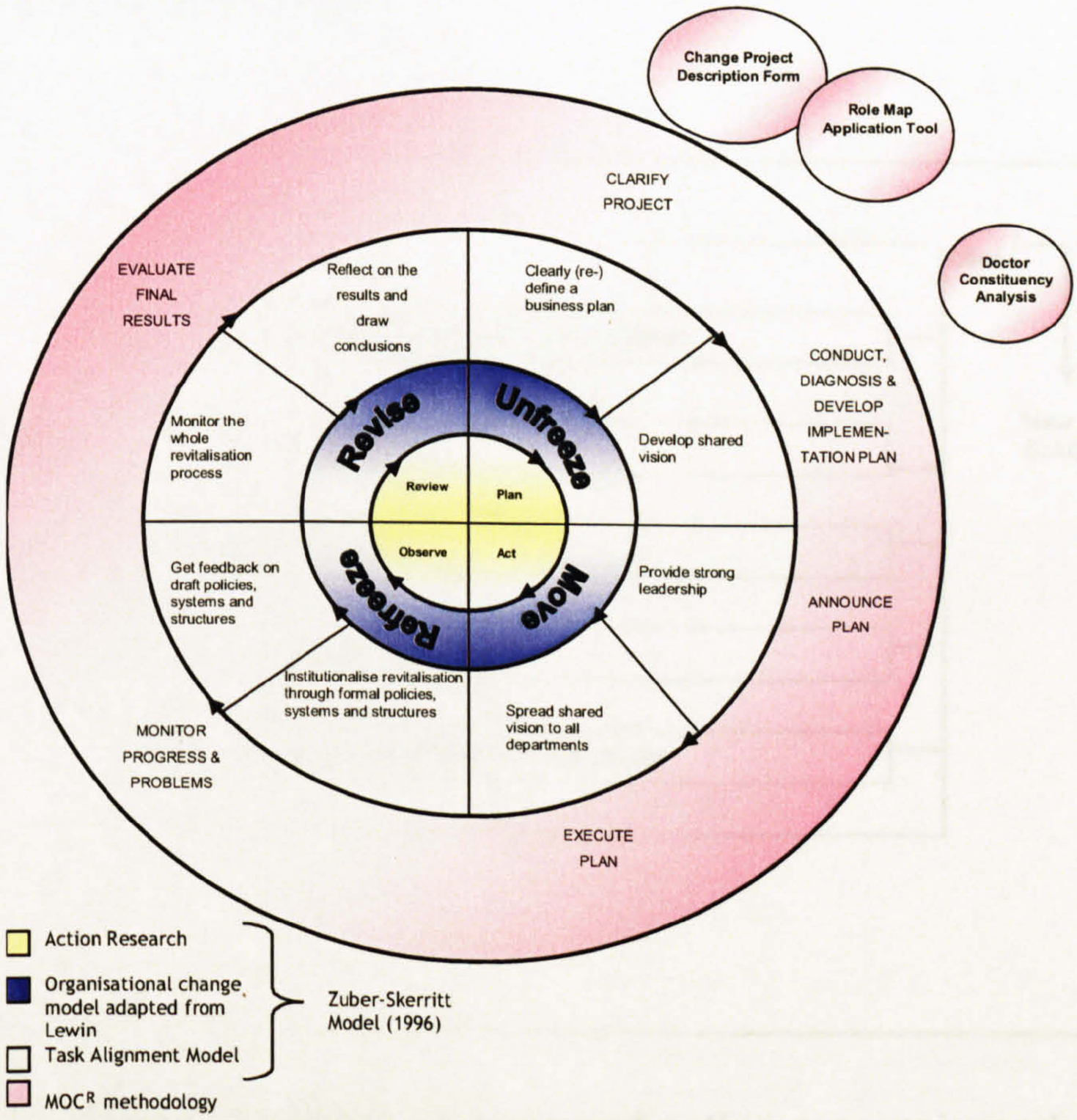


Figure 2.2: Adapted model incorporating the ODR MOC® methodology and Zuber-Skerritt's model of emancipatory action research for organisational change

2.5.3 Karlsen's action research model (1991)

Karlsen's (1991: 148) action research model, as portrayed in Figure 2.3, provided an important link to differentiate between the objectives of the business project and the action process linked to the research objectives. Whilst the business project focused on meeting financial targets and maximising leverage without compromising therapeutic outcome, the research project aimed to

develop an integrated system for the management of pharmaceutical and surgical consumable products.

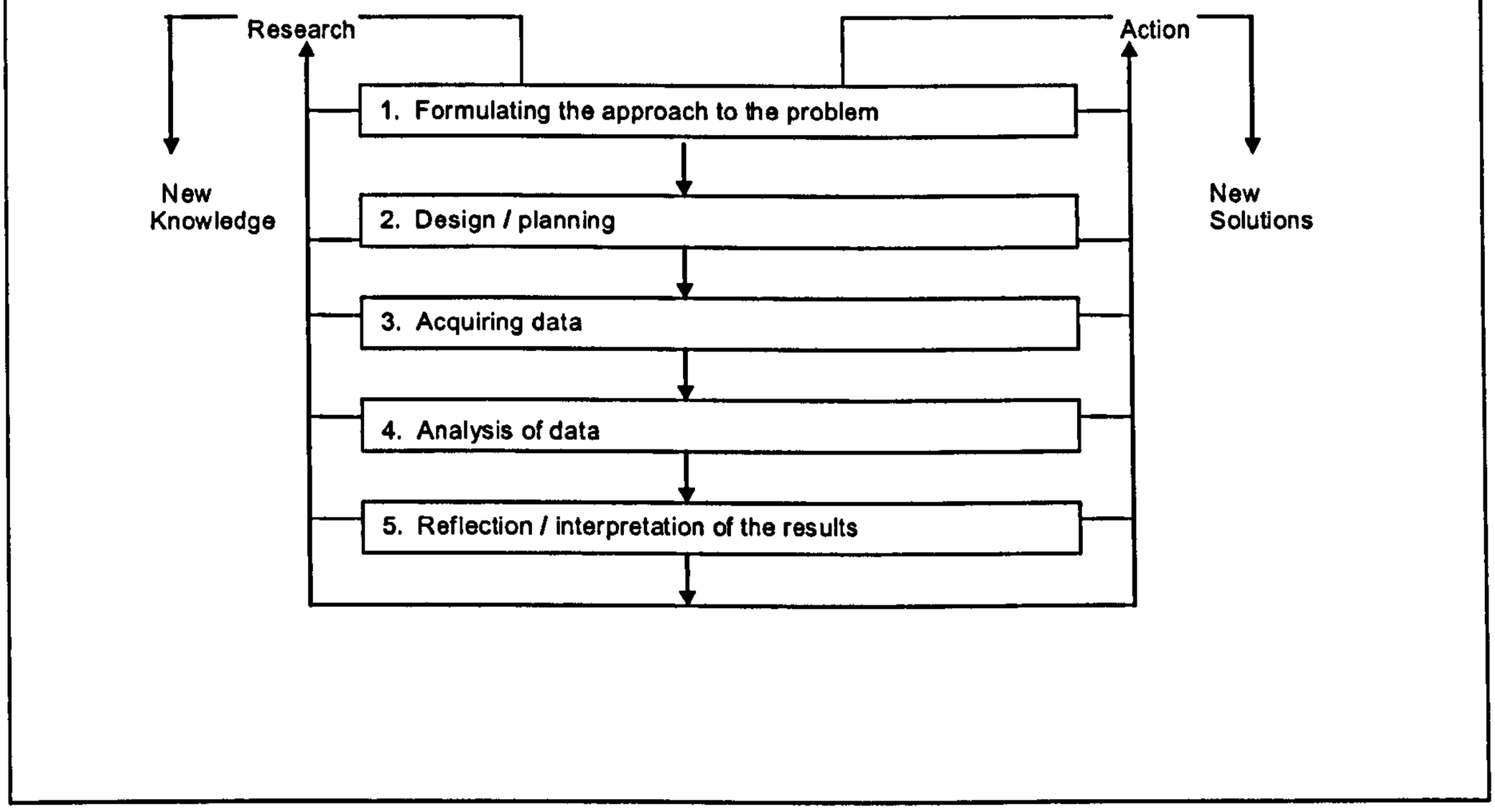


Figure 2.3: Karlsen's action process and action research model (Karlsen, 1991:148)

As stated by Karlsen (1991:149), in contrast to the practitioner, the researcher in this model is responsible for both sides of the process. This was also the case in this study where I was both project leader of the business project and the researcher. The business solutions were carried out together with the project team, whilst the research aspect, the development of the integrated system, including the identification and compilation of its processes and tools, was my work.

2.6 RESEARCH DESIGN AND RESEARCH METHODS

The research design is described as the type of research, the research strategy applied and the context of the study (Burns & Grove, 2001:27). A summary of the methods and design in each cycle is indicated in Table 2.1.

Table 2.1: Summary of the research methods and design

CYCLE	RESEARCH DESIGN	UNIT OF ANALYSIS	DATA GATHERING	DATA ANALYSIS	RESULT
1	• Descriptive; • Exploratory; and • Qualitative.	• Processes and procedures for the management of pharmaceutical and surgical consumables across twenty-four (24) AHL acute-care hospitals.	• Project team meetings and minutes; • Compliance reports; • Observation of pharmaceutical and surgical product purchasing data; and • ODR tools.	• Content analysis.	• Process for product selection; • Product data base; and • Draft integrated system for the management of pharmaceutical and surgical consumables.
2	• Descriptive; • Exploratory; and • Qualitative.	• System for the management of pharmaceutical and surgical consumables; and • Implementation process across 24 AHL acute-care hospitals.	• Reflections of the project team and researcher on shortcomings of cycle 1; • Observation of pharmaceutical and surgical product purchasing data; • Compliance reports; • Consultative forums; and • Literature examination.	• Inductive from results of cycle 1; and • Content analysis.	• Expanded integrated system and Improved implementation process.

CYCLE	RESEARCH DESIGN	UNIT OF ANALYSIS	DATA GATHERING	DATA ANALYSIS	RESULT
3	• Qualitative; • Descriptive; and • Exploratory.	• Processes and procedures for the management of pharmaceutical and surgical consumables in 19 newly acquired acute-care hospitals.	• New acquisitions merger project team meetings and minutes; • Compliance reports; and • Observation of pharmaceutical and surgical product purchasing data.	• Content analysis.	• Verified, expanded integrated system for the management of pharmaceutical and surgical consumables
CONCLUSION					
	• Descriptive; and • Exploratory.	• Processes and procedures for the management of pharma-ceuticals and surgical consumables as developed in the three (3) action research cycles; and • International and national literature.	• Literature examination.	• Content analysis.	• Integrated system for the management of pharmaceutical and surgical consumables across a group of private hospitals; and • Recommenda-tions

2.6.1 Type of research design

A qualitative design was applied in this study. Qualitative research is used to generate knowledge, and uses structured and unstructured observation and communication as a means of gathering data (Burns & Grove, 2001:27). Qualitative data gathering in this study was done through a number of different processes, namely steering committee reviews; project team minutes of meetings, reports, consultative forums and workshop notes and observations.

The qualitative numerical data followed a longitudinal descriptive research design with measurable variables identified in the cycles then tracked over an extended period of time.

2.6.2 Research strategy

The research strategy was exploratory and descriptive. Exploratory studies are undertaken when a new area or topic is being investigated (Polit & Hungler, 1999:18). In this study, an exploratory approach was followed in order to:

- Address thematic concerns relating to the management of pharmaceuticals and surgical consumables in AHL;
- Identify and develop the elements of the integrated system;
- Identify practices that had become obsolete and had to be changed;
- Formulate concepts and tools to support the implementation; and
- Identify opportunities and practice improvements.

Description is integral to the process of exploration adopted for this study and was done through the systematic approach of action research in three (3) cycles. The descriptive researcher is concerned with observing, describing and documenting aspects of events or situations as they occur naturally, and uses the information obtained to form the foundation for the development of theory (in this case, the development of the system) (Cormack, 2000:214 and Babbie & Mouton, 2002:80).

2.6.3 Independent contribution by the researcher

Although action research must be collaborative and conducted within a group, research at doctoral level has to be an independent piece of work of the researcher and an original contribution to knowledge in the field under study (Perry & Zuber-Skerritt, 1992:205). It is therefore important to describe the relationship between the research study and core action research in which I show the independency of my work.

Participatory action research was achieved in this study by applying strategic and change management actions through the three (3) cycle spirals of planning, acting, observing and reflecting.

The research study involved:

- Collaboration – the researcher (myself) and local people working together on the project that was designed, initiated and managed by myself;
- Consultation – where I asked people for their opinions and consulted with them before interventions were made; and
- Independent work of the researcher (myself).

The relationship model (Zuber-Skerritt, 2000:92-93) between thesis research, core action research and thesis writing was adapted for this study to describe the independent work of the researcher (myself) and is reflected in Figure 2.4.

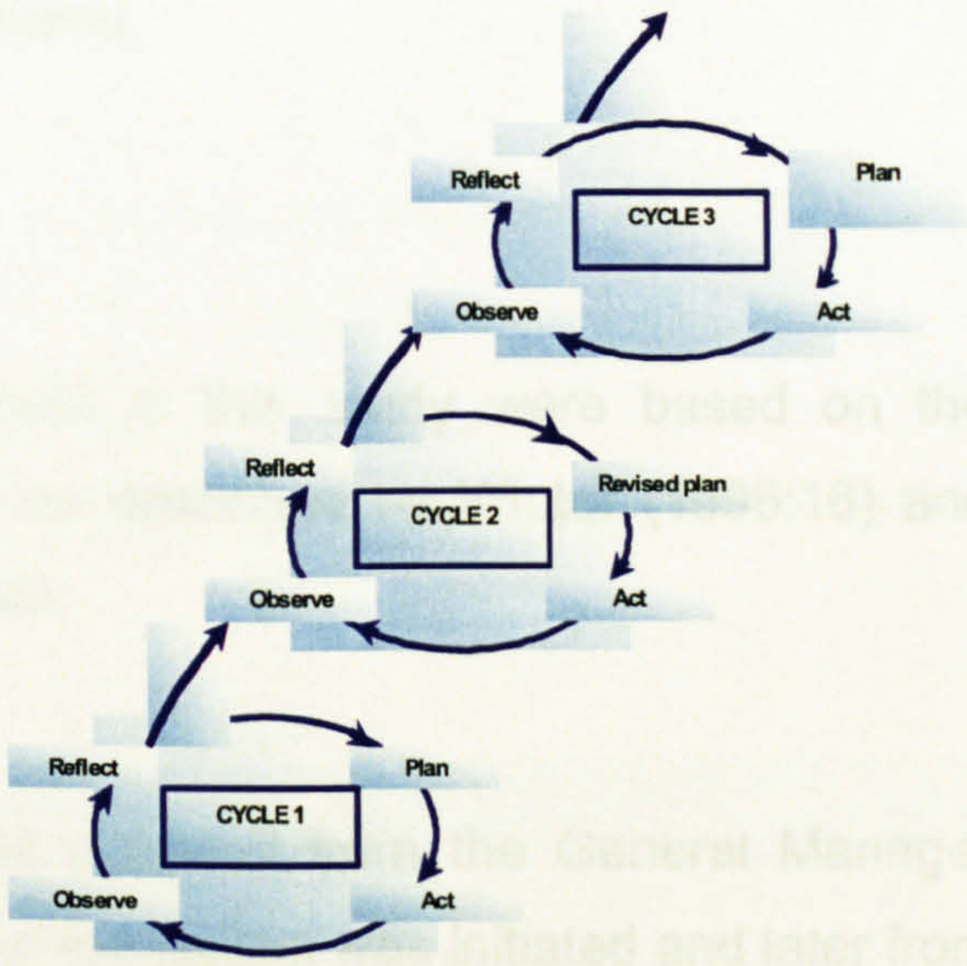
INDEPENDENT CONTRIBUTION BY THE RESEARCHER

Planning the thesis	Observations in the thesis
• Develop the research problem from general thematic concerns (Submission 1) • Complete and describe the literature survey regarding the management of pharmaceutical and surgical consumables nationally and internationally (Submission 1) • Compare literature within the value and operational requirements of the business within the contextual framework of the study (Submissions 1, 3, and 4) • Describe the design and rationale (Submissions 1, 2 and 3) • Justification of the methodology (Submissions 1, 3 and 4)	• Describe the research process and procedures followed for data gathering and data analysis throughout the study (Submissions 1,2 and 3) • Evaluate the reflection results of each cycle for application in light of the literature and contextual framework of the study (Submissions 2, 3 and 4) NOTE: Submission 4 = Innovation Report

Core action research: Collaboration with project team within contextual framework of the study: Researcher's Role:

- Directing, coaching and leading the project teams
- Providing strategic direction, methodology and allocating tasks to project teams
- Identifying, gathering, storing, analysing data and formulating actions
- Building and presenting feedback on progress and next steps to business
- Planning and running project team workshops, training sessions and meetings
- Writing and/or reviewing, editing policies and procedure

(Submissions 2a, b and c)



Independent contribution by the researcher: Reflection thesis

- Reflection by the researcher (Submissions 1, 2, 3 and Innovation Report)
- Analyse and describe the reflection by the researcher and participants (Submission 2)
- Analysis and evaluation of results of action (content and process) in light of the literature (Submissions 3 and 4)
- Describe the propositional conclusions from the research with knowledge claims (Submissions 3 and 4)
- Summarise the research strategy and the various qualitative techniques used in the study (Innovation Report)
- Describe recommendations for further research (Submissions 3 and 4)

Figure 2.4: Relationship between core research and the researcher's independent contribution: Adapted from Perry & Zuber-Skerritt (1992)

2.6.4 Context of the study

Unlike the quantitative researcher, who, in order to increase generalisability, usually aims at analysing variables in isolation from the context or the setting, the qualitative researcher's aim is to describe and understand events within the context in which they occur (Babbie & Mouton, 2002: 272).

This study was undertaken within the contextual framework of a healthcare company in the private sector in South Africa, namely Afrox Healthcare (AHL). The background of this context was described in Chapter 2 of Submission 1 and summarised in Section 1.3 of this submission.

2.6.5 Ethical considerations

Ethical considerations taken into account in this study were based on the principles for action research fieldwork as described by Winter (1996:16) and Morton-Cooper (2000:41). These included:

- Informed consent for this study was obtained from the General Manager HealthCare Services at the time when the project was initiated and later from the newly appointed managing director of AHL in 2002;
- The right to privacy, as described by Burns and Grove (2001:200), was ensured by not linking the participants of the project team to the results of the discussions. No participant is referred to by name and no individual hospital names were used in this study;
- Adequate feedback and reporting of the study's progress (Morton-Cooper 2000:42) was provided through ongoing feedback to the MD, who had agreed to be the mentor for the research study as well as through a steering committee of senior managers in AHL that was formed in Cycle 2; and

- I also used the company code of ethics and the five (5) principles of the code of ethics for pharmacy to guide me as researcher (ASHP, 1996:1805). No known or expected harmful effects to participants or patients were expected or have resulted from this study.

2.7 TRUSTWORTHINESS OF THE STUDY

The key criterion or principle of good qualitative research is found in the notion of trustworthiness, and a qualitative study cannot be called transferable unless it is credible, and it cannot be deemed credible unless it is dependable (Babbie & Mouton 2002: 276)

The criteria for credibility as described by Babbie and Mouton (2002: 277) and their application in the study are summarised in Table 2.2.

Table 2.2: Application of criteria for credibility (Babbie & Mouton, 2002: 277)

CRITERIA FOR CREDIBILITY OF QUALITATIVE STUDIES	APPLICATION IN THE STUDY
Prolonged engagement	The study was conducted over three (3) action research cycles which spanned over three (3) years corresponding to the financial year cycles of AHL. Further monitoring and application of the system continued subsequently and outcomes are presented up to the end of the 2003 financial year.
Persistent observation Consistently pursue interpretations in different ways, in conjunction with a process of constant and tentative analysis.	Outcomes of the implementation of the integrated system were measured monthly. Monthly progress was reviewed with collaborative team members, with myself as leader. Further independent observations were conducted by the researcher (myself) throughout the study as described in each submission. A further literature examination by myself as researcher to compare the integrated system to other systems of management resulted in additional recommendations for improvements and a further conceptualisation of the integrated system.

CRITERIA FOR CREDIBILITY OF QUALITATIVE STUDIES	APPLICATION IN THE STUDY
Triangulation The best way to elicit the various and divergent constructions of reality that exist within the context of a study is to collect information about different events and relationships from different points of view.	The outcomes of the integrated system were measured across the group and in each individual hospital. Evaluation was conducted with different collaborative team members and by myself (the researcher) as well as with steering committees within the business. An independent test of the integrated system in 19 newly acquired hospitals was conducted in Cycle 3.
Referential adequacy What materials are available to document your findings.	Outcomes of the integrated system were available in monthly reports, minutes of meetings, notes from workshop and from the management and measurement tools developed within the integrated system. Examples of tools and materials were provided as appendices in the relevant submissions
Peer debriefing This is done with a similar status colleague (not with a junior or senior peer) who is outside the context of the study who has a general understanding of the nature of the study, and with whom you can review perceptions, insights, and analyses.	The steering committees established in the implementation of the integrated system as described in Submissions 2b and 2c, included three (3) fellow members of the AHL executive team. These committees/peers provided input into the study, and provided input into next steps. I also examined the literature extensively and repeatedly in order to refine the conceptual framework and to compare the integrated system to other systems of management internationally.
Member checks Go to the source of the information and check both the data and the interpretation.	The validity of individual hospital data was checked monthly. Extensive discussions were held with collaborative team members to test interpretation. The independent test of the system further validated the findings. A paper trail of reports, minutes of meetings, workshop notes, measurement and management data was established.

Transferability was a further element of trustworthiness applied in the study. According to Lincoln and Guba (1985: 290) transferability is achieved through thick description and transferability to similar context. Thick description was achieved through a comprehensive description of all of the research procedures followed. Transferability to a similar context was achieved through the independent test of the integrated system in 19 newly acquired hospitals in Cycle 3, and again in the implementation in four (4) further hospitals as will be described in section 6.3 of Chapter 6.

2.8 SUMMARY

The research design and research methods of the study were summarised in this chapter, including the change management methods used and the action research methodology. Trustworthiness was discussed based on the criteria for credibility and transferability. I will now provide an overview of the three (3) action research cycles of the study.

CHAPTER 3

DETERMINING WHAT IS NEEDED TO DEVELOP AND MAINTAIN AN INTEGRATED SYSTEM FOR THE MANAGEMENT OF PHARMACEUTICAL AND SURGICAL CONSUMABLE PRODUCTS

3.1 AN OVERVIEW OF THE THREE (3) ACTION RESEARCH CYCLES

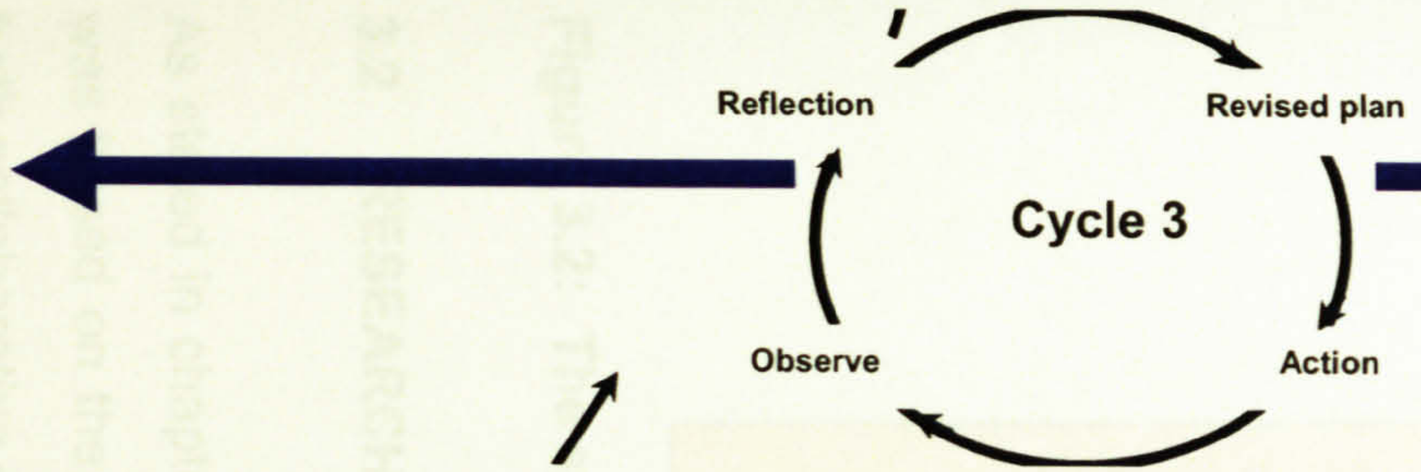
The core of the study consisted of three (3) action research cycles, during which I set out to determine what was needed to develop, implement and evaluate an integrated system for the management of pharmaceutical and surgical consumable products across the hospitals in AHL.

Figure 3.1 provides a diagrammatic overview of the three (3) cycles, showing the research questions, thematic concerns and results of each cycle. The results shown in the figure include the outcomes of implementation, which is covered in this chapter, as well as the results relating to the research objective, which will be described in the next chapter.

As stated in Chapter 2, I used Karlsen's action research model (Figure 2.3: 26) as a link to differentiate between the objectives of the business project and the research objectives. This chapter will conclude with an overview of the progressive outcomes, and the overall impact of the integrated system on achieving the business objectives. I will also provide a diagrammatic overview of the integrated system as it progressed over the three (3) action research cycles, and summarise the features and key unique features of each of the processes of the system in this chapter.

QUESTION:
What will be the results of implementing the integrated system in 19 newly acquired PresMed hospitals?
AIM:
•To independently test the integrated system by implementing and evaluating it in 19 newly acquired hospitals in AHL.

Thematic Decisions:
Examine processes and system against the literature in order to further conceptualize the integrated system.



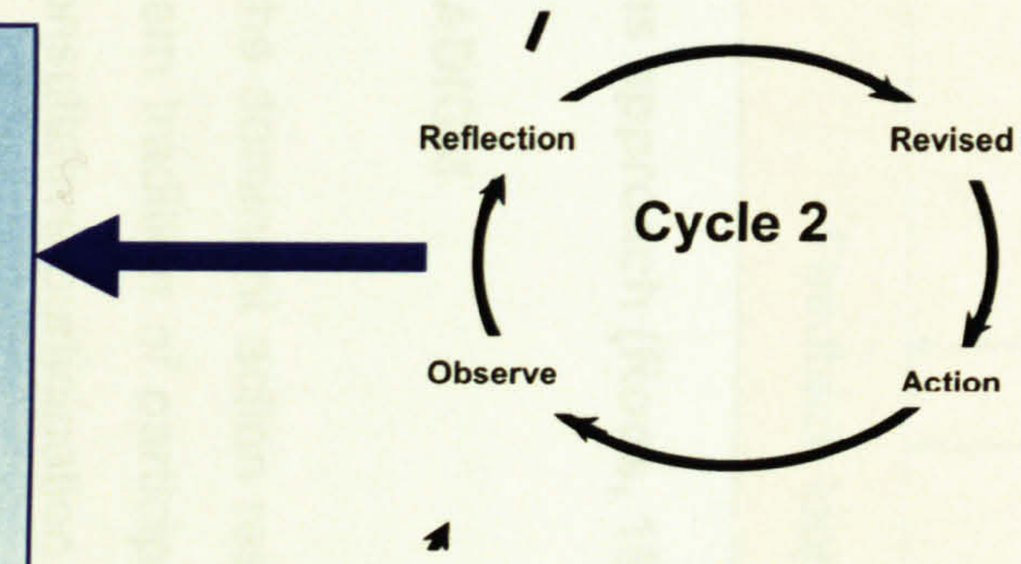
Thematic Concern:
Can the adapted and enhanced integrated system be effectively implemented in 19 newly acquired hospitals?

RESULTS

INTEGRATED SYSTEM INDEPENDENTLY TESTED:
- Product selection process
- Information technology support systems
- Hospital implementation process
- Measurement and management tools.
- Pharmacy capability development
- Supplier strategy and formalised interface.

OUTCOMES OF IMPLEMENTATION (PresMed hospitals)
- 57% of products covered by product selection process
- 14% of products covered by supplier-only standardisation
- 68% reduction in number of products
- 83% of products classified
- 80% product line compliance87% product value compliance

RESEARCH QUESTION:
What support elements will address the gaps identified during the implementation phase of Cycle 1?
AIM:
To develop support elements for identified gaps resulting from the implementation of the draft integrated system in Cycle 1



Thematic Concerns:
Implementation of the draft integrated had not met expectations. Risk of not achieving leverage and financial targets. How can the identified gaps be addressed?

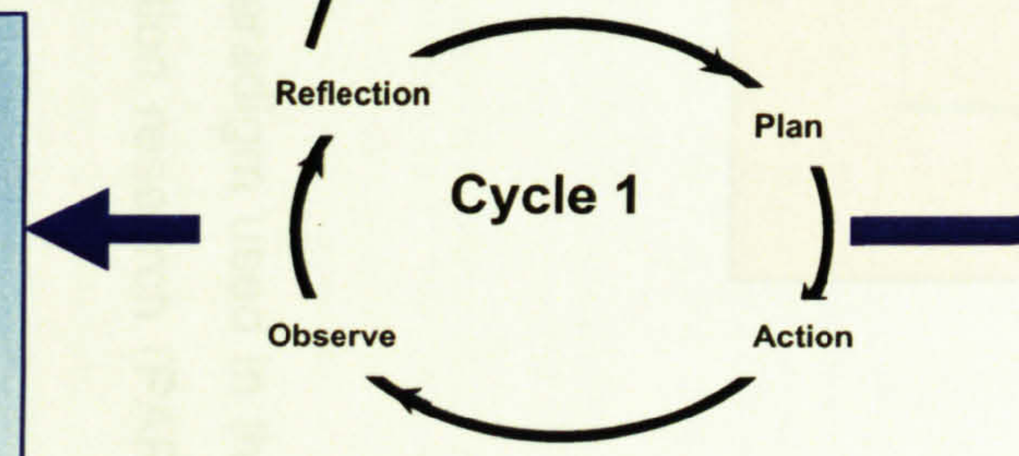
RESULTS

ADAPTED AND ENHANCED INTEGRATED SYSTEM:
Four existing processes adapted:
- Product selection process
- Information technology support systems
- Hospital implementation process
- Measurement and management tools.

Two new processes:
- Pharmacy capability development
- Supplier strategy and formalised interface.

OUTCOMES OF IMPLEMENTATION:
- 52% of products covered by product selection process
- 14.5% of products covered by supplier-only standardisation
- 68% reduction in number of products
- 67% of products classified
- 75% product line compliance87% product value compliance

RESEARCH QUESTION:
What will an integrated system for the management of pharmaceutical and surgical consumable products consist of and how would the developed system perform when implemented across the hospitals in the group?
AIM:
To develop, implement and evaluate the developed system across the hospitals in AHL.



Thematic Concern:
Pharmaceutical and surgical consumable products account for 45% of group turnover. How can leverage opportunities be maximised and financial targets be met for these products in the existing and future healthcare environment?

RESULTS

DRAFT INTEGRATED SYSTEM:

Four processes identified as focus areas:
- Product selection process
- Information technology support systems
- Hospital implementation process
- Measurement and management tools.

OUTCOMES OF IMPLEMENTATION:
- 24% of products covered by product selection process
- 74% reduction in number of products
- 31% of products classified
- 44% product line compliance

Figure 3.1: Diagrammatic overview of the three (3) action research cycles of the study

As shown in Figure 3.1, *reflection* involved a review of thematic concerns and the development of reflective questions in each of the three (3) cycles. These then formed the basis of the *planning* steps. The development and/or implementation of the plan resulted in the *action* steps. To evaluate the developed system in each cycle, outcomes of implementation were measured and discussed in the *observe* steps. This led to further *reflections* and thematic concerns and from that further questions were formed and so forth.

Each of the cycles also followed a systems approach of input-process-output with feedback loops as shown in Figure 3.2. Since feedback from each process and step was used as input for further development of the integrated system, conclusions (outcomes) related to each step were included in the descriptions where appropriate.

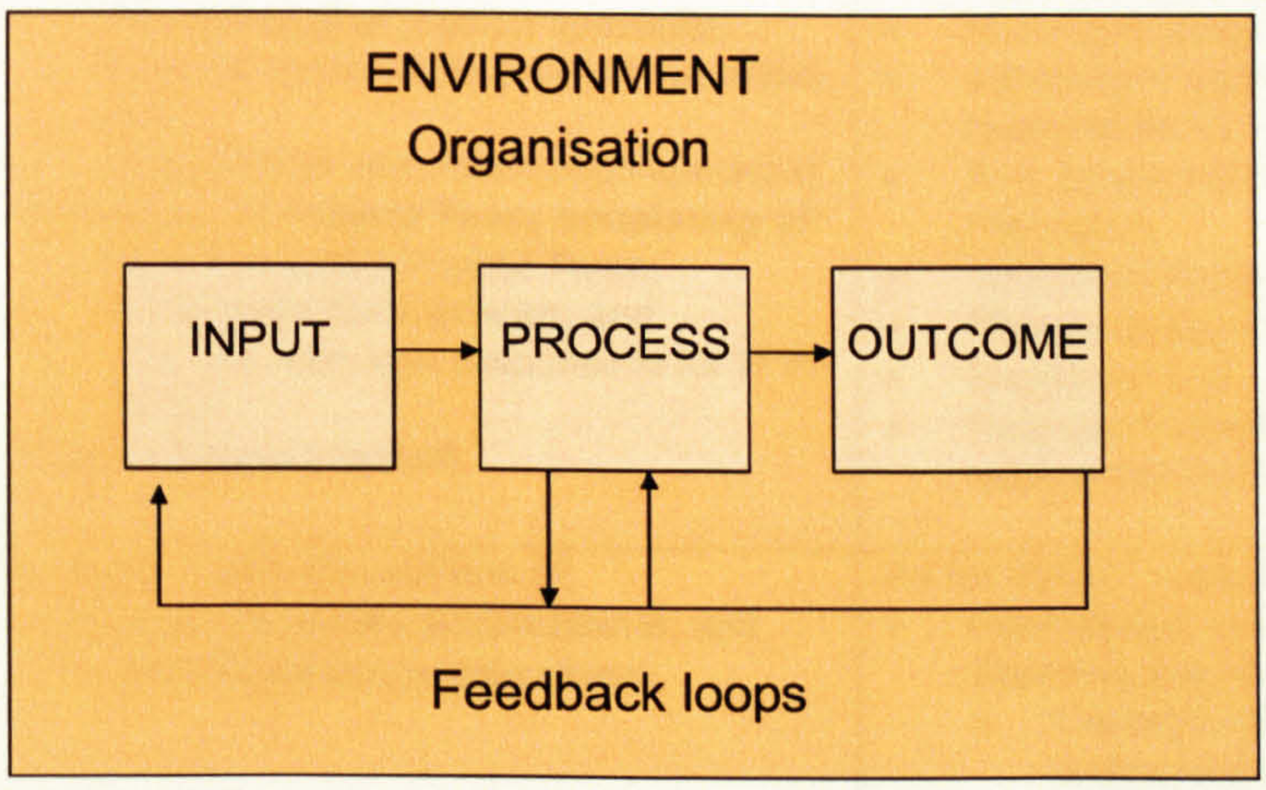


Figure 3.2: The systems approach (Roos, 1996:137)

3.2 RESEARCH PARADIGM

As stated in chapter 2, the dominant action research paradigm used in the study was based on the northern tradition of participatory action research (PAR) using both collaborative and consultative participation.

A summary of the collaborative project teams and consultative participants for each of the action research cycles is shown in Table 3.1. The members of the various collaborative teams were chosen on the basis of their experience and

knowledge within their specific fields of expertise. The consultative participants were selected to represent key stakeholders in the organisation who would be affected by the proposed changes or who were specialists in a particular category of pharmaceutical or surgical consumable products.

Table 3.1: Summary of collaborative and consultative teams used in the three action research cycles

CYCLE	COLLABORATIVE PARTICIPANTS Researcher (myself) and local people work together on project designed, initiated and managed by the researcher	CONSULTATIVE PARTICIPANTS People asked for opinions and consulted by the researcher (myself) before interventions are made

CYCLE 1	• **Core Formulary Project Team from Afrox Pharmacy Management Services (APMS) staff; and**
	• **Product Selection/Formulary Design Project Team from APMS staff consisting of:**
	  ○ Pharmaceutical product specialist;
	  ○ Surgical consumable product specialist; and
	  ○ Procurement and information specialist.
	• **Formulary IT Project Team consisting of:**
	  ○ Core Formulary Project Team;
	  ○ APMS price file manager; and
	  ○ The AHL manager responsible for IT in APMS.
	• **Project leader (myself).**
		• Operations managers from APMS staff responsible for processes, procedures and performance of pharmacy in the hospitals;
		• Pharmacy managers in Afrox Healthcare Limited (AHL);
		• Nursing managers in AHL;
		• Information technology (IT) manager responsible for IT systems in APMS;
		• AHL senior management and hospital managers;
		• Specialist doctors and nurses;
		• Pharmacology specialists;
		• Suppliers; and
		• Relevant IT professionals from the IT department in AHL.

CYCLE 2	As for Cycle 1, with the addition of:
	• **A human resources professional**; and
	• **A communications professional**.
		As for Cycle 1, with the addition of:
		• **Formalised Formulary Project Steering Committee consisting of:**
		  ○ General manager (GM) responsible for APMS;
		  ○ A GM from the acute-care hospital division;
		  ○ The IT manager; and
		  ○ Myself as project leader.

CYCLE 3	As for Cycle 1 with the exception of: • Core Formulary Project Team **with one (1) additional pharmacist from the PresMed group**; and • Formulary IT Project Team**, including a PresMed IT specialist**.	• As for Cycle 1 with the exception of: • **Presmed Integration Executive Steering Committee**; • Operations managers from APMS staff responsible for processes, procedures and performance of pharmacy in the hospitals **with one (1) additional pharmacy operations manager**; • Pharmacy managers in **PresMed hospitals**; • Nursing managers in **PresMed hospitals**; and • **Information technology (IT) manager with knowledge of PresMed IT systems**.

Collaborative team members worked with the project team leader (myself) to deliver different components of the project. Each had a direct reporting relationship to me, except for the HR and communications professionals who were co-opted in Cycle 2 for a specific time period. My role, as project leader and researcher, was to:

- Provide strategic direction, as well as the research and project methodology;
- Allocate tasks to the team members;
- Direct, coach and lead the project teams;
- Identify, gather, store and analyse data and formulate actions;
- Build and present feedback on progress and ensuing steps to the business;
- Plan and run project team workshops, meetings and training sessions; and
- Compile and/or review and edit policies and procedures.

3.2.1 Research methods

The unit of analysis and different methods of data gathering for each cycle was described in Table 2.1: 27. In addition, tools from the ODR MOC® methodology, such as the MOC® Change Project Description Form, were used to gather data during group work sessions of both the collaborative and consultative participants.

All data gathered was documented in minutes of meetings, formal reports, presentations to the executive management steering committee of AHL and new processes and protocols for the management of pharmaceutical and surgical consumable products.

A step-by-step data analysis approach was followed by applying a gap analysis strategy between the existing situation and the desired outcome of the cycle. Due to the exploratory nature of the research, it was not always possible to separate data gathering and data analysis in each step. These were therefore presented simultaneously using a descriptive approach.

At the end of each cycle, an inductive approach was followed in line with Karlsen's action research model as described in Chapter 2, in order to develop the integrated system further. In each cycle whilst, the project team focused on activities relating to achieving the goals of the business project, I was responsible both for leading the business project as well as developing and revising the integrated system as the aim of the study.

The progression of the integrated system over the three (3) cycles arising from the inductive approach (as shown on the right-hand side of Figure 2.4:31 in this submission) will be discussed in Chapter 4.

In this chapter I will provide an overview of each of the three (3) action research cycles which progressed as follows:

- In Cycle 1, the first four (4) processes of the integrated system were identified, developed and implemented across all hospitals in AHL **(Section 3.2)**;
- In Cycle 2, gaps in the draft integrated system were identified and addressed **(Section 3.3)**; and
- In the third cycle of action research the adapted and enhanced integrated system was independently tested in 19 newly acquired hospitals whilst continuing in existing hospitals **(Section 3.4)**.

I will provide an overview of the steps followed, highlight the thematic concerns and briefly describe the key implementation components and present a summary of the outcomes with regard to each cycle.

To conclude this chapter, the outcomes of all three (3) cycles will be compared and discussed **(Section 3.5)**. By the end of the action research cycles the integrated system had been implemented across all 43 acute-care hospitals in AHL.

3.3 CYCLE 1: IDENTIFICATION, DEVELOPMENT AND IMPLEMENTATION OF THE FIRST FOUR (4) PROCESSES

Figure 3.3 shows a graphic representation of the progress of Cycle 1, which began with a review of the thematic concerns and reflective questions.

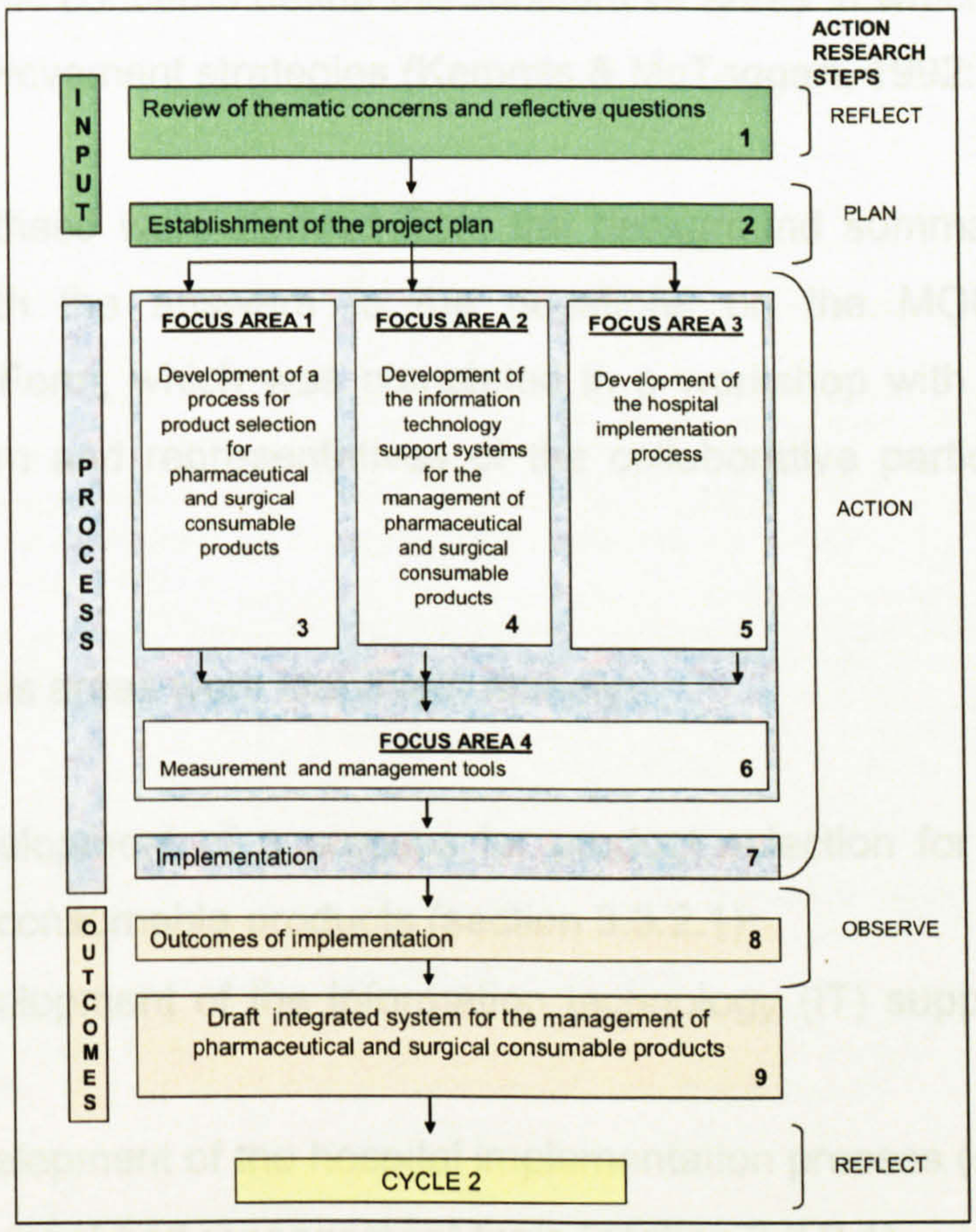


Figure 3.3: Graphic representation of the progression of Cycle 1

A project plan was established in which four (4) key focus areas were identified (step 2). The processes developed as part of the exploratory work in the four (4) focus areas (steps 3-6) were implemented as a draft system across all hospitals (step 7), and outcomes were measured over a 3-month period (step 8).

The result of the cycle was a draft integrated system for the management of pharmaceuticals and surgical consumables (step 9). Each of the steps illustrated in Figure 3.3 was described in detail in the study and can only be summarised at high level in this overview.

3.3.1 Thematic concerns and identifying the processes of the integrated system

The input phase of Cycle 1 included the review of thematic concerns and reflective questions, the identification of the processes and the establishment of the project plan. Thematic concerns define the substantive areas in which a group decides to focus its improvement strategies (Kemmis & McTaggart, 1992:11).

In Cycle 1 these were derived from the background summarised in Chapter 1, together with the answers to the questions on the MOC® Change Project Description Form, which was completed in a workshop with the Core Formulary Project Team and representatives of the collaborative participants as shown in Table 3.1.

Four (4) focus areas were identified, namely:

- The development of a process for product selection for pharmaceutical and surgical consumable products (section 3.3.2.1);
- The development of the information technology (IT) support systems (section 3.3.2.2);
- The development of the hospital implementation process (section 3.3.2.3); and
- Measurement and management tools (section 3.3.2.4).

Together with "implementation" the progression of these four (4) focus areas formed the process component of Cycle 1. A summary of the thematic concerns and group reflective questions, mapped against the focus areas is presented in Table 3.2.

Table 3.2: Thematic concerns and group reflective questions mapped against the project focus areas

THEMATIC CONCERNS	GROUP REFLECTIVE QUESTIONS	COMPONENT/FOCUS AREA
Escalating cost of pharmaceuticals and surgical consumables.	• How can the escalating costs of pharmaceutical and surgical consumable products be responsibly addressed?	• Product selection Process (1).
Growing number of different pharmaceutical and surgical brands.	• How can the number of product brands kept across the group be managed? • How can it be established which products are substitutable and which are not?	• Product selection process (1); and • IT support for the formulary (2).
Growing number of reimbursement systems where the provider (hospital) is expected to take risk, e.g. per diems and fixed fees.	• How can the lowest cost on pharmaceuticals and surgical consumable products used in different risk models be ensured?	• Product selection process (1).
Loss of mark-up on pharmaceutical and surgical consumable products in the fee-for-service reimbursement model will impact on margins and profitability.	• How can margins on pharmaceuticals and surgical consumables without compromising cost to patients and funders be retained and improved?	• Product selection process (1).
Doctor resistance to challenging their choice of products.	• How can doctor support for product choices and correct usage of such be ensured?	• Hospital implementation (3); and • Product selection process (1).
Maintain optimal therapeutic outcomes. Credibility of product choices and process.	• How can it be ensured that product choices have credibility with stakeholders and do not compromise quality care or quality service delivery?	• Product selection process (1).
Leverage group synergy so that the total is greater than the sum of parts.	• How can it be ensured that the group (AHL) indeed influence product choice and utilisation across all hospitals in order to leverage that power with suppliers?	• Hospital implementation (3).
Implement solutions across all hospitals.	• How can the full implementation of the system for the management of pharmaceutical and surgical consumables across all AHL hospitals be ensured?	• Hospital implementation (3).
Information database and systems capability are critical to support future management systems.	• What information is needed to determine strategy and to drive the project? • How can the use of the electronic environment to achieve set objectives be maximised?	• Information technology (IT) support (2).
Ongoing management and maintenance.	• How will the effective ongoing management of pharmaceutical and surgical consumable products be ensured and not end up as just a "once off" project?	• Measurement and management tools (4).

3.3.2 Development and implementation of the four (4) processes

Although the development of the four (4) processes was described separately, the actions progressed simultaneously and overlapped each other.

3.3.2.1 Product selection process

Figure 3.4 provides an overview of the rationale for the steps in the product selection process for pharmaceutical and surgical consumable products. The sequential steps are indicated with an arrow, and those bracketed occurred simultaneously.

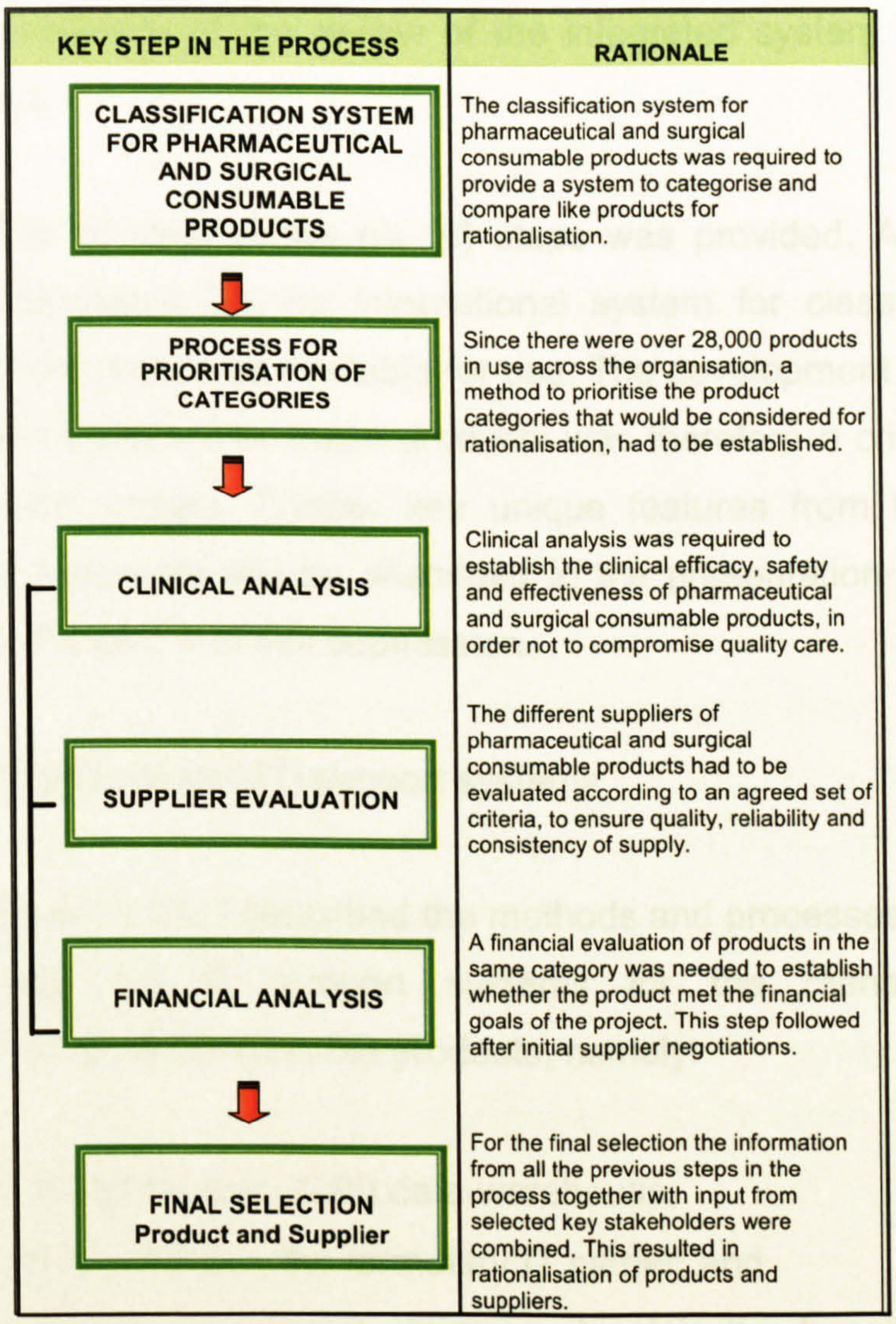


Figure 3.4: An overview of the product selection process for pharmaceutical and surgical consumable products

The product selection process for pharmaceutical and surgical consumables was derived from:

- The examination of processes used internationally and nationally;
- Consideration of existing processes in the management of pharmaceutical and surgical consumable products; and
- Consideration of the goals of the project.

The key differences from international trends were in the integration of pharmaceutical and surgical consumable products and in the approach adopted for the system development. Further discussion of these differences will be highlighted in the discussion of the review of the integrated system against the literature in Chapter 5.

A detailed description of each of the six (6) steps was provided. As stated in section 4.2.1 of Submission 2A, no international system for classification for surgical consumable products was available for use. The development of a unique seven tier classification system for these products was therefore a critical step in enabling an integrated system. Further key unique features from the product selection steps and processes will be described in the presentation of the draft integrated system in Chapter 4 of this submission.

3.3.2.2 Information technology (IT) support systems

In Chapter 5 of submission 2A, I described the methods and processes followed to identify and develop the IT support systems for the management of pharmaceutical and surgical consumable products, namely:

- Group procurement information (GPI) data warehouse;
- The product database (PIPS) – the formulary IT carrier; and
- Access to the formulary at hospital pharmacy level in the hospital billing IT system (MAC).

For each of these aspects the Formulary IT Project Team, with myself as team leader, had to:

- Examine existing IT systems within AHL that could support the requirements;
- Convene consultative workshops with relevant consultative participants to obtain input on requirements and specifications; and
- Consult and provide specifications to IT specialists that would provide the technology solutions for the requirements that were identified.

Details of the development of the three (3) identified IT systems and their use in the integrated system were described in Chapter 5 of Submission 2A. The GPI data warehouse and the enhanced product database (PIPS) were both the first of these IT support systems in the private hospital industry in SA as was the ability to electronically link surgical consumable products to a classification system. Further key unique features and innovations of the information technology support systems will be described in the details of the draft integrated system in Chapter 4.

3.3.2.3 Hospital implementation process

The process for implementation across all hospitals was developed in focus area 3 of Cycle 1. Targets for the change process were identified from the answers to the questions in the ODR MOC® Change Project Description Form. It was agreed that all pharmaceutical and surgical consumable products would be purchased and dispensed or distributed by the pharmacy department in each hospital.

Changes to protocols and procedures were identified for implementation during Cycle 1, and a consultative process was followed with staff in AHL to agree on the process for implementation. Supportive processes put in place for hospital implementation included:

- The establishment of a formulary "hot-line" for telephonic queries and assistance that was manned by the members of the Core Formulary Project

Team. Queries were monitored and also used as ongoing feedback for the process;

- The development of a formulary newsletter with relevant information, which was distributed to all pharmacy managers and hospital managers; and
- A formulary slide presentation, which included all the key concepts of the procedures and product selection process.

Doctor implementation in individual hospitals was the responsibility of pharmacy managers with support from nursing staff and hospital managers. Pharmacy managers were inducted on the formulary implementation requirements in a group workshop.

3.3.2.4 Measurement and management tools

The overall success of the project depended on the ability to achieve the changes in product usage in order to realise the leveraged benefits and meet financial targets. Without successful implementation across all hospitals:

- The goals of the project and financial improvements would not be realised;
- The risks in per diem and fixed fee tariffs for the hospitals and AHL as a whole would increase and affect performance; and
- The integrated system for the management of pharmaceutical and surgical consumable products would break down.

Measurement and management tools were identified and developed for each of the processes as summarised in Table 3.3.

Table 3.3 Summary of measurement and management tools: Draft integrated system for the management of pharmaceutical and surgical consumable products

FOCUS AREA	MEASUREMENTS	MANAGEMENT TOOLS
Focus area 1 **Process for product selection for pharmaceutical and surgical consumable products.**	• Value of pharmaceutical and surgical consumable products analysed; and • Percentage reduction in number of products.	• Core Formulary Project Team trained to use the Cognos Impromtu® and Cognos Powerplay® tools to enable them to extract and analyse further detailed information from the PIPS database and GPI data warehouse.
Focus area 2 **Information technology support systems for the management of pharmaceutical and surgical consumable products.**	• GPI data warehouse: percentage of total value of products in the suspense file; and • PIPS database: Percentage of total products classified.	• List of products in the suspense file per hospital and for the entire group; and • Core Formulary Project team trained to use the Cognos Impromtu® and Cognos Powerplay® tools to enable them to extract and analyse further details on classification from the PIPS database.
Focus area 3 **Hospital formulary implementation.**	• Compliance to product selection. Line compliance.	• Compliance report with list of non-formulary products ranked by total value purchased.

The measures of progress for the **product selection process** were based on value of spend covered and the percentage reduction in the number of products.

For the **IT support systems** the value of reliable and accurate information was recognised as an important competitive advantage for AHL. In the GPI data warehouse, inaccurate and poor quality data, e.g. wrong product codes, pack sizes or suppliers, were discarded into a "suspense" file and excluded from the data warehouse. Thus data on usage and value would be incomplete.

The degree to which classification had been completed was also included as a measure in the IT system process, as without the classification being completed it was not possible to proceed with product selection.

Compliance to the formulary, as measured by the extent to which the actual chosen product was used, was a key measure of the result of **hospital**

implementation. Each time a non-formulary product was used it would decrease the percentage compliance. This measure was called product line compliance.

A target of 70% compliance was set for pharmacy managers. To enable them to improve the compliance percentage, a formulary compliance report for pharmaceutical and surgical consumable products was developed for each hospital.

3.3.3 Outcomes of Cycle 1

The outcomes of the measures for Cycle 1, monitored over a three-month period, were as follows:

- The product selection process had been completed for 24% of total products purchased (37% of pharmaceutical products and 8% of surgical consumable products);
- The percentage reduction in the number of products was 74% (from 2058 to 528 products);
- 31% of products were classified in the product database (51% pharmaceuticals and 15% of surgical consumable products); and
- Compliance in terms of all 19 hospitals was 44,3% for pharmaceutical products and 52% for surgical consumable products. Individual hospital compliance showed that the variance in product usage was not from hospital to hospital but within each hospital.

To conclude Cycle 1, a diagrammatic overview of the integrated system was developed by myself (the researcher) as a draft integrated system and the processes and sub-processes described. This will be covered in Chapter 4.

3.4 CYCLE 2: IDENTIFYING AND ADDRESSING THE GAPS IN THE DRAFT INTEGRATED SYSTEM

The objectives of Cycle 2 were:

- To identify the gaps resulting from the implementation of the system in Cycle 1;
- To develop support elements for the identified gaps; and
- To verify the adjustments by retesting the system in AHL hospitals.

The progression of Cycle 2 is shown in Figure 3.5. As with Cycle 1, a systems approach of input, process and outcomes as well as the action research steps of review, plan, action and observe were followed.

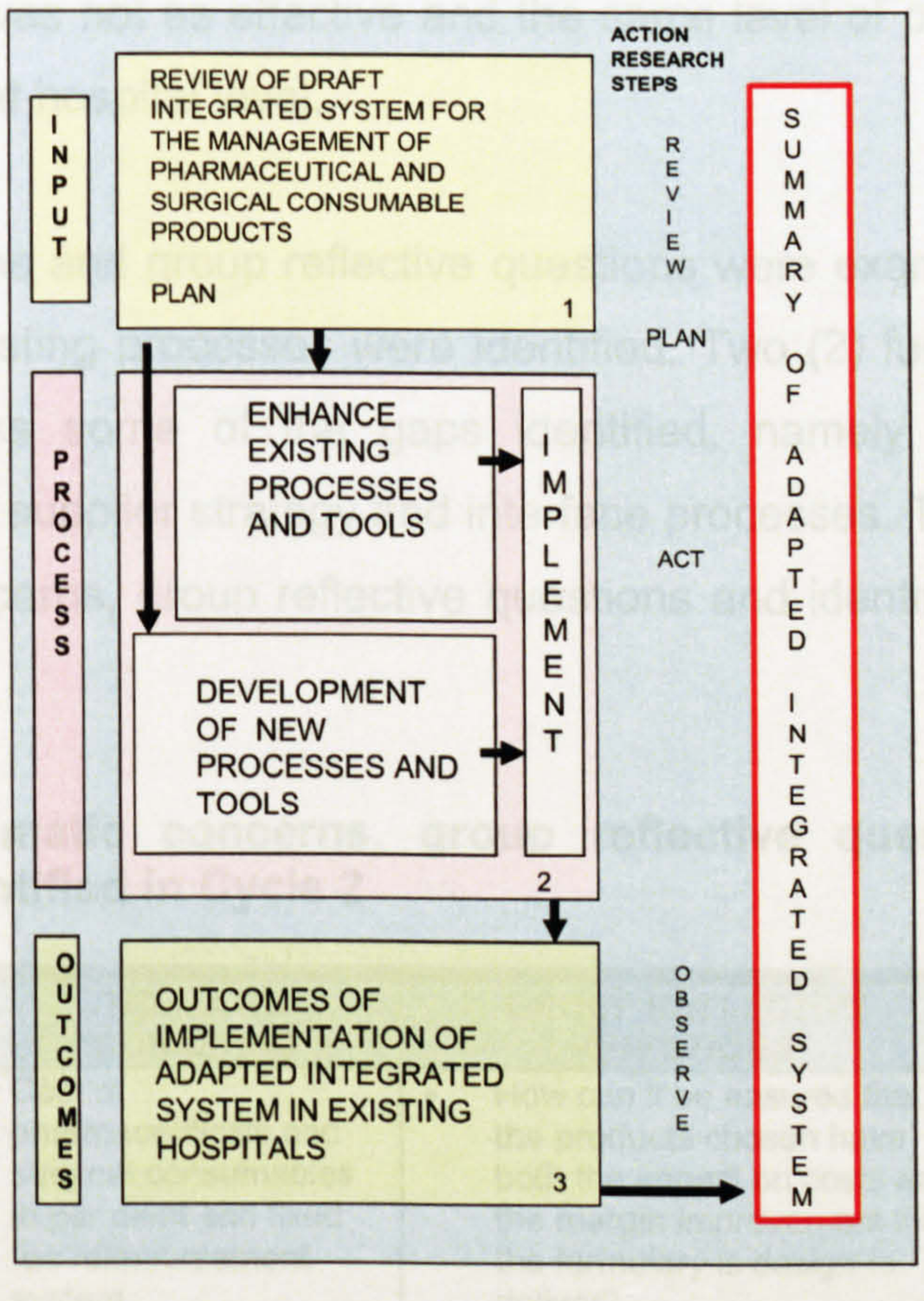


Figure 3.5: Graphic representation of the progression of Cycle 2

The **input** phase of Cycle 2 (step 1) involved the review of the draft integrated system and the outcomes of Cycle 1, the identification of gaps in the draft integrated system and the establishment of a plan to address the gaps. This included a review of the change management methods. The **process** phase (step 2) included enhancing existing processes, the development of new processes and

the implementation of these in all hospitals. Finally, in step 3, the **outcomes** of the implementation of the adapted integrated system were measured.

3.4.1 Review of the draft integrated system

The outcomes of Cycle 1 were lower than expected, with specific reference to:

- The target of 70% compliance set for pharmacy managers was not achieved;
- The process for product selection took longer than expected and as a result only 24% of products used were covered by the formulary; and
- While the potential for the reduction in the number of products was considered good, buy-in was not as effective and the same level of product reduction was not achieved at hospital level.

Thematic concerns and group reflective questions were examined and actions for improving the existing processes were identified. Two (2) further processes were added to address some of the gaps identified, namely pharmacy capability development and supplier strategy and interface processes. Table 3.4 summarises the thematic concerns, group reflective questions and identified actions for Cycle 2.

Table 3.4: Thematic concerns, group reflective questions and actions identified in Cycle 2

FOCUS AREA	THEMATIC CONCERNS	GROUP REFLECTIVE QUESTIONS	ACTIONS
1. **PRODUCT SELECTION PROCESS**	Cost of pharmaceuticals and surgical consumables in per diem and fixed fee reimbursement system. Impact on margins and profitability of loss of mark up on fee-for-service reimbursement. Credibility of the product selection process.	• How can it be ensured that the products chosen have both the impact on costs and the margin improvement that the formulary is design to deliver? • What gaps are there in ensuring the correct quality of products are selected? • How can the feedback process on product quality be enhanced? • What happens when new products are introduced? • When would it be appropriate to review the original product choices?	• Extend the scope of the product selection process for pharmaceuticals and surgical consumable products; • Identify and address the gaps in the product selection process; and • Develop a formulary review/maintenance process.

FOCUS AREA	THEMATIC CONCERNS	GROUP REFLECTIVE QUESTIONS	ACTIONS
2. IT SUPPORT	The information database and information technology systems capability are critical components of the integrated system for the management of pharmaceutical and surgical consumable products.	• How can it be ensured that the necessary resources are available to address the gaps in information technology (IT) support? • How can it be ensured that the information technology (IT) systems continue to support the integrated system on an ongoing basis?	• Establish a sustainable IT support system for the integrated system; • Provide the IT functionality for the enhanced integrated system; and • Complete the pre-event formulary application to provide electronic access to the formulary at hospital level.
3. HOSPITAL IMPLEMEN-TATION PROCESS	• Compliance is less than what was expected and required. • Doctor and staff resistance is impacting on the effectiveness of implementation. • The initial enthusiasm and commitment to the formulary process was wearing off. • There was a risk that commitments to suppliers would not be met.	• How can it be prevented that the pharmaceutical and surgical consumable products formulary becomes just a theoretical list of approved products? • How can the support and commitment of staff and doctors working in the hospitals be gained? • How can it be ensured that potential leveraging power with suppliers is not discredited? • Do relevant staff have the skills to fully implement the integrated system?	• Develop a sustained communication strategy to all stakeholders; • Agree and align performance measures with project objectives for all relevant staff; • Establish and train formulary implementation teams in each hospital; • Improve the process for ensuring doctor buy-in; and • Provide appropriate information to pharmacy managers to defend formulary/product selection decisions.
4. MEASURE-MENT AND MANA-GEMENT TOOLS	The ongoing management and maintenance of the project could only be sustained by relevant measurements that meet the needs of the organisation.	• Do the measurement and management tools meet the needs of the organisation and tell the full story?	• Review measurement and management tools and ensure they are understood and effectively used at all levels of management.
NEW PROCESSES	**ACTIONS**		
5. PHARMACY CAPABILITY DEVELOP-MENT	• Develop and implement programs to ensure pharmacists have the clinical and technical knowledge to support formulary implementation; • Develop and implement interpersonal skills training such as presenting, selling, conflict handling and negotiation skills; and • Ensure ongoing pharmacy manager and pharmacist induction on the formulary system.		
6. SUPPLIER STRATEGY AND INTERFACE PROCES-SES	• Develop a supplier strategy; • Formalise the supplier interface process; and • Develop and implement supplier representative policy.		

3.4.2 Improvements and additions to the integrated system

The improvements to the draft integrated system included enhancements of the existing four (4) processes as well as the addition of further processes.

Enhancements to the **development of a product selection** process for pharmaceutical and surgical consumable products included the development of a product review process with a product trial process for surgical consumable products, as well as the addition of supplier-only standardisation, therapeutic substitution and formulary restrictions. The corresponding changes in **information technology (IT) support systems** were developed to meet the new product selection processes and the completion of electronic access to the formulary. To improve the **process for implementation** a role map and communication strategy were developed together with a method for doctor constituency analysis and the establishment and training of formulary implementation teams. In the **measurement and management tools** process, two (2) new measures were added in Cycle 2, namely compliance based on value spent and market share reports.

One gap identified was the need to develop a process to ensure that pharmacists were fully skilled to drive and implement the formulary system in their respective hospitals. A second gap was a need to develop a supplier strategy and formalised interface with suppliers in order to maximise the potential to leverage purchasing power. I identified these processes as:

- Pharmacy capability development; and
- Supplier strategy and interface.

To address the **pharmacy capability development** process, three (3) areas of development were identified, processes developed and implemented as described in the green shaded area of Table 3.4.

The need for a **supplier strategy, which included formal interface processes**, was highlighted by, amongst others, the fact that the lower than expected compliance level achieved in Cycle 1 created a risk that the leverage position achieved with formulary suppliers would be discredited.

Figure 3.6 contains a graphic representation of the concepts of the supplier strategy.

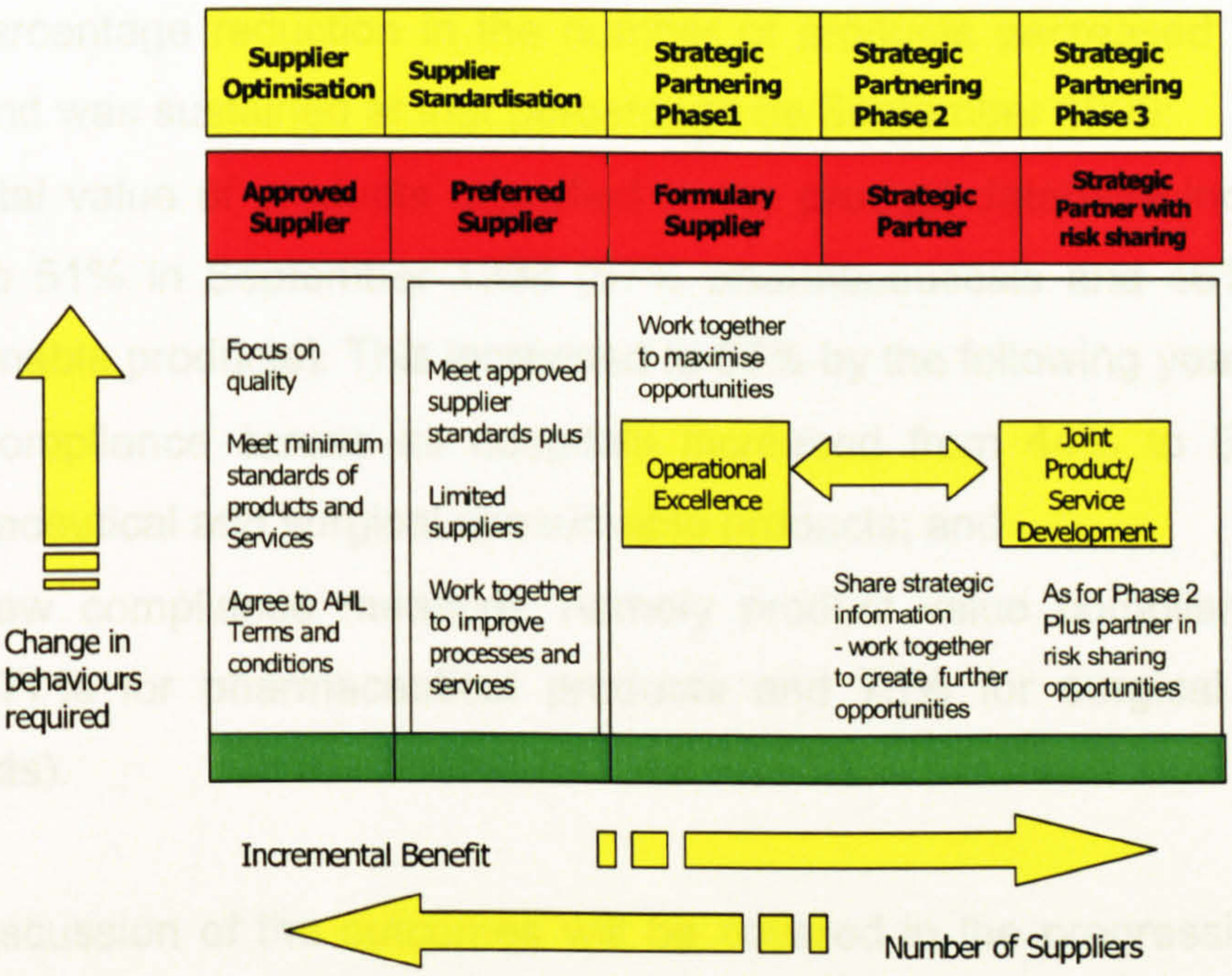


Figure 3.6: Graphic representation of the concepts of the supplier strategy

The supplier strategy moved identified suppliers from 'approved suppliers' through to 'formulary suppliers', 'strategic partners', and finally 'strategic partners with risk sharing'. In addition to the supplier strategy, formal interface processes with suppliers, including requests for information (RFI), requests for quotations (RFQ) and a representative policy, were developed and implemented.

3.4.3 Outcomes of implementation of the adapted and enhanced integrated system

The outcomes of Cycle 2 were measured from April 1998 to September 1998, which coincided with the financial year-end of AHL. Outcomes were also

measured to September 1999, which was the start of Cycle 3. The outcomes encompassed the following:

- The completion of the product selection process increased from 24% of total products purchased in Cycle 1 to 39% of products in Cycle 2 (49% of pharmaceutical products and 33% of surgical consumable products). This increased to 52% by September 1999;
- The percentage reduction in the number of products decreased from 74% to 68% and was sustained at that percentage by September 1999;
- The total value of products classified in the product database increased from 31% to 51% in September 1998 (57% pharmaceuticals and 46% of surgical consumable products). This increased to 67% by the following year.
- Line compliance across all hospitals increased from 44% to 54% for both pharmaceutical and surgical consumable products; and
- The new compliance measure, namely product value compliance, reached 75% (77% for pharmaceutical products and 75% for surgical consumable products).

Further discussion of the outcomes will be covered in the progressive outcomes and the overall impact of the integrated system in section 3.6 of this chapter.

In Chapter 4, I will show the progression of the graphic representation of the integrated system as the enhanced and adapted integrated system that was developed at the end of Cycle 2, as well as the improvements and additions to the processes and sub-processes that were described.

In September 1999, AHL acquired a company known as PresMed, which included 19 acute care hospitals, thereby enhancing its geographic spread across SA and providing the potential to achieve further economies of scale (Vice, 1999: 7). This led to the initiation of a third action research cycle which will now be discussed.

3.5 CYCLE 3: INDEPENDENT TEST OF THE ADAPTED INTEGRATED SYSTEM

In September 1999, AHL expanded further through the acquisition of a 19 hospitals, known as PresMed, making AHL the largest hospital group in the SA private healthcare sector at the time. According to the MD of AHL (Hogben, 1999:11) the focus of the newly merged organisation resulting from the acquisition of the PresMed group was to:

- Optimise synergy across the group;
- Transfer knowledge and experience across organisational boundaries;
- Build an atmosphere of trust and common purpose;
- Unlock managerial potential; and
- Sustain the ability to manage growth.

A financial goal of achieving R10 million synergy benefits in PresMed hospitals in the 2000 financial year was announced to industry analysts by the MD (Hogben, 1999: 17).

The outcomes of the implementation of the adapted integrated system in AHL hospitals resulted in significant margin improvements for the group, and curtailed the increase in costs of pharmaceutical and surgical consumables from 25% to less than 7% by September 1999 (Hogben, 1999:15). As MD of Afrox Pharmacy Management Services (APMS), I identified the opportunity to implement the AHL integrated system in the recently acquired PresMed hospitals in order to meet the integration goals of the organisation and at the same time to independently test the adapted system from Cycle 2 in a completely new group of 19 hospitals.

3.5.1 Progression of Cycle 3

Figure 3.7 shows the progression of Cycle 3 through the action research steps using the input-process-output systems approach.

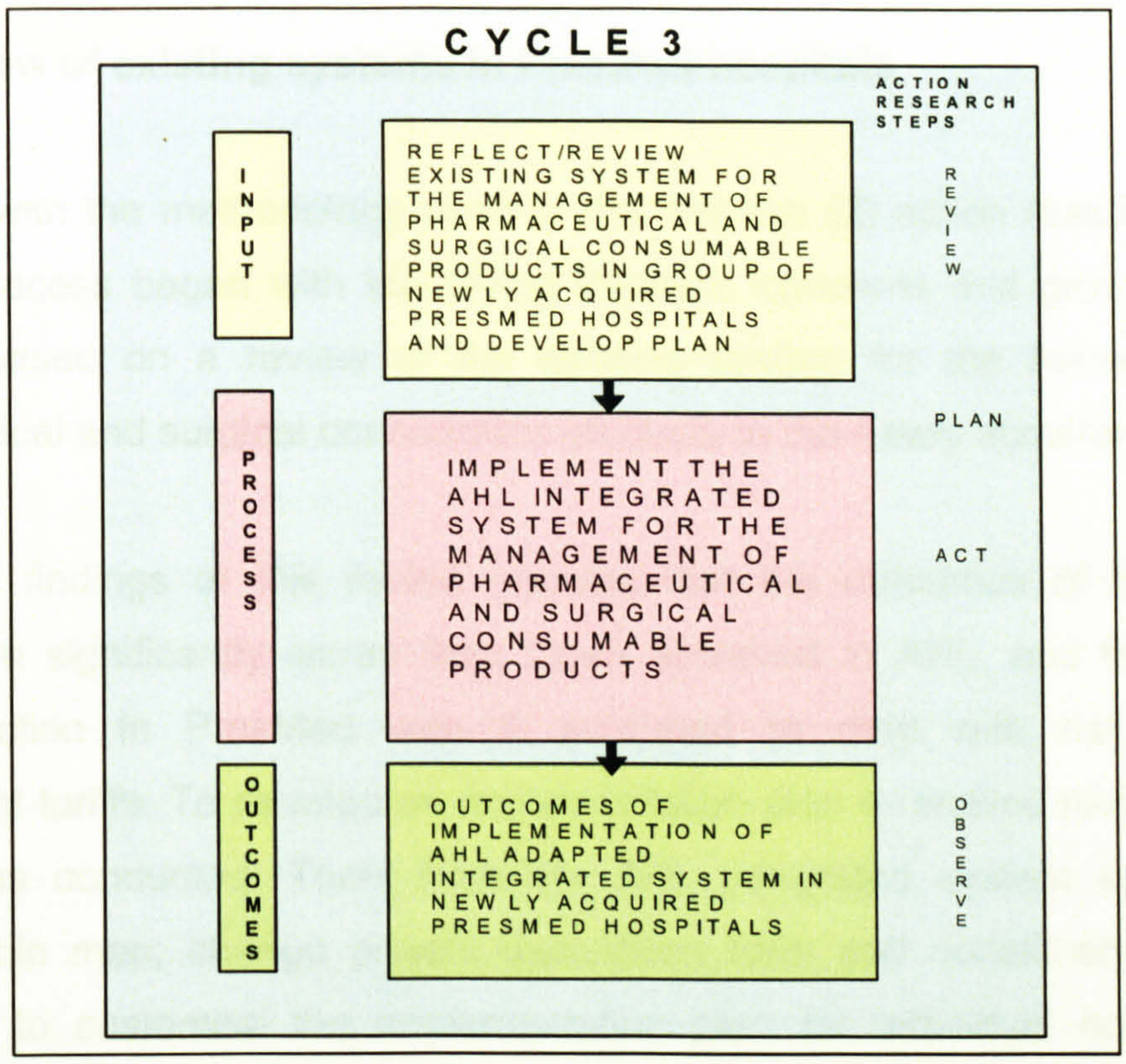


Figure 3.7: Graphic representation of the progression of Cycle 3

The INPUT or REVIEW step in Cycle 3 involved the review of the existing system for the management of pharmaceutical and surgical consumable products in the group of 19 PresMed hospitals and the development of a plan for the implementation of the integrated system.

The execution of the plan formed the ACTION or PROCESS phase of Cycle 3. As with Cycles 1 and 2, while these actions will be described progressively, implementation in the PresMed group of hospitals was not a single event, but rather a number of simultaneous actions across the hospitals.

The outcomes of the implementation (OBSERVE or OUTCOMES components) were measured from October 1999 to September 2000, which represented a full financial year for the combined company.

To ensure the change management process was followed, the adapted model, as discussed in Chapter 2, Figure 2.2:25, was used to guide the approach.

3.5.2 Review of existing systems in PresMed hospitals

In keeping with the methodology used in the first two (2) action research cycles, the input process began with identifying thematic concerns and group reflective questions based on a review of the existing system for the management of pharmaceutical and surgical consumable products in the newly acquired hospitals.

The overall findings of this review showed that the outcomes of the existing system were significantly worse than those achieved in AHL, and the old-style buying function in PresMed was ill equipped to deal with risk-based re-imbursement tariffs. To develop an implementation plan a detailed review of each process was conducted. Tools from the AHL integrated system such as the formulary role map, change project description form and constituency analysis were used to customise the implementation plan for individual hospitals and address the concern of imposing an AHL system on the PresMed hospitals.

A detailed gap analysis of each of the six (6) processes of the AHL integrated system was completed and action steps combined into an overall action plan.

3.5.3 Implementation and change management

The implementation process across the 19 acute-care PresMed hospitals followed the methods identified in Cycle 1 and adapted in Cycle 2 of the study. Implementation of each process was described in detail and their role and impact reviewed at the end of the Cycle. Throughout the implementation, change management processes as identified in the adapted model and described in the review of change management conducted in the input phase were considered and adopted as required.

3.5.4 Outcomes of Cycle 3

The outcomes of implementation in the newly acquired hospitals were measured from the baseline of September 1999 to September 2000, which was the end of the financial year.

- One (1) product selection process and information technology (IT) support system was used across all hospitals;
- The value of pharmaceutical and surgical consumable products analysed for all hospitals reached 57%;
- The percentage product reduction achieved through the product selection process was 68% for the combined group;
- Products classified in the product database reached 83% from 67% at the end of Cycle 2 and the accuracy of data remained intact with the total value of products rejected into the suspense file at 5,6%;
- The percentage product line compliance achieved was 80% in PresMed hospitals by the September 2000; and
- All PresMed hospitals reached over 80% value compliance by that period and seven (7) hospitals had reached over 90% compliance, resulting in a total value compliance of 87%.

To conclude the independent test of the system, I reviewed the application of the integrated system and its individual components. Table 3.5 shows a summary of each component of the integrated system in September 2000 compared to findings of the review conducted in September 1999, from which thematic concerns and the action plan were developed.

Table 3.5: PresMed hospitals: System in September 2000 compared to the review findings in September 1999

FOCUS AREA	REVIEW FINDINGS IN SEPTEMBER 1999	PRESMED HOSPITALS BY SEPTEMBER 2000
1. PRODUCT SELECTION PROCESS	• No product selection process existed for either pharmaceutical or surgical consumable products; • No classification system was in place for product comparison; • No formalised system for product evaluation, supplier evaluation or financial analysis existed; • Some standardisation of products had been embarked on and was communicated to pharmacy hospital staff through workshops and by pharmacy operations managers in PresMed; and • No formulary was in place for either pharmaceutical products or surgical consumable products.	• Integrated product selection process for both categories of products; • Classification system applied to all product analyses including product comparisons; • Formalised system for product evaluation, supplier evaluation and financial analysis incorporated with AHL hospitals; • A formulary for both pharmaceutical and surgical consumable products covering 57% of all products (see Table 4.1 of this submission); and • Supplier-only standardisation for 14% of products (see Table 4.1 of this submission).
2. IT SUPPORT	• No information technology (IT) infrastructure existed to support a product selection process or the standardisation of products; • No product utilisation database or centralised information on product purchases or usage information existed; • There was no IT data analysis capability for these products; • There was no PresMed product database. Hospitals leased the HHD price file except for one (1), which used an alternative file known as Comedis; and • Data on individual hospital product purchases was available in the hospital billing systems of which two (2) (ProClin and Delta 9) were used in the group. These were the equivalent of the MAC billing system used in AHL.	• Ability to utilise AHL information technology (IT) systems to support the product selection process and standardisation of products; • Capability developed to incorporate data from multiple systems for product utilisation review; • IT data analysis capability for both pharmaceutical and surgical consumable products; • The price file was replaced with a full product database, which enables reporting, allows flagging of formulary and non-formulary products and indicates restrictions and classification of products; • Data from individual hospitals could be retrieved from existing systems for all but one (1) hospital whilst all hospitals were moved to the MAC billing system; and • Access to formularies at hospital level was in place for all hospitals that were moved to the MAC billing system.

FOCUS AREA	REVIEW FINDINGS IN SEPTEMBER 1999	PRESMED HOSPITALS BY SEPTEMBER 2000
3. FACTORS IMPACTING HOSPITAL IMPLEMEN-TATION PROCESS	• As no formulary was in place for either pharmaceutical or surgical consumable products the change management tools as described in Table 2.3 of submission 2b had to be used; • No constituency analysis as described in Figure 3.6 of submission 2b existed; • Procedures and protocols supported the existing limited system of the management of pharmaceutical and surgical consumable products; and • Doctors in PresMed had not been exposed to the concept of a formulary for pharmaceutical and surgical consumable products.	• Hospital implementation processes were in place, including sustained communication process to all stakeholders, agreed and aligned performance measures and formulary implementation teams; • Constituency analysis completed for each PresMed hospital and information to achieve doctor buy-in such as the doctor communication pack and decision support material (DSM) available to all pharmacists; and • Monthly formulary newsletter provided to all pharmacy managers.
4. MEASURE-MENT AND MANAGE-MENT TOOLS	• No formulary measurement and management tools were in place.	• Full spectrum of measurement and management tools for both pharmaceutical and surgical consumable products; and • Measures available at individual hospital level, for all PresMed hospitals and benchmark data for all hospitals including both PresMed and the original AHL hospitals.
5. PHARMACY CAPABILITY DEVELOP-MENT	• Operational training and development of pharmacy managers and pharmacists was through one-on-one contact with pharmacy operations managers and regional workshops; • No specific skills development training or clinical skills training for pharmacy staff had been conducted in the last 5 years; and • There was some ongoing continued professional development undertaken by individual pharmacists through their professional hospital pharmacist association.	• Interpersonal skills training completed including conflict handling, negotiation skills and academic detailing; • Continuing medical education (CME) in place to provide clinical and technical knowledge for formulary implementation; and • Ongoing formulary induction for new pharmacists.
6. SUPPLIER STRATEGY AND INTERFACE PROCESSES	• Supplier relationships were based on the buying function; • Buying processes were not formalised at centre; and • No supplier representative policy existed. All supplier representatives had full access to market all products to all hospitals and departments.	• Supplier strategy and interface incorporated into AHL integrated system; and • Supplier representative policy implemented across all PresMed hospitals.

The review showed that as a result of the implementation of the processes and sub-process, the newly acquired hospitals had transitioned from an old style procurement system to an integrated system for the management of pharmaceutical and surgical consumable products. I will now present the progressive outcomes of the three (3) action research cycles and discuss the overall impact of the integrated system.

3.6 PROGRESSIVE OUTCOMES AND OVERALL IMPACT OF THE INTEGRATED SYSTEM

Table 3.6 shows a summary of outcomes of each of the three (3) cycles including the comparison between the newly acquired hospitals (PresMed) and the existing hospitals (AHL) and the combined outcomes of all hospitals in the group at the end of Cycle 3.

The results used for Cycle 2 are at the end of September 1999, which represents a further year of implementation and shows the developments to the beginning of Cycle 3.

Table 3.6: Summary of outcomes of Cycle 3: September 2000

PROCESS	MEASUREMENTS	PRODUCT	OUTCOMES				
			CYCLE 1 March 98	CYCLE 2 Sept 99	CYCLE 3 PresMed hospitals	CYCLE 3 AHL hospitals	CYCLE 3 Combined AHL & PresMed
Process for product selection for pharmaceutical and surgical consumable products.	Supplier-only standardisation. (4.2.1)	Pharmaceuticals	Not measured	14.5%	14% (one process used for all hospitals)		
		Surgical consumable products	Not measured	14%	14% (one process used for all hospitals)		
		TOTAL (All products)	Not measured	14.5%	14% (one process used for all hospitals)		
	Value of pharmaceutical and surgical consumable products analysed (% of group spend) (4.2.2)	Pharmaceuticals	37%	54%	74% (one process used for all hospitals)		
		Surgical consumable products	8%	40%	46% (one process used for all hospitals)		
		TOTAL (All products)	24%	52%	57% (one process used for all hospitals)		
	Percentage reduction in number of products. (4.2.3)	Pharmaceuticals	81%	85%	70% (one process used for all hospitals)		
		Surgical consumable products	70%	63%	64% (one process used for all hospitals)		
		TOTAL (All products)	74%	68%	68% (one process used for all hospitals)		
Information technology support systems for the management of pharmaceutical and surgical consumable products.	Group Purchasing Information (GPI) – percentage of total value of products in the suspense file. (4.3.1)	TOTAL (All products)	13%	5%	16% (Oct99) 6%	5%	5,6%
	PIPS database: percentage of total value of products classified. (4.3.2)	Pharmaceuticals	51%	70%	87% (one process used for all hospitals)		
		Surgical consumable products	15%	56%	79% (one process used for all hospitals)		
		TOTAL (All products)	31%	67%	83% (one process used for all hospitals)		
Hospital Formulary Implementation .	Product line compliance. (4.4.1)	Pharmaceuticals	44%	68%	79%	84%	82%
		Surgical consumable products	52%	77%	81%	88%	85%
		TOTAL (All products)	44% (Pharmaceuticals only)	75%	80%	86%	84%
	Product value compliance. (4.4.2)	Pharmaceuticals	Not measured	89%	89%	92%	91%
		Surgical consumable products	Not measured	83%	86%	90%	89%
		TOTAL (All products)	Not measured	87%	87%	93%	90%

3.6.1 Discussion of progressive outcomes

The discussion of the progressive outcomes will follow the three (3) processes shown in Table 3.6.

3.6.1.1 Process for product selection

One (1) process for product selection was used for all hospitals for both pharmaceutical and surgical consumable products across all three (3) action research cycles. **Supplier-only standardisation** was added in Cycle 2 in order to cover whole categories of products where a single supplier was selected but individual categories were not separated for single product selection (e.g. sutures). The 0,5% decrease in the percentage supplier-only-standardisation in Cycle 3 represented the change in proportion of spend in the product categories for the combined organisation. The **value of products analysed as a percentage of total spend** on both types of products increased from 24% in Cycle 1, to 52% by September 1999 when the PresMed hospitals were acquired and reached 57% by the end of Cycle 3. This progress included the ongoing review of product selection. The **percentage reduction in the number of products** decreased from 74% in Cycle 1 to 68% in the next two (2) cycles due to some categories having fewer brand choices within them.

3.6.1.2 Information technology (IT) support systems

The same IT support systems were used for all hospitals in each cycle. The **accuracy of information in the group purchasing information data base (GPI)** was measured by the percentage of total value of products rejected into a suspense file. This value improved from 13% in Cycle 1 to a combined value of 5,6% for all hospitals at the end of Cycle 3. **Classification of products**, which was a critical step in the product selection process, increased from 31% in Cycle 1 to 83% for both pharmaceutical and surgical consumable products at the end of Cycle 3. The increase from 67% in Cycle 2 was due to an additional resource being added at the time of the PresMed acquisition to focus on accelerating the classification of products and increase product selection and review.

3.6.1.3 Hospital formulary implementation process

Figure 3.8 shows the comparison of the percentage line and value compliance across the newly acquired PresMed hospitals and the existing AHL hospitals over the period September 1999 to September 2000. Both value and line compliance represents combined compliance for pharmaceutical and surgical consumable products.

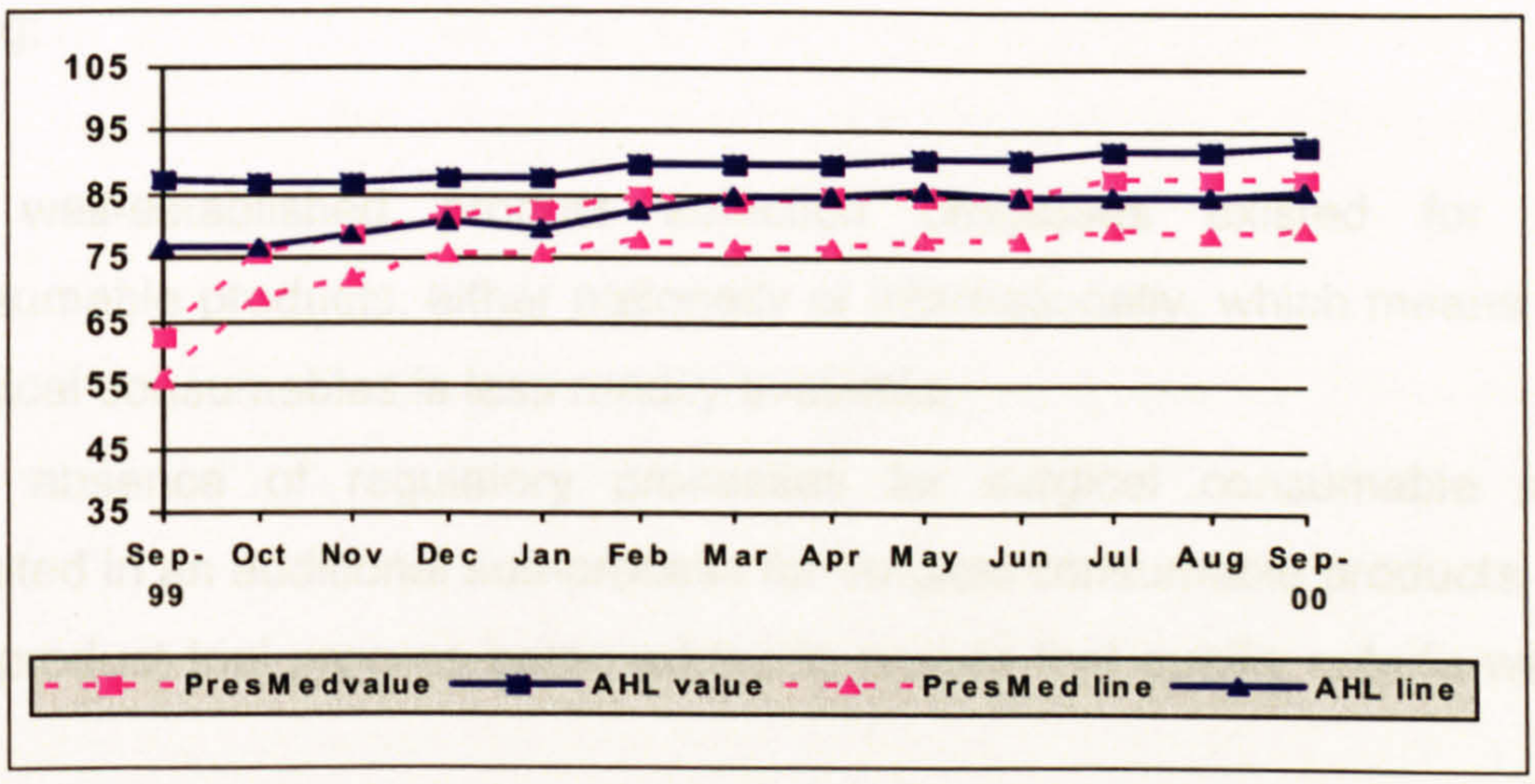


Figure 3.8: Comparison of value and line compliance: September 1999 - 2000

Line value compliance increased from 44% in Cycle 1 to 84% by Cycle 3. This represents the progressive process of improvement of the integrated system and focuses on implementation and improvement as is built into the system, e.g. through the management and measurement tools such as the individual and group product compliance reports. In contrast to AHL hospitals in Cycle 1, the percentage line value compliance in PresMed hospitals exceeded the 70% target within three (3) months. Percentage value compliance reached 85% within 12 months compared to 75% in AHL over the same period in previous cycles. This was attributed mainly to the fact that an already developed and improved system was rigorously implemented in PresMed rather than the draft system that was developed and implemented at the same time in AHL

3.6.2 Comparative outcomes for pharmaceutical and surgical consumable products

Table 3.6 shows the differences in outcomes between pharmaceuticals and surgical consumables across all three (3) cycles. In all measures, except for product line compliance, outcomes were better for pharmaceutical products than they were for surgical consumable products. This is due to a number of factors, including:

- No well-established product selection processes existed for surgical consumable products, either nationally or internationally, which means data on surgical consumables is less readily available;
- The absence of regulatory processes for surgical consumable products resulted in an additional sub-process for surgical consumable products, namely the product trial process being added to ensure that quality criteria were met; and
- A new classification system needed to be developed compared to using the established system for pharmaceuticals.

The lower percentage reduction of products was due to the fact that it is more difficult to establish which products are the same as others, unlike with pharmaceuticals where active generic ingredients can be traced. The differences in value compliance were larger in the earlier cycles and improved in Cycle 3. This was due to the fact that the implementation of the integrated system was driven through the pharmacy department that were more familiar with pharmaceuticals and only improved their knowledge of these products over time. Each new surgical product also often requires a longer learning curve than for pharmaceuticals.

3.6.3 Progressive impact of the integrated system

The progressive impact of the integrated system determined the extent to which the business objectives were met. At the end of Cycle 1, the set target of 70% compliance was not met and only 24% of the total value of pharmaceutical and

surgical consumable products were covered by the product selection processes. As a result the targeted financial improvements for that period were not met, which resulted in the initiation of Cycle 2 to identify and address the gaps in the draft integrated system.

In Cycle 2 it was recognised that the value of product spend covered by the integrated system was a better measure of the potential impact of the integrated system than the line items or units used. Through the various improved processes and new processes, resources and efforts were focused on improving the impact of the integrated system.

A new measure was developed in Cycle 2. It provided a graphic representation of the percentage of total value compliance versus the percentage of total purchases covered in the product selection process. Both formulary products, where one (1) product and one (1) supplier was selected, and supplier-only standardisation, where a single supplier was selected for a category of products, is shown.

Figure 3.9 shows the total value compliance percentage versus percentage of total spend covered by the formulary and supplier-only standardisation processes by September 1998. As shown in the graph, the total value of products covered by the product selection process increased to 52%, of which 39% resulted in a single product and single supplier for a category, and 13% in supplier-only standardisation. The percentage product value compliance reached 75.4% for formulary products and 77% for supplier-only standardisation.

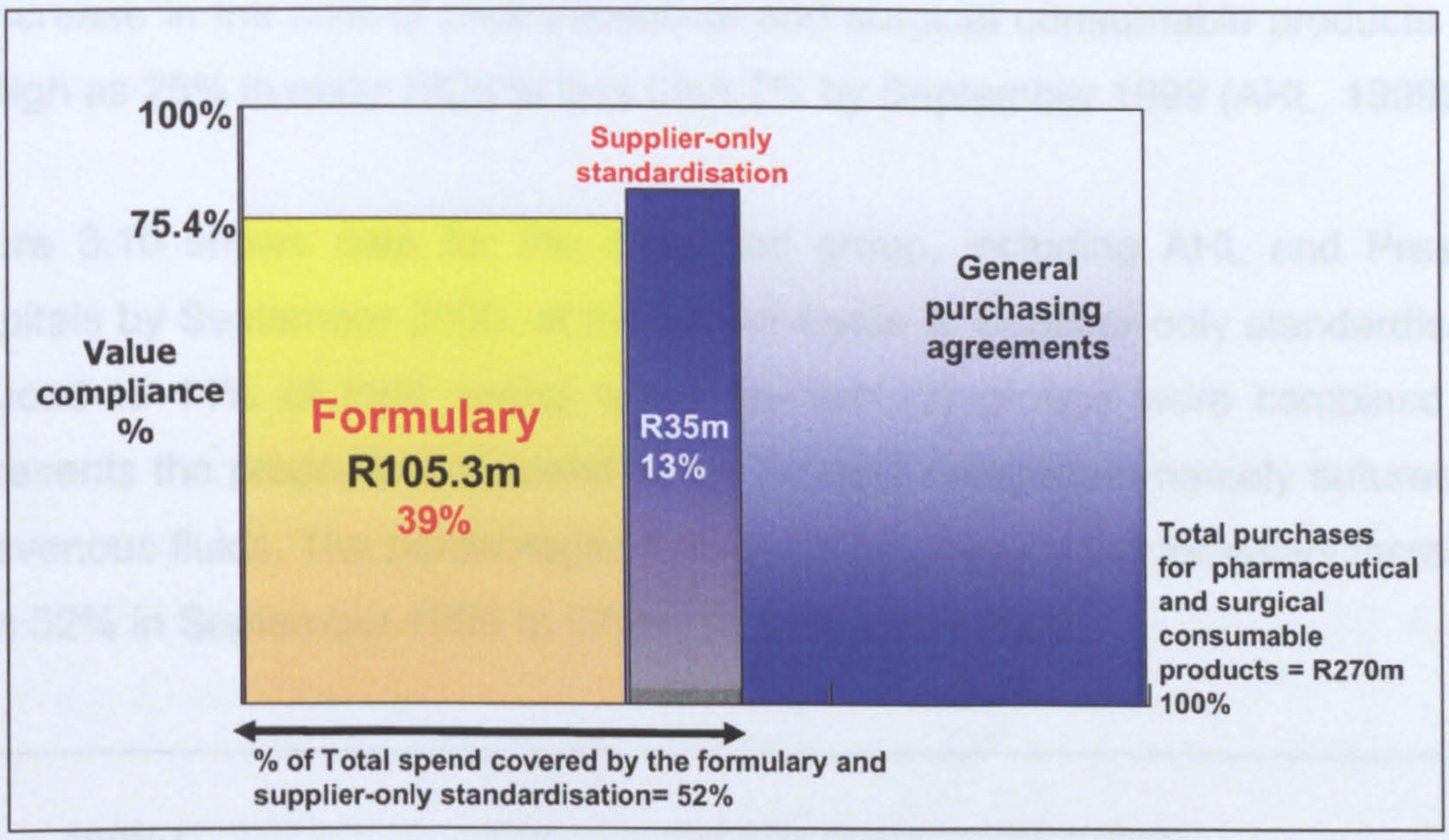


Figure 3.9: Cycle 2: Total value compliance percentage versus percentage of total spend covered by the formulary and supplier-only standardisation processes: September 1998

Importantly, despite the fact that the goal of 70% scope of products covered had not been reached because of the focus on high value products, the business results showed that the implementation of the integrated system exceeded the financial targets set. Financial improvement was demonstrated in the fee-for-service environment and cost-reductions were achieved in risk-based tariffs (AHL, 1998).

By September 1999, the value of products covered by the product selection process increased to 66.5%, with 52% single formulary products selected and 14.5% supplier-only standardisation. In addition, the continued focus on high value items resulted in the product value compliance increasing to almost 87% by September 1999.

A further improvement in margin in the fee-for-service environment and reduction in cost of products in risk-based tariffs was achieved in the financial year October 1998 to September 1999 (AHL, 1999a). Overall, the adapted integrated system for pharmaceutical and surgical consumable products successfully curtailed the rate

of increase in the cost of pharmaceutical and surgical consumable products from as high as 25% in early 1998 to less than 7% by September 1999 (AHL, 1999b).

Figure 3.10 shows data for the combined group, including AHL and PresMed hospitals by September 2000, at the end of Cycle 3. Supplier-only standardisation reduced to 14% of total spend when the two (2) groups were combined and represents the proportion of spend of the product categories, namely sutures and intravenous fluids. The percentage of products covered by the formulary increased from 52% in September 1999 to 57,4% in September 2000.

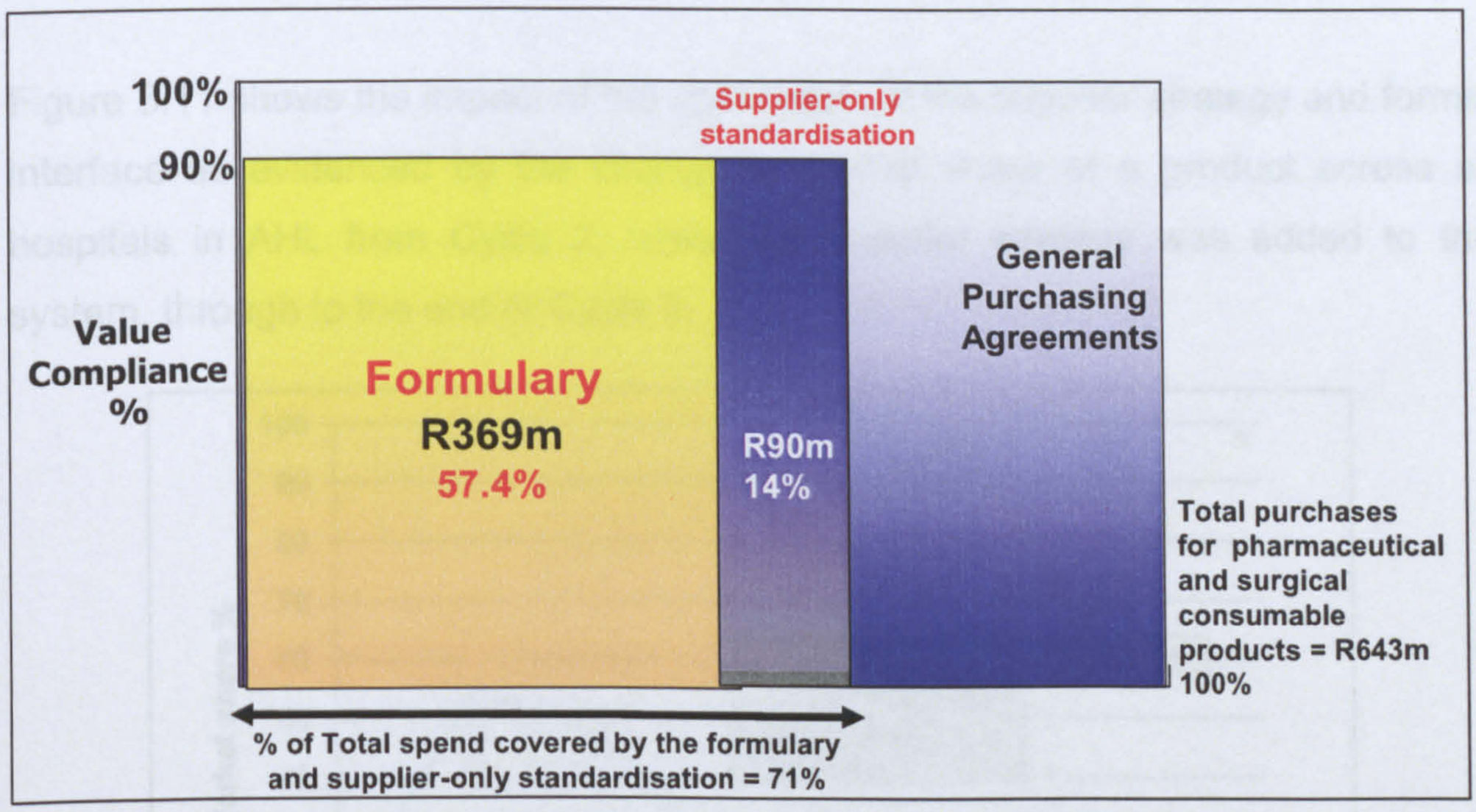


Figure 3.10: Cycle 3: Total value compliance percentage versus percentage of total spend covered by the formulary and supplier-only standardisation process by September 2000

The ongoing review of existing categories is not represented in this figure, but continued to be a focus area throughout the period. The results shown in Figure 3.10 reiterate the achievement of the targets set for the implementation of the integrated system, including total spend covered (target 70%) and value compliance (target 80%). Overall the outcomes showed that, as a result of the implementation of the integrated system for the management of pharmaceutical and surgical consumable products, the financial targets were achieved in both

PresMed and AHL hospitals, which in turn made a significant impact on the overall performance of the merged organisation (AHL, 2000).

3.6.4 Impact of the supplier strategy

The objective of the development and implementation of the integrated system was to maximise leverage opportunities and meet financial targets whilst ensuring no compromise in quality of care. Key to the ability to leverage the group was the impact of the supplier strategy in which the aim was to be able to shift market share across all hospitals.

Figure 3.11 shows the impact of the application of the supplier strategy and formal interface as evidenced by the change in market share of a product across all hospitals in AHL from Cycle 2, when the supplier strategy was added to the system, through to the end of Cycle 3.

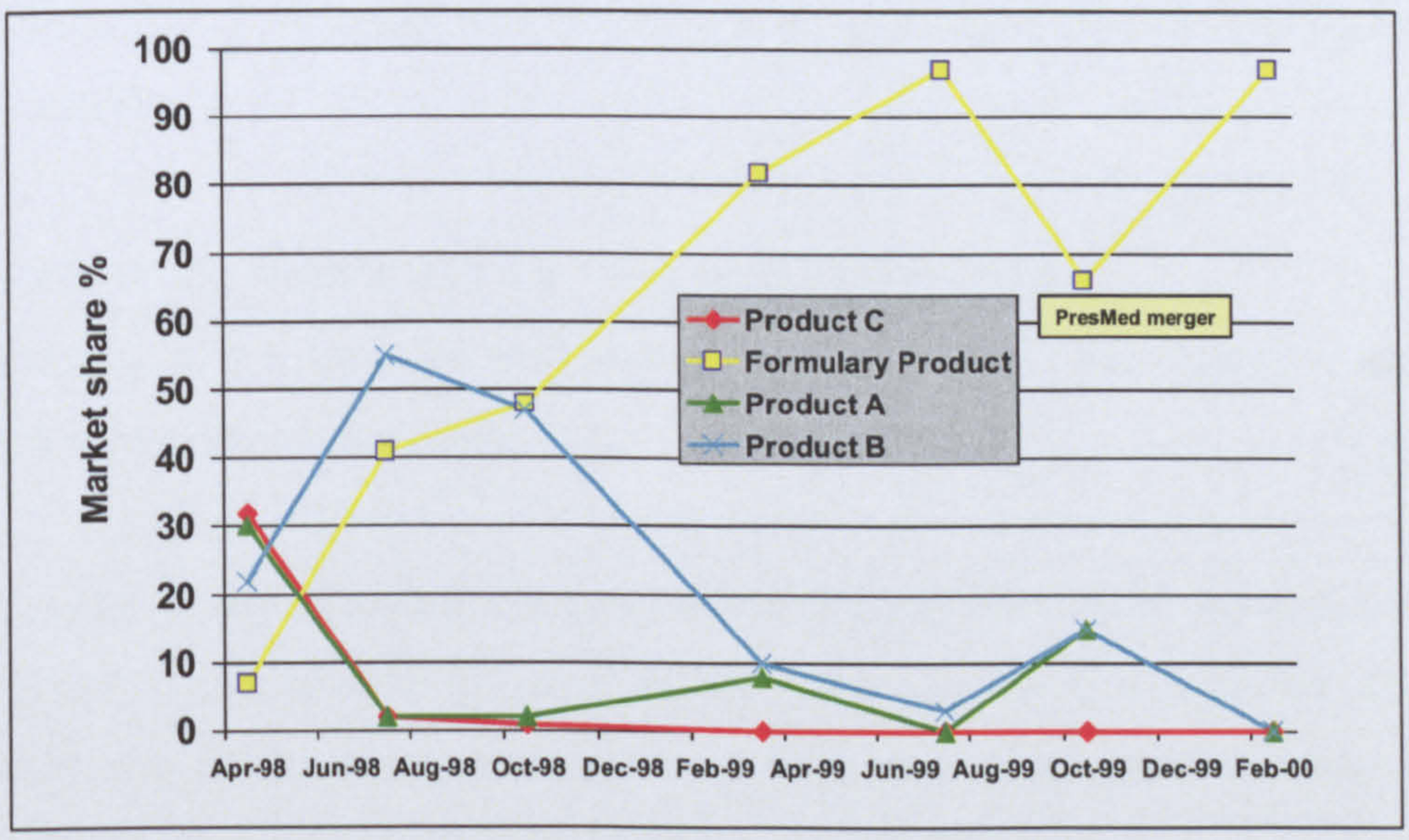


Figure 3.11: Example of market share report for a surgical consumable product showing impact of PresMed hospital implementation

As shown in the graph, the combined market share of the formulary product fell to below 70% when the PresMed hospitals were merged into AHL, but moved back

to over 90% with the formulary implementation process and through the work done jointly with the supplier.

3.7 SUMMARY

In this chapter I provided an overview of the three (3) action research cycles through which I determined what was needed to develop and implement an integrated system for the management of pharmaceutical and surgical consumable products. The outcomes of each cycle were summarised and a discussion of the progressive outcomes and impact of the integrated system over the three (3) cycles was presented.

I will now describe the progression of the integrated system as derived from the deductive process following Karlsen's model.

CHAPTER 4

PROGRESSION OF THE INTEGRATED SYSTEM OVER THE ACTION RESEARCH CYCLES

4.1 INTRODUCTION

Figure 1.2:14 showed a concept map of the study and differentiated between the objectives of the business project and the action process linked to the research aim.

At the end of each action research cycle, as part of the independent contribution of the researcher, I reflected on the processes and outcomes of implementation and presented:

- A diagrammatic overview of the integrated system; and
- A summary of the features and key unique features of the integrated system compared to previous cycles.

In this chapter, I will describe the progression of the integrated system over the action research cycles and present a final overview of the features and key unique features of the integrated system. This was used as the basis for the literature comparison conducted as the next step in the study.

4.2 GRAPHIC REPRESENTATION OF THE INTEGRATED SYSTEM

In order to provide an overview of the integrated system, a graphic representation was presented at the end of Cycles 1 and 2 of the action research cycles. No changes were made in Cycle 3, as the aim was to independently test the existing system.

4.2.1 Cycle 1: Draft integrated system

Figure 4.1 contains a graphic representation of the draft integrated system for the management of pharmaceutical and surgical consumable products across all acute-care hospitals in AHL as defined by the end of Cycle 1.

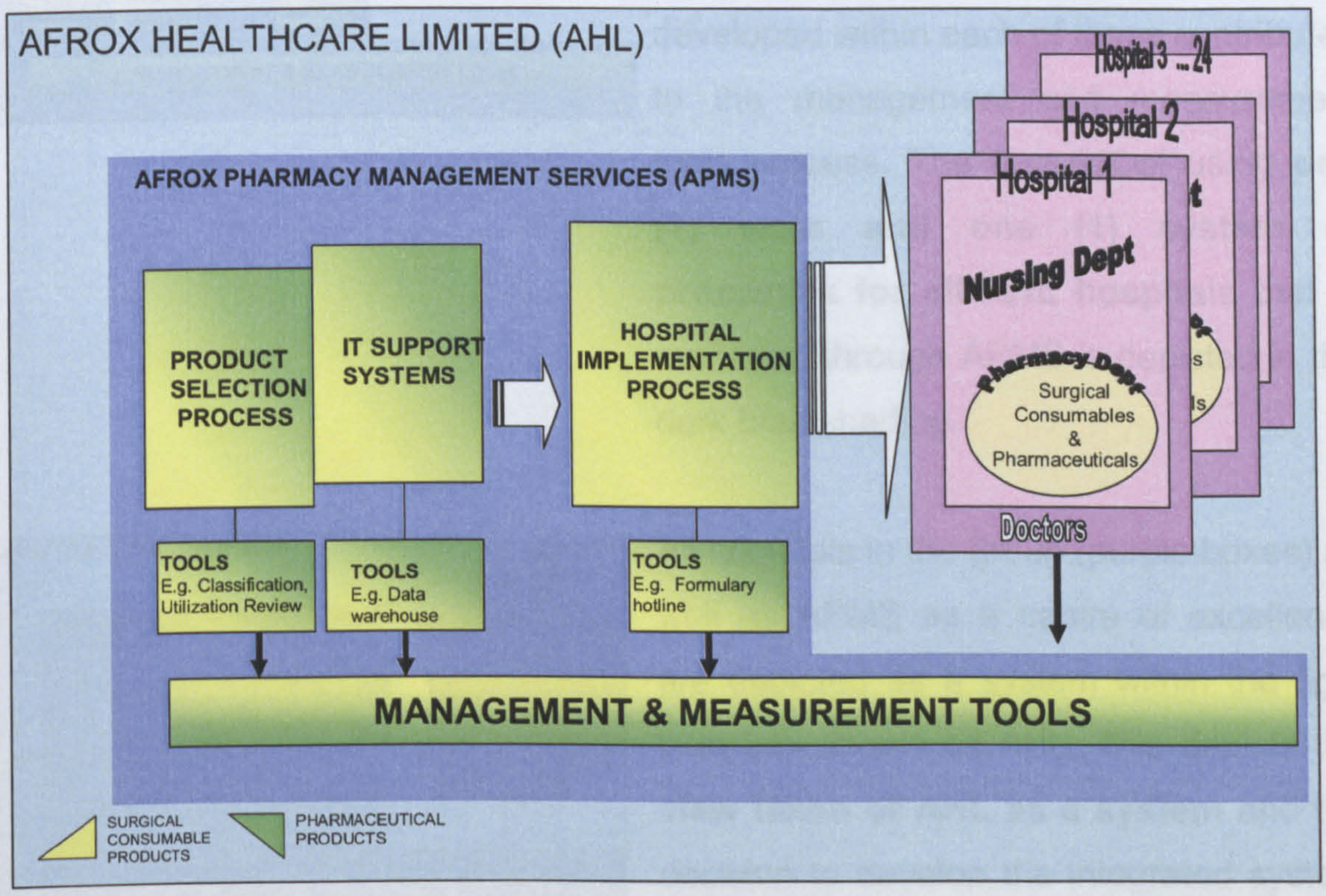
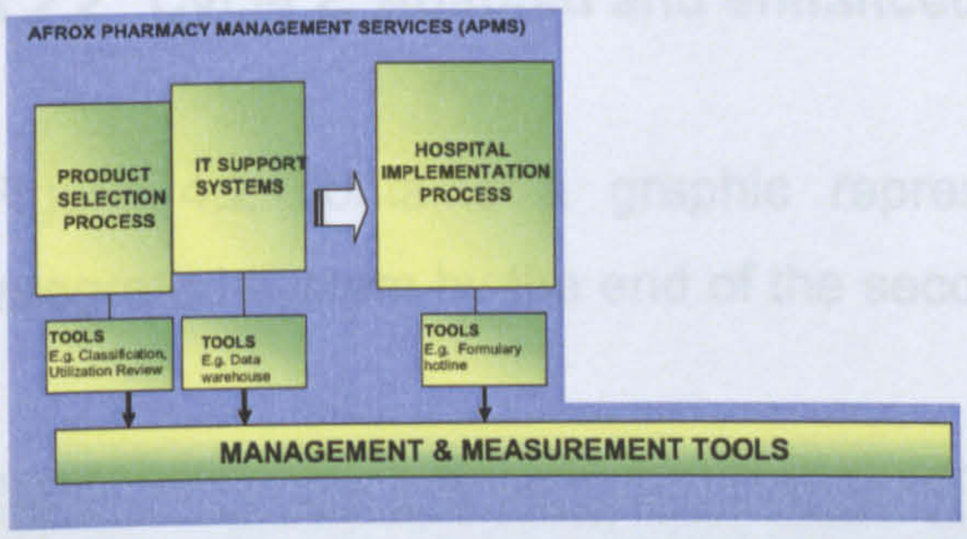


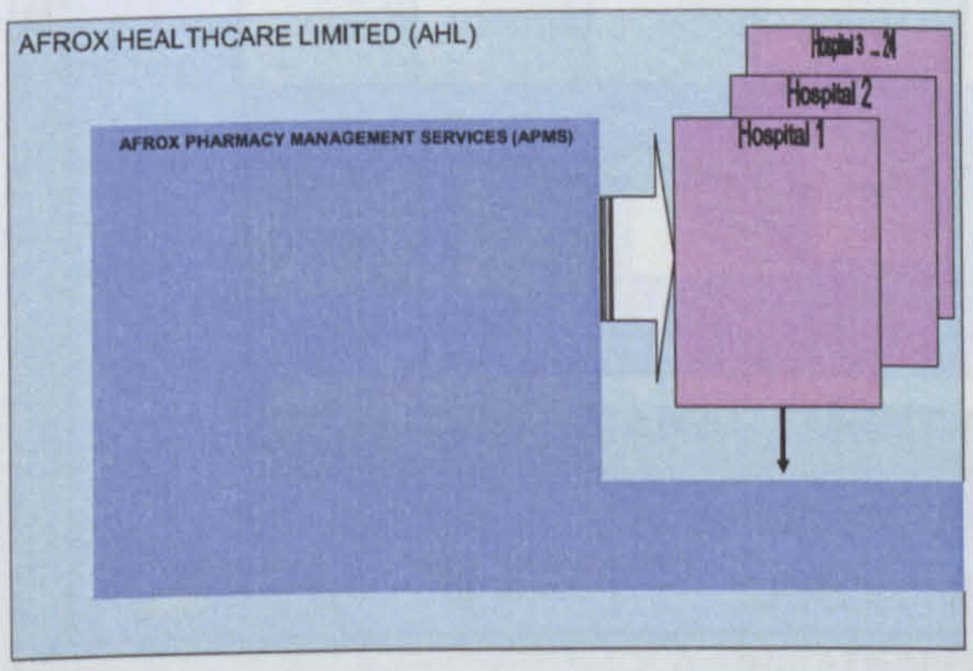
Figure 4.1: Graphic representation of the draft integrated system for the management of pharmaceutical and surgical consumable products across all acute-care hospitals in AHL as defined in Cycle 1

I will now explain the different components of the integrated system.

The decision to include both pharmaceutical and surgical consumable products into one (1) integrated system of management. This is depicted in the diagrammatic overview as green and yellow "integrated" shading.



The four (4) processes of the draft integrated system, as identified, developed and implemented in Cycle 1, are shown as individual boxes, and tools developed within each of these contributed to the management and measurement tools process. The concept of using **one (1) team and one (1) system of processes for all AHL hospitals** that is managed through APMS is depicted in the dark blue shading.



All hospitals in the group (purple boxes) as well as APMS as a centre of excellence are depicted as a system within the light blue box shown as AHL. This depicts the **view taken of AHL as a system** and the decision to develop the integrated system across all hospitals in order to maximise leverage opportunities.

The concept of a hospital as a system is represented in the diagram by the purple block and includes the integration of products into one (1) management system managed through the pharmacy department. Although doctors are independent practitioners, they are recognised as an integral part of the hospital system.

4.2.2 Cycle 2: Adapted and enhanced integrated system

Figure 4.2 contains a graphic representation of the improvements to the integrated system by the end of the second cycle.

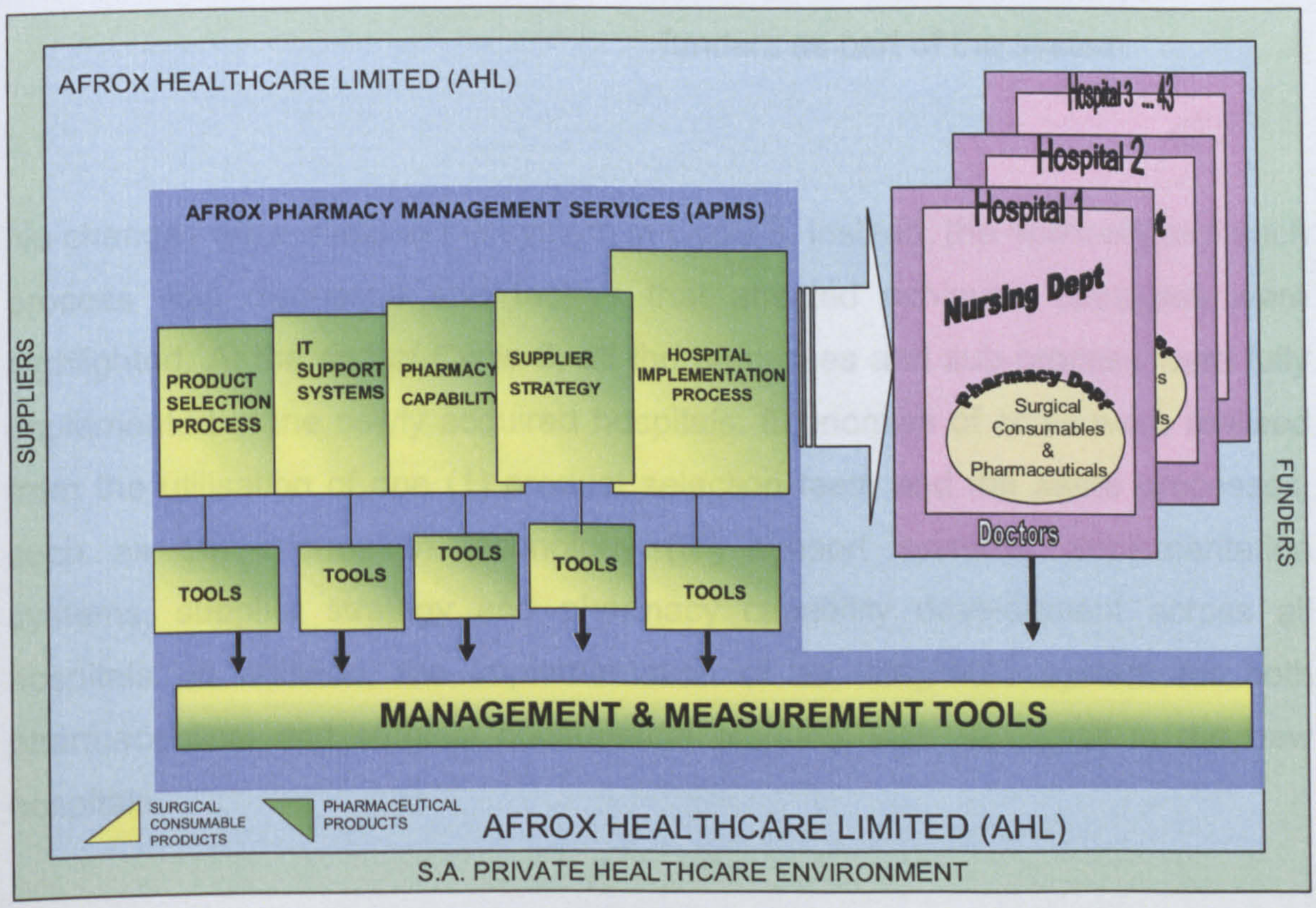
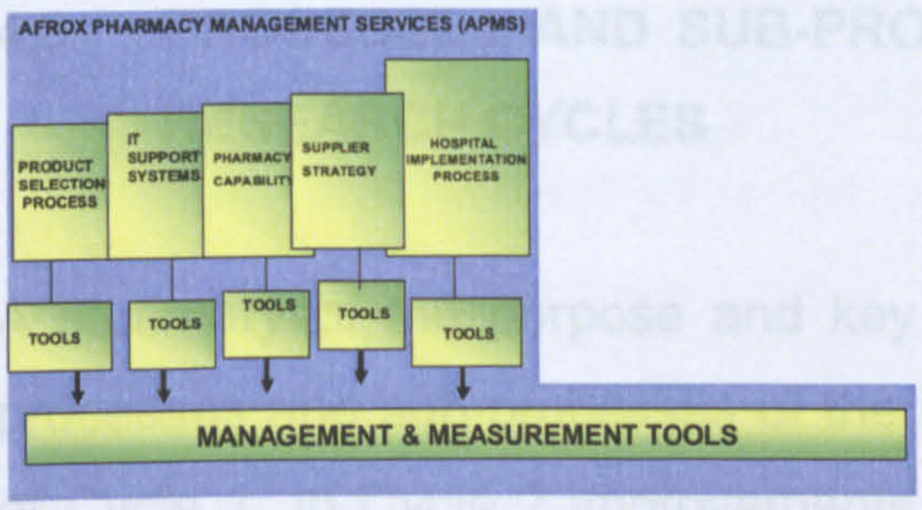
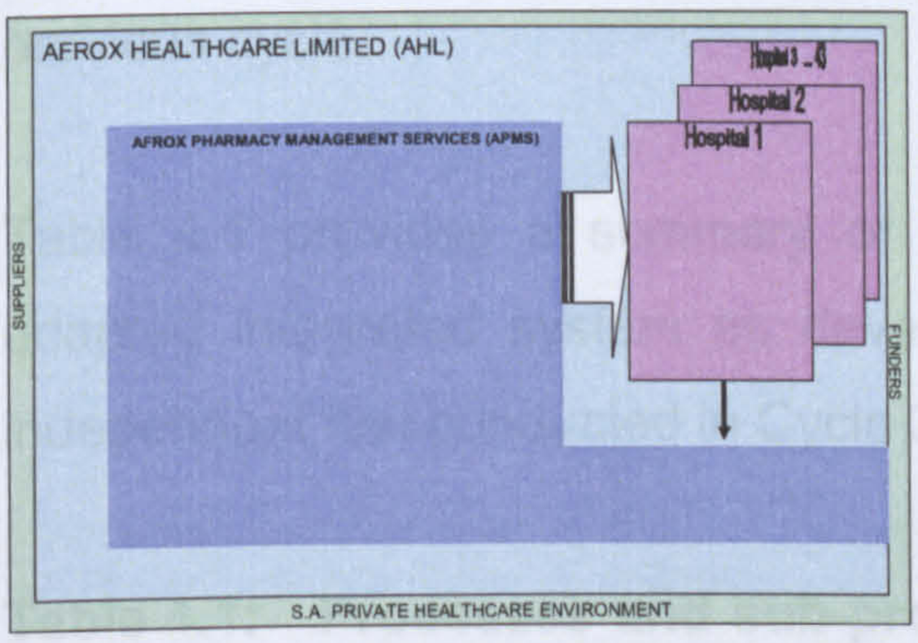


Figure 4.2: Graphic representation of the adapted integrated system as defined by the end of Cycle 2



The addition of the two (2) new processes in Cycle 2 is shown as two (2) further boxes. The inter-relationship of the processes is depicted by the overlap of the individual boxes.



In addition, the inclusion of a supplier strategy resulted in the expansion of the context of the integrated system and the recognition of **the integrated system as an open system**. This is depicted in the addition of the green block around AHL, which includes the SA private healthcare environment, suppliers and funders as part of the system

No changes were made to the system in Cycle 3. Instead, the application of each process was discussed and factors that affected achieved outcomes were highlighted. At the end of Cycle 3, all the processes and sub-process were fully implemented in the newly acquired hospitals. Economies of scale were realised from the utilisation of one (1) product selection team and the same processes, such as the information technology (IT) support systems, implementation systems, supplier strategy and pharmacy capability development across all hospitals. In addition, the implementation of an integrated system for both pharmaceutical and surgical consumable products was replicated in the new hospitals.

4.3 PROCESSES AND SUB-PROCESSES DEVELOPED IN THE ACTION RESEARCH CYCLES

A summary of the purpose and key unique features of each of the individual processes and sub-processes of the integrated system was provided at the end of Cycle 1. In Cycle 2 improvements to the existing processes were presented, which included new processes and sub-processes in comparison with the previous cycle.

Table 4.1 provides a summary of the processes and sub-processes of the adapted integrated system as developed in Cycles 1 and 2, as well as the independent test conducted in Cycle 3.

Table 4.1: Processes and sub-processes of the integrated system for the management of pharmaceutical and surgical consumable products

PROCESS OR SUB-PROCESS & PURPOSE	FEATURES & KEY UNIQUE FEATURES
PRODUCT SELECTION PROCESS ***PURPOSE: Process for the selection of pharmaceutical and surgical consumable products that results in a restricted pharmaceutical and surgical consumable formulary that:*** • ***Has credibility with stakeholders;*** • ***Leverages the group spend; and*** • ***Ensures optimal therapeutic outcome and quality of service.***	• Integrated system for *both* pharmaceutical and surgical consumable products; • One (1) process for all hospitals; • One (1) product selection team for *all* hospitals with relevant consultative participants brought in when required; • Formulary product review process; • Therapeutic substitution and formulary restrictions; • Formalised product and/or service complaint system to provide feedback on quality of products and service levels of suppliers selected; and • Supplier-only standardisation.
1a. Classification system *PURPOSE: Provides a system for valid comparison of products in the product selection process and facilitates strategic analysis of product usage.*	• Integrated 7-tier classification system for pharmaceutical and surgical consumable products; and • Classification system for surgical consumable products based on functional or therapeutic use.

PROCESS OR SUB-PROCESS & PURPOSE	FEATURES & KEY UNIQUE FEATURES
1b. Prioritisation of product selection process – product utilisation review *PURPOSE: Provides a system for the prioritisation of product selection and ensures a strategic approach to product selection.*	• Utilisation review capability for both pharmaceutical and surgical consumable products; • Utilisation review for all product categories across all hospitals and per individual hospitals; and • Formulary product review criteria and processes.
1c. Clinical analysis process *PURPOSE: To ensure efficacy and safety of both pharmaceutical and surgical consumable products in the product selection process.*	• A process for evaluation of surgical consumable products for use in AHL in the context of there being no regulations in SA to evaluate these products; • One (1) clinical analysis team for all hospitals with relevant experts brought in when required; • Clinical analysis of new surgical products that includes a product trial process with involvement of users in hospitals; and • One (1) process for product review across all hospitals rather than multiple products being trailed at multiple hospitals.
1d. Supplier evaluation process *PURPOSE: To ensure reliability and consistency in supply across all hospitals.*	• A national supplier evaluation across all hospitals that includes input from the hospitals and the monitoring of service delivery; and • Formalised product and service complaint process to monitor suppliers.
1e. Financial analysis *PURPOSE: To ensure cost-effectiveness of products and compliance with financial criteria.*	• A financial analysis process that covers both managed health care re-imbursement models and traditional fee-for-service.
2. INFORMATION TECHNOLOGY (IT) SUPPORT SYSTEM ***PURPOSE: To provide information technology (IT) support for the integrated system for the management of pharmaceutical and surgical consumable products.***	• Integrated IT system to support the management of *both* pharmaceutical and surgical consumable products; • One (1) IT system provides both a group and individual hospital perspective; and • Economies of scale across all hospitals enabled appointment of dedicated IT resources to ensure ongoing IT support and continuous improvement of IT capability for the integrated system.
2a. Product utilisation database – group purchasing information (GPI) *PURPOSE: A system and process that provides ongoing, up-to-date information on product usage in individual hospitals and across all hospitals in the group.*	• Combined utilisation data for all hospitals in terms of both pharmaceutical and surgical consumable products; • Utilisation review capability across both categories of products to use in the product selection process and to measure the impact of the integrated system; • Utilisation database that cross links to the product database and allows detailed analysis, e.g. by classification; and • Ability to include data drawn off non-AHL billing systems into the product utilisation database.

PROCESS OR SUB-PROCESS & PURPOSE	FEATURES & KEY UNIQUE FEATURES
2b. Product database *PURPOSE: To provide a comprehensive interactive data storage capability that holds the full range of products and has the ability to carry additional key features for each product, e.g. formulary flags, 7-tiers of classification, etc.*	• One (1) integrated database for both pharmaceutical and surgical consumable products; • Ability to hold multiple levels of information on all products; • Can link to other systems, e.g. GPI, MAC billing system, etc.; and • Addition of therapeutic substitution and restrictions to database.
2c. Access to the formulary at hospital level *PURPOSE: To ensure pharmacy staff have access to the formulary at the time of dispensing and/or distribution of both pharmaceutical and surgical consumable products.*	• Access to the formulary at hospital level with addition of information on therapeutic substitutions and restrictions on hospital billing and dispensing system.
3. HOSPITAL IMPLEMENTATION PROCESS ***PURPOSE: To ensure effective implementation of the integrated system for the management of pharmaceutical and surgical consumable products across all hospitals in the group.***	• Pharmacy managers responsible for the implementation of both pharmaceutical and surgical consumable products; • Protocols and procedures in all hospitals aligned to deal with the integrated system; • Formulary "hotline" established at centre to provide information and support for formulary implementation; • Doctor implementation through pharmacy managers; • Template for the development of a communication strategy and plan; • Role map for hospital implementation; • Aligned performance management template; • Introduction of formulary implementation teams and training workbook; • Doctor constituency analysis method; • Communication pack for hospital and pharmacy managers to use for doctor buy-in; • Provision of decision support material (DSM) for all products to pharmacy staff; and • Monthly formulary newsletter with index for cross referencing.
4. MEASUREMENT AND MANAGEMENT TOOLS ***PURPOSE: To ensure the effective measurement and management of the integrated system for the management of pharmaceutical and surgical consumable products across all hospitals in the group.***	• Measurement and management tools for both the progress of the development of the system as well as the outcomes; • Measurement of outcomes in both categories of products across all hospitals and per individual hospitals; • Ability to use Cognos Impromtu® and Cognos Powerplay® tools in conjunction with the product database (PIPS) and group purchasing information (GPI) for detailed analysis; • New measure of value compliance for all products to add to line item compliance; • Scope of spend covered and value compliance to measure the progress of the implementation of the integrated system; and • Market share reports across all hospitals and per individual hospital for suppliers and to measure progress for analysed products.

PROCESS OR SUB-PROCESS & PURPOSE	FEATURES & KEY UNIQUE FEATURES

5. PHARMACY CAPABILITY DEVELOPMENT
 	
PURPOSE: To ensure that pharmacy managers and pharmacy staff have the necessary skills and knowledge to effectively implement the formulary for both pharmaceuticals and surgical consumables across all hospitals in the group.
	• Interpersonal skills training programme to support formulary implementation, including:
	  ○ Conflict handling;
	  ○ Negotiation skills; and
	  ○ Academic detailing programme to train pharmacy staff to interface with doctors on the same level as supplier representatives "selling" the AHL formulary products.
	• Continuing Medical education (CME) modules aligned with formulary categories and designed to ensure clinical and technical knowledge for formulary implementation in terms of both pharmaceutical and surgical consumable products; and
	• Standardised formulary induction process for all hospitals to equip new pharmacy employees to implement the formulary for both pharmaceutical and surgical consumable products.

6. SUPPLIER STRATEGY AND FORMALISED INTERFACE PROCESS
 	
PURPOSE: To ensure that the supplier strategy and interface process support the system for the management of pharmaceutical and surgical consumable products.
	• Supplier strategy and formalised interface process across both pharmaceutical and surgical consumable suppliers incorporating the concept of approved suppliers, preferred suppliers, formulary suppliers and strategic partners; and
	• Formalised supplier interface for both pharmaceutical and surgical consumable products, including:
	  ○ Standardised request for information and request for quotation documents in line with product selection process; and
	  ○ Supplier representative policy.

4.4 SUMMARY

In this chapter I provided a diagrammatic overview of the integrated system as it progressed over the three (3) action research cycles, and I presented a summary of the features and key unique features of the integrated system.

The next step in the study was to return to the literature and review the individual components and the integrated system as a whole against the literature to further conceptualise the integrated system for the management of pharmaceutical and surgical consumable products.

As shown in Figure 4.3, this represented a further step of independent research and distinguishes the research aim from the business objectives.

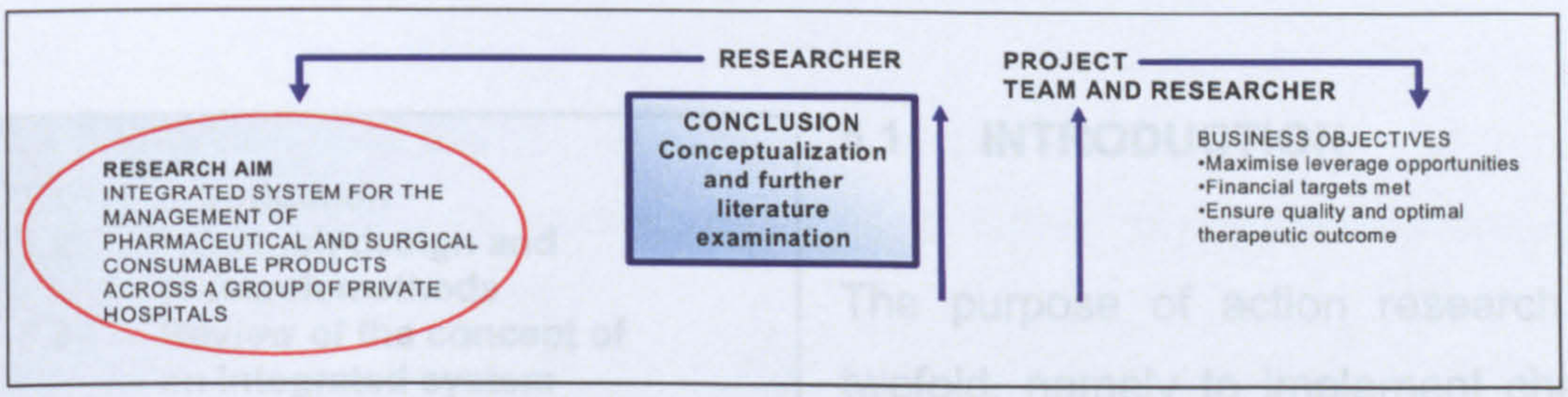


Figure 4.3: Extract of overview of the study to distinguish the research aim from the business objective

CHAPTER 5

COMPARISON TO INTERNATIONAL SYSTEMS THROUGH FURTHER LITERATURE EXAMINATION

5.1 INTRODUCTION

The purpose of action research are twofold, namely to implement change and to generate theory (Greenwood, 1994:13 and Whyte, 1991:54). As stated in Submission 1, the cornerstone of action research is based on the concept that knowledge is derived from practice, and that practice informed by knowledge is an ongoing process (O'Brien, 1998:6).

An overview of the three (3) action research cycles of the study was presented in Chapter 3, and the progression of the development of the integrated system was described in Chapter 4. The next step in the study was to return to the literature to compare the integrated system with other systems of management for pharmaceutical and surgical consumable products, in order to:

- Justify and understand the limitations of the integrated system;
- Highlight differences in the international approach; and
- Identify improvements and additions to the system from other studies.

The literature examination covered the following key differences in the approach to the study:

- The development of an *integrated* system for the management of pharmaceutical and surgical consumable products (**section 5.3**);

- The application of systems thinking to the integrated system (**section 5.4**); as well as
- A review of each of the processes and sub-process of the integrated system (**section 5.5**).

After the completion of the above-mentioned steps, the learning derived from the literature examination was incorporated into a further conceptualisation of the integrated system (**section 5.6**).

5.2 RESEARCH DESIGN AND RESEARCH METHODS

The research question formulated for this step in the study was as follows:

- Will the existing knowledge framework add to the development of a system for the management of pharmaceutical and surgical consumable products in AHL?

An exploratory and descriptive design was applied where the results from the action research cycles and national and international literature served as the unit of analysis. Unlike the action research cycles, which followed a participatory action research method, this aspect of the study was conducted independently by myself (the researcher).

The research methods utilised to achieve the objectives of Submission 3 included data collection, sampling and data analysis.

5.2.1 Data collection

The techniques of skimming, comprehending, analysing and synthesising, as described by Burns and Grove (2001:129-130), were used for the extraction and utilisation of relevant information and content from the selected sources, to examine the existing processes and outcomes of the implementation of the integrated system against the literature.

5.2.2 Sampling

Purposive sampling was used through the utilisation of key search words from national and international theoretical and empirical resources on the topic of systems of management for pharmaceutical and surgical consumable products. Specific searches were also done on the six (6) processes identified in the integrated system for the management of pharmaceutical and surgical consumable products, namely:

- Process for product selection;
- Information technology (IT) support systems for the integrated system;
- Process for hospital implementation;
- Measurement and management tools;
- Pharmacy capability development; and
- Supplier strategy and formalised interface.

A further search was conducted on the concept of systems thinking as the generalised concept applied in the study.

5.2.3 Data analysis

Data analysis was done through content analysis using inductive reasoning and inductive generalisation. Derivation was also used as a strategy to analyse data, and entailed the redefinition and transposition of a concept, statement or theory from one (1) context to another (Mouton & Marais, 1992:106). Concepts, statements and theories of the systems theory were transposed from the general theoretical framework and applied to the further conceptualisation of the integrated system within the operational framework of AHL (the contextual framework of the study).

5.3 REVIEW OF THE CONCEPT OF AN INTEGRATED SYSTEM

No similar concept of combining the system of management for both pharmaceutical and surgical consumable products was evidenced in the literature, despite similar issues being recognised as found in AHL, such as the large numbers, increasing variety and duplication of surgical consumable products and the fact that both products impact on quality and costs of care.

5.3.1 Pharmaceutical products

There was ongoing evidence in the literature to support the concept of a management system for pharmaceutical products driven by the need to manage costs and ensure the use of high quality medicines. Compared to the literature review conducted as background to the study (see Chapter 1), the review conducted subsequent to the development and testing of the integrated system revealed that more studies had recognised the importance of the concept of medicine management systems as opposed to the compilation of a restricted list of drugs (Kahn, 2002:159 and Fitzpatrick et al., 2001:588).

In addition, whilst earlier studies showed inconsistent outcomes pertaining to the implementation of a formulary, recent studies have indicated that hospitals that used the broader concept of medicine management systems have more consistently been able to demonstrate improvements in costs without compromising quality of care (Mullins et al., 2001:71; Binyon & Cooke, 2000:186 and Fitzpatrick et al., 2001:588). This was also the case with the integrated system.

5.3.2 Surgical consumable products

Recent literature has indicated that the need to adopt improved management systems in terms of surgical consumable products is increasingly being recognised. There is also an increasing realisation that traditional materials management solutions were insufficient to deal with risk-based reimbursements

such as per diem payments (HHNMAG 2002; Eskew, 2002:24; Hoban, 2003:28 and Tambolas, 2004). This was also a key motivating factor for the integrated systems with per diem re-imbursement tariffs in AHL having increased to 40% of turnover in 2003 and was predicted to increase to over 70% by 2005 (AHL 2004)

Factors impacting on the lack of progress with the management of surgical consumable products in other hospitals were identified and discussed, including:

- The decentralised nature of materials management in hospitals;
- Justification of old style procurement functions and systems through short term savings achievements;
- Poor information availability for analysis and product selection; and
- No way of comparing products due to the absence of a classification system.

5.3.3 Rationale for integration

Two (2) main common issues were highlighted as providing the rationale for the integration of pharmaceutical and surgical consumable products into one (1) system of management. The first motivating factor was that both types of products require a system to ensure quality of care through the rational use of products and avoidance of inferior products and those with potential serious adverse effects. Secondly both products contribute significantly to overall costs and require expenditure and costs to be controlled by recommending cheaper alternatives, competitive purchasing and avoidance of duplication. To further substantiate the decision to develop an integrated system, the following additional issues, as supported by the literature, were discussed:

- Management of both product categories require co-operation with health professionals in order to ensure cost-effective quality care (Giaquinta, 1994:30; Andrews, 2000:16; Hoban, 2003:29 and Neil, 2004:3);
- The opportunity exists to use the existing skills of pharmacists and the pharmaceutical formulary management processes based on the following factors:

- Pharmacists have a historical role as agents of change for promoting rational drug use (Al-Shaqha & Zairi, 2001:284 and Stephens et al., 2000:256);
- There is proven track record of successful pharmacist interventions to improve costs and quality of care in hospitals (Helling, 2000b:577; Anderson 2002:1163 and Dean et al., 2004:201); and
- Pharmacists have established credibility amongst healthcare professionals as providers of drug information (Lipton et al., 1995:488);

- Pharmacy departments have skills and management systems in place for the procurement, distribution and control of pharmaceutical products that could be extended to surgical consumable products (Samways, 2001:144 and Al-Shaqha & Zairi, 2001:284)
- There is an increasing overlap in the usage of pharmaceutical and surgical consumable products. For example, medical administration devices and in-line filtration products have an impact on drug effectiveness and safety (ASHP, 2002a and Schechter, 2004:S20); and
- The importance of including both types of products in the development of step-care protocols and care pathways, which are increasingly being used to ensure cost-effectiveness and safety in the delivery of patient care (ASHP, 2004:939).

5.3.4 Benefits and limitations of an integrated system for AHL

A number of benefits were realised from the development of the integrated system in AHL, for example:

- Ensuring that the impact on quality of care was properly considered in the selection criteria of both types of products;
- Using the same system of consultation with relevant health professionals for pharmaceutical product selection and surgical consumable product selection;
- The efficiencies derived from using the infrastructure, management systems and existing skills of pharmacists for the management of both types of products; and

- The ability to holistically deal with surgical consumable products that have an impact on medication usage such as new drug-delivery devices.

Limitations of the integrated system were divided into management system-related and pharmacy-related limitations. The two (2) main management system-related limitations identified were:

- The fact that the integrated system was driven by a strong matrix function through APMS. The type of resources, infrastructure and executive sponsorship of APMS may not exist in other organisations; and
- No formal materials management department existed in AHL hospitals or at head-office at the start of the study. The change management was therefore substantially less than for hospitals and hospital groups where it would be necessary to "merge" two (2) existing departments and/or move the management of certain products from a materials management department to the pharmacy department.

Examples of pharmacy-related limitations identified included:

- The impact of placing an additional burden of responsibility on pharmacy departments already facing staff shortages (Langleben, 2001:470 and Anderson, 2002:1165);
- Distracting pharmacists from the core function of safe and effective medicine usage; and
- The additional resources required to provide ongoing training for pharmacists in surgical consumable products.

I will now summarise the findings from the literature of the application of the systems thinking approach.

5.4 APPLICATION OF THE SYSTEMS THINKING APPROACH

A system is defined as a set of components that work together for the overall objective of the whole, a series of interrelated and interdependent parts, such that the interaction or interplay of any subsystem (parts) affects the whole (Bowditch & Buono 1997:29, Cooper, 1997:1 and Haines, 1998:24).

A comparison of the integrated system to the international approach resulted in the identification of key differences in the integrated system relating to the application of the systems thinking approach. Justification of each of the differences was provided based on a detailed review of the systems thinking literature. In addition limitations of the systems approach were highlighted and will be discussed in section 5.4.2.

5.4.1 Differences and benefits of the systems thinking approach

The key differences in the approach of the integrated system related to systems thinking and the benefits realised from this are summarised in Table 5.1.

Table 5.1: Key differences and benefits in the systems thinking approach of the integrated system

KEY DIFFERENCES IN THE APPROACH OF THE INTEGRATED SYSTEM RELATED TO SYSTEMS THINKING	BENEFITS DERIVED FROM THE SYSTEMS THINKING APPROACH
All hospitals in the group viewed as one (1) system and the resultant process driven approach **versus** Hospitals viewed as individual units and an activity or problem focused approach	• The realisation of economies of scale and synergy benefits from the use of one (1) team and the development of one (1) set of processes for all hospitals, both small and large; • The system was implemented across all hospitals at the same time, rather than following a fragmented approach of copying "best-practice" after a pilot study, thereby ensuring benefits flowed through to all hospitals which improved buy-in; • The systems approach resulted in a focus on high value products across the group, thereby ensuring that the integrated system impacted on the financial performance of all hospitals; and • The group was able to impact on the market share of products across all hospitals and realise the resulting financial benefits.

KEY DIFFERENCES IN THE APPROACH OF THE INTEGRATED SYSTEM RELATED TO SYSTEMS THINKING	BENEFITS DERIVED FROM THE SYSTEMS THINKING APPROACH
A hospital viewed as a system with integrated boundaries and collaborative relationships **versus** Different departments initiate separate activities resulting in a fragmented approach	• The systems approach enabled the development of a new mental model relating to the management of surgical consumable products, i.e. the opportunity to manage both products through the pharmacy department; and • Hospital implementation teams were able to see the larger picture and work together to meet performance targets.
Integration of both types of products **versus** Separate management of pharmaceutical and surgical consumable products	• Ensured that the impact on quality of care was considered in the management of both types of products; • Synergy derived from the ability to use the consultation process with health professionals for both types of products; • Efficiencies derived from using the infrastructure, management systems to cover legislative requirements and existing skills of pharmacists for both types of products; and • The ability to deal holistically with surgical consumable products that have an impact on medication usage, such as new drug delivery devices, thereby minimising the risk of medication errors as described in the example in section 5.3.1 of this chapter.
Adoption of the concept of leverage across the total group of hospitals and all products **Versus** Individual hospital and separate departments limiting opportunities for leverage	• Leverage of spend and usage of both types of products across all hospitals was made possible from the systems approach; • Resources and infrastructure such as IT resources could be leveraged across all hospitals; • All hospitals were able to enjoy the same benefits by leveraging the whole group that smaller hospitals would not have been able to realise on their own; and • Shifting market share across all hospitals resulted in suppliers experiencing the leverage capability of the group and the co-ordinated implementation of the integrated system.
Input-process-output model **versus** Limited information flow across departments and hospitals	• The feedback loop of the input-process-output model provided the ongoing information required to be able to simultaneously develop and implement the integrated system; and • The use of the input-process-output model also formed the basis of a continuous improvement approach of the processes in the integrated system and ensured the system responds to both positive and negative feedback.
The integrated system as an open system **versus** A problem-oriented analytical approach that tries to control individual departments as closed systems	• Recognition of the integrated system as an open system ensured that there was an awareness and response to changes in the external environment such as mergers and acquisitions of suppliers, competitor activity and legislative changes.

5.4.2 Limitations of the systems approach

The limitations identified in terms of the systems approach were discussed in detail in Submission 3, Chapter 4 and are summarised here as follows:

- The size of AHL compared to larger organisations may prohibit all hospitals being regarded as a system and may impact on synergies that can be achieved. For example some authors have stated that larger healthcare organisations in the USA have shown little evidence of economies of scale (Goldsmith & Jeff, 1994:26);
- In AHL less than 40% of hospitals were greater than 200 beds. Smaller hospitals were able to benefit from combining all hospitals. In other organisations, larger hospitals may argue that they can leverage spend and realise synergies on their own;
- SA has one (1) set of legislation governing medicines across all provinces. Different legislative processes in other countries were not considered, nor was the impact of having different legislation in individual states (such as in the USA). This may also impact on the scope of services that pharmacy departments may provide;
- The development and implementation of the integrated system across all hospitals in AHL did not require the change process of disbanding existing PTC structures, as are in place in many other hospitals and hospital groups. The benefits derived for example from the economies of scale of one (1) system and one (1) product selection team across a group of hospitals where PTC structures already exists, would be limited by the complexity of the change management process to achieve this synergy;
- The absence of a materials management department in AHL hospitals also resulted in an easier application of the concept of an integrated system for both pharmaceutical and surgical consumable products, i.e. it is easier to integrate a "turf" that is not being "defended"; and
- Integrating surgical consumable products within the system may result in them not being considered when purchasing medical equipment that require these products as disposable attachments. This was overcome in the integrated

system by identifying the relevant products and establishing a consultative process that included the group clinical engineering department responsible for medical equipment. This was facilitated by the fact that this department also fell under my responsibility within the business, and may not be as easy to achieve where this is not the case.

Further discussion on the limitations will be covered under focus areas for further research in Chapter 9.

5.5 IMPROVEMENTS TO THE PROCESSES AND SUB-PROCESSES

Each of the processes and sub-processes of the integrated system were reviewed against the literature in order to justify the process and make recommendations for further enhancements. The justification of each of the processes and sub-processes with supporting references was described in detail in Submission 3, Chapter 3.

Overall, whilst concepts relating to the individual processes and sub-processes were evident in the management of pharmaceutical products in hospitals, there was no evidence of processes or a combination of processes being brought together as a functioning whole-system for the management of these products.

I was also able to identify focus areas for further work within the processes and sub-processes in the more recent literature review. The recommendations for further work are summarised in Table 5.2. Only processes where enhancements were derived from the literature are included in the table.

Table 5.2: Recommendations for further work relating to the processes and/or sub-processes

PROCESS OR SUB-PROCESS	RECOMMENDATIONS FOR FURTHER WORK DERIVED FROM THE LITERATURE REVIEW
1. **PRODUCT SELECTION PROCESS**	• Enhancement of a formalised product and/or service complaint system is needed to ensure trends analysis across the group, the classification of complaints and more feedback on trends rather than incidents, e.g. to suppliers.
Clinical analysis process	• A formal decision matrix, as used by other systems, as described in Submission 3, should be explored and the weighted assessment formally completed and kept on record; and • This should also be applied to the product trial process for new surgical products to ensure that the process is not simply an acceptance trial, but also explores local applicability of outcomes provided in international studies
Financial analysis	• A greater use of pharmacoeconomic data has to be considered in product selection as this data becomes available; • This concept needs to be extended to surgical consumable products and the group should use its leverage to ensure surgical suppliers increasingly undertake these studies; and • The Product Selection Team at APMS requires further training with regard to in pharmacoeconomic concepts and concepts relating to the total costs of surgical consumable products.
2. **INFORMATION TECHNOLOGY (IT) SUPPORT SYSTEM**	• While some work was done to cross-link the IT support system with procedures and diagnostic coding, further development is required to facilitate analysis of usage by procedures and diagnosis. This analysis will become important in risk-sharing tariffs and will need to include peer-review data as is found in large academic hospitals in the USA for example.
3. **HOSPITAL IMPLEMENTATION PROCESS**	• Implementation is not a once-off process, and, for example, formulary implementation teams must be sustained and trained on an ongoing basis; • Communication processes must continue and must address gaps for new doctors and new staff; and • Protocols and procedures must be reviewed in light of ongoing changes.
5. **PHARMACY CAPABILITY DEVELOP MENT**	• Competency assessments and evaluation of prior learning needs to be built into both interpersonal skills training and continuing medical education (CME); • Action learning projects in the individual hospitals will improve application of learning rather than theoretical learning in CME; • Interpersonal skills training and CME should be adapted and extended to nursing staff; and • Consideration should be given to register the training programmes with relevant professional bodies to ensure that health professionals meet their requirements for continuing professional development (CPD).
6. **SUPPLIER STRATEGY AND FORMALISED INTERFACE PROCESS**	• The implementation of a more advanced supplier representative process as described in Submission 3, should be considered; and • As risk based reimbursement increases there will be a need to explore more ways to develop risk-sharing partnerships with suppliers.

5.6 FURTHER CONCEPTUALISATION OF THE INTEGRATED SYSTEM

Conceptualisation refers to the clarification and analysis of the key concepts in a study, as well as the way in which one's research is integrated into the body of existing theory and research (Mouton, 1998:109).

Two (2) adaptations of the diagrammatic overview of the integrated system were identified from the review of the literature, namely:

To fully represent the integrated system following the literature review, I will now combine these two (2) concepts into one (1) and present a further version of the diagrammatic representation of the integrated system in Figure 5.1.

In the first adaptation I recognised the importance of the ongoing feedback process to continuously review and improve the system. The continuous flow of information between a system, its internal components and the external environment forms a feedback loop that enables the organisation to adapt to changing conditions (Cooper, 1997:2 and Bowditch & Buono, 1997:19). The capacity to use this information to control the system and make necessary changes is crucial if organisations are to become self-correcting systems (Larsen et al, 1996:13). As discussed in Section 4.6 of Submission 3, the input-transformation-output model together with the action research approach formed the basis of the development of the integrated system and allowed the simultaneous development and implementation of the system across all hospitals. The feedback loop in the form of outcomes of implementation provided the information from which I could adapt the system on an ongoing basis.

This concept is built into the graphic representation of the integrated system by the inclusion of the input-process/throughput–output and feedback loop as applied to the processes and sub-processes of the integrated system.

The second adaptation, described in Section 4.7 of Submission 3, is the addition of the orange block, which depicts the expanded environment of the open system.

Organisations are open systems that are influenced by a multitude of environmental forces or inputs such as availability of raw materials, changes in technology and government regulations (Haines, 1998:17 and Cooper, 1997:1). The integrated system operates as an open system and as such recognises that it is impacted by and impacts on the environment. Some examples of environmental forces impacting on the integrated system include legislative changes, the entry of new technology products into the market place, changes to suppliers in the form of mergers and acquisitions, competitor activity and public healthcare sector activity.

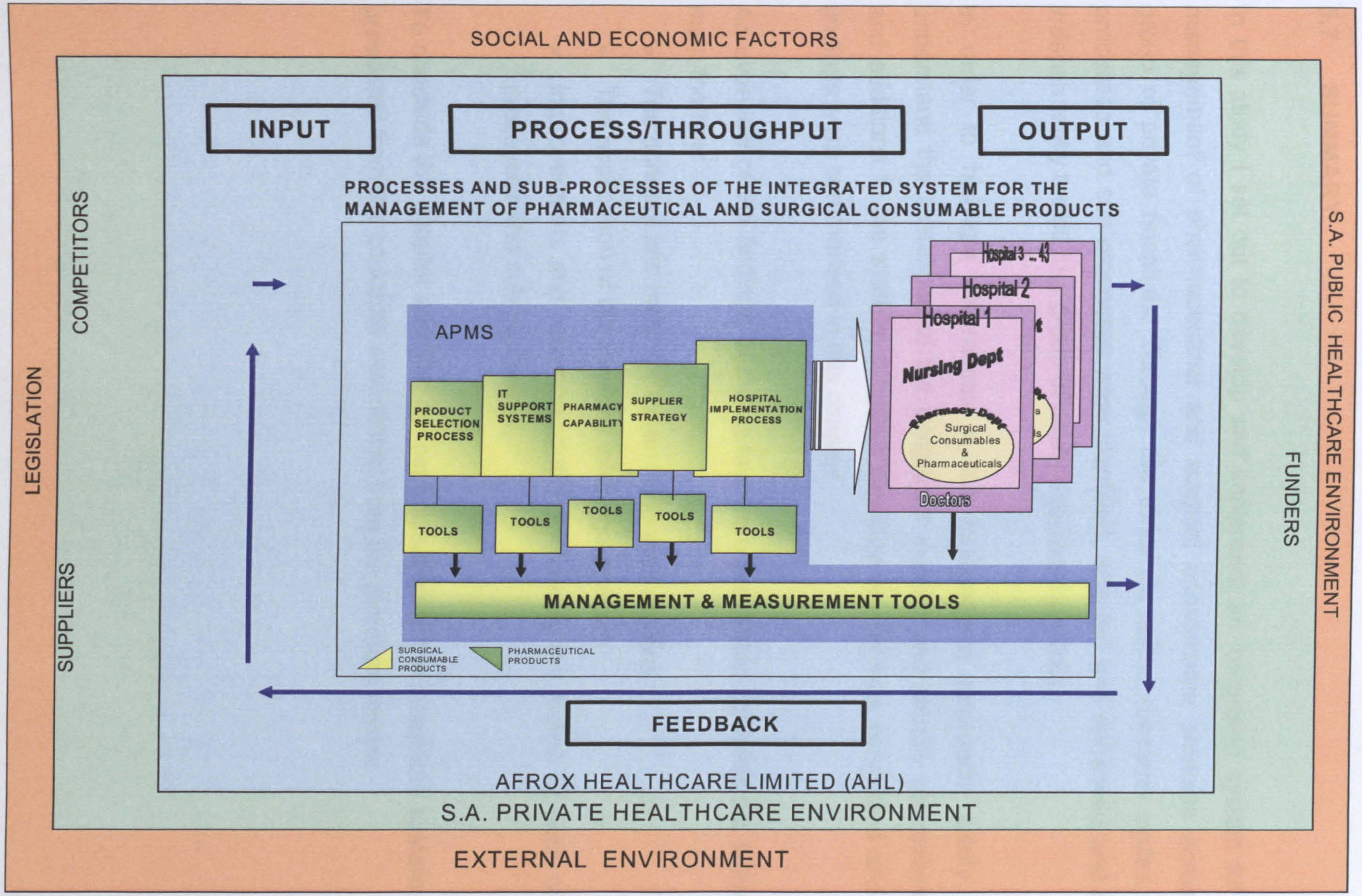


Figure 5.1: Diagrammatic overview of the integrated system including developments from the literature review

5.7 SUMMARY

In this study I set out to develop and implement an integrated system for the management of pharmaceutical and surgical consumable products across a group of private hospitals. Through the three (3) action research cycles, the processes and sub-processes were identified, adapted and enhanced and then independently tested in a group of newly acquired hospitals.

In order to highlight differences in the international approach; justify and understand the limitations of the integrated system and identify improvements and additions to the system, a further literature review was conducted and the findings were summarised in this chapter.

An overview of the findings of the review were presented covering the following main themes:

- The concept and rationale for an integrated system
- The application of the systems thinking approach
- Improvements and recommendations following the review of each of the processes and sub-processes.

To conclude the chapter a further conceptualisation of the integrated system was presented from the concepts assimilated from the literature review.

CHAPTER 6

APPLICATIONS AND OUTCOMES SINCE THE ACTION RESEARCH CYCLES

6.1 INTRODUCTION

The tight virtuous spirals of action research provide flexibility and responsiveness for effective change and also serve as substantiation of rigour (Zubber-Skerritt,1995:26 and Dick, 2000:72).

In Chapter 3, I presented an outline of the three (3) action research cycles that were used to develop, maintain and test the integrated system, and I also discussed and compared the outcomes of each of the cycles up to the end of September 2000. During the period September 2000 to September 2003 the study continued to progress as follows:

- A further cycle of action research was undertaken to extend the system to include specialised products in cardiac catheterisation laboratories;
- The integrated system was again implemented in a group of four (4) newly acquired hospitals known as the Amahosp group; and
- I continued to measure the outcomes of implementation of the integrated system across all hospitals.

Each of these represents a further turn of the spiral of action research and provided yet another chance to substantiate the rigour of the study, which will now be discussed in turn.

6.2 APPLICATION OF THE INTEGRATED SYSTEM TO SPECIALISED PRODUCTS IN CARDIAC CATHETERISATION LABORATORIES

In keeping with the business strategy to develop centres of excellence in specialised care, AHL developed specialised cardiac catheterisation laboratories (cathlabs) in four (4) of its large hospitals (AHL, 1998). The acquisition of the PresMed hospitals in September 1999 increased the number to five (5) and in October 2000 a 6th cathlab was opened (AHL, 2000).

Because each of these units was established separately, there was little or no leverage of spend or synergy achieved. In addition, since the pharmaceutical and surgical consumable products used in cathlabs were specialised products, the implementation of the integrated system did not have a significant impact on these units. In November 2000 a further cycle of action research was undertaken to extend the integrated system to the six (6) cathlabs in AHL. The methodology followed that of the previous cycles.

Since no new processes or sub-processes were added to the integrated system as a result of this cycle of research, I will only describe the application of the existing processes and summarise the outcomes achieved.

6.2.1 Application of the processes and sub-processes of the integrated system to cardiac catheterisation laboratories

Table 6.1 shows the application of the processes and sub-process of the integrated system to the six (6) cardiac catheterisation laboratories across AHL.

Table 6.1: Application of the processes and sub-processes of the integrated system for the management of pharmaceutical and surgical consumable products in cardiac catheterisation laboratories

PROCESS OR SUB-PROCESS & PURPOSE	APPLICATION IN CARDIAC CATHETERISATION LABORATORIES
1. PRODUCT SELECTION PROCESS	• As with previous cycles, I followed an integrated approach to the product selection process, including both pharmaceutical and surgical consumable products; • The existing product selection team was used with input from specialists in cardiac catheterisation (both doctors and nurses); and • Because of the specialised nature of the products the supplier-only standardisation process was selected.
1a. Classification system	• The integrated 7-tier classification system for pharmaceutical and surgical consumable products was extended to include specialised products used in cathlabs; and • The classification system for surgical consumable products used in cathlabs was also based on functional or therapeutic use.

1b. Prioritisation of product selection process – product utilisation review	• A product utilisation review was conducted using data from the six (6) cathlabs; and
	• The following product categories were identified as priorities:
	  ○ Cardiac imaging products and intervention products (16 different suppliers were being used); and
	  ○ Contrast media (5 different suppliers).

1c. Clinical analysis process	• The clinical analysis process was used to evaluate the products identified in the categories identified in 1b; and • Relevant cardiac catheterisation experts were included in the clinical analysis process.
1d. Supplier evaluation process	• The supplier analysis process was used and resulted in two (2) suppliers being identified for each of the categories identified in 1b.
1e. Financial analysis	• The financial analysis process was used for the selection of the products and suppliers.
2. INFORMATION TECHNOLOGY (IT) SUPPORT SYSTEM	• The existing IT support systems were used.
2a. Product utilisation database – group purchasing information (GPI)	• Combined utilisation data for all hospitals for both pharmaceutical and surgical consumable products; and • I was able to utilise group purchasing data from all six (6) cathlabs in AHL for analysis and monitoring of progress.

PROCESS OR SUB-PROCESS & PURPOSE	APPLICATION IN CARDIAC CATHETERISATION LABORATORIES
2b. Product database	• The classification of specialised cardiac catheterisation products was added to the product database and all relevant products linked to their respective classification.
2c. Access to the formulary at hospital level	• Access to formulary at hospital level was extended to include the cardiac catheterisation products.
3. HOSPITAL IMPLEMENTATION PROCESS	• Pharmacy managers were responsible for the implementation of specialised cardiac catheterisation products, including both pharmaceutical and surgical consumable products; • A role map for cathlab implementation was developed; • Implementation teams that included strong representation by cardiac cathlab nurses were trained; • A detailed doctor constituency analysis was done for each of the six (6) cathlabs and used in the training of the teams; • Detailed communication plans were developed for doctor buy-in, including new decision support material (DSM); and • Monthly information sharing was instituted between all cathlab teams, including benchmarking data and information to support implementation.
4. MEASUREMENT AND MANAGEMENT TOOLS	• Existing measurement and management tools were used; • Additional information on cathlab activities were also collated and shared with staff in all six (6) cathlabs; and • Market share reports across all hospitals and per individual hospital were provided to suppliers where partnerships had been entered into.
5. PHARMACY CAPABILITY DEVELOPMENT	• Interpersonal skills training was reinforced to support pharmacist responsible for implementation in cathlabs.
6. SUPPLIER STRATEGY AND FORMALISED INTERFACE PROCESS	• Two (2) suppliers in each category of products were chosen as formulary suppliers; • In the cardiac imaging and intervention category there was an undertaking to develop a strategic partnership starting with information sharing and a joint process to move market share from the existing 16 suppliers to the two (2) selected suppliers; and • The supplier representative policy in the integrated system was reinforced in the cathlabs. Specific obstacles were encountered with regard to representatives who provided technical assistance and were from non-selected suppliers. This was addressed through the implementation teams.

6.2.2 Outcomes of the application of the integrated system in cardiac catheterisation laboratories

The outcomes of the application of the integrated system in cardiac catheterisation laboratories are presented in Table 6.2. Compliance in this table refers to compliance to the use of the two (2) selected suppliers for each category of products. In all cases the price of products from the selected suppliers marked a significant improvement, which resulted in improved financial performance in the cardiac catheterisation laboratories across the group.

Table 6.2: Outcomes of the application of the integrated system in cardiac catheterisation laboratories across the group

	Contrast Media Compliance		Diagnostics Compliance		Cardiac Intervention Compliance	
CATHLAB	**Nov-00**	**Sep-03**	**Nov-00**	**Sep-03**	**Nov-00**	**Sep-03**
1	90	94	46	93	26	55
2	77	100	21	93	43	59
3	75	97	26	87	29	63
4	90	97	32	88	45	87
5	90	99	30	80	35	84
6	80	70	65	91	70	79

Compliance for the cardiac intervention products was the most difficult to achieve and sustain. The rapid technology innovations by suppliers and new suppliers entering the market with new products, required ongoing effort in the product review process. Because of the specialised nature of these units, doctor buy-in requires ongoing effort and the implementation team needs to ensure rigorous monitoring and interventions. Any lapse on behalf of the cathlab team resulted in a non-selected supplier product being used and a decrease in compliance as shown in the contrast media in cathlab 6. This was mostly due to staff changes, either in the pharmacy or the nursing staff in the cathlab. In addition, the ongoing need to keep up to date with advances in technology resulted in it being more difficult to apply the supplier representative policy and non-formulary suppliers used supposed technology advances, to change product usage.

6.2.3 Conclusion

Despite the specialised nature of the cardiac catheterisation laboratories, the outcomes of this cycle of research showed that the integrated system for the management of pharmaceutical and surgical consumable products could be applied to specialised units, and with consistent effort, the benefits in terms of synergy and leverage could be achieved.

Specific challenges are however experienced in these units, especially those relating to the ability to respond to ongoing technological changes. For example, a high level of interaction is required with specialist doctors in order to differentiate between those product technology changes that are actual advances, and those with limited or no additional benefits.

6.3 IMPLEMENTATION IN A FURTHER GROUP OF HOSPITALS KNOWN AS AMAHOSP

In January 2002, AHL acquired a group of four (4) hospitals in Kwazulu Natal known as the Amahosp group. As with the PresMed acquisition, the incorporation of the newly acquired hospitals was achieved swiftly (Flemming, 2002:15).

The incorporation of the four (4) hospitals into the AHL group included the implementation of the integrated system for the management of pharmaceutical and surgical consumable products. Implementation followed the same process as described in Submission 2c in terms of PresMed hospitals, and will therefore not be described in this submission.

Outcomes for the four (4) hospitals will be included in the outcomes across all hospitals (see section 6.4) from March 2002.

6.4 OUTCOMES ACROSS ALL HOSPITALS: SEPTEMBER 2000 TO SEPTEMBER 2003

In addition to the application of the integrated system to cardiac catheterisation laboratories and the implementation in the four (4) Amahosp hospitals, all processes within the system, including the formulary review process, continued to operate across all hospitals.

Because of the focus on the value impact of the integrated system, I will limit the presentation of outcomes achieved to value compliance as a measure rather than line-item compliance.

Figure 6.1 shows the formulary value compliance across all hospitals in the AHL group over the financial years October 2000 to September 2003.

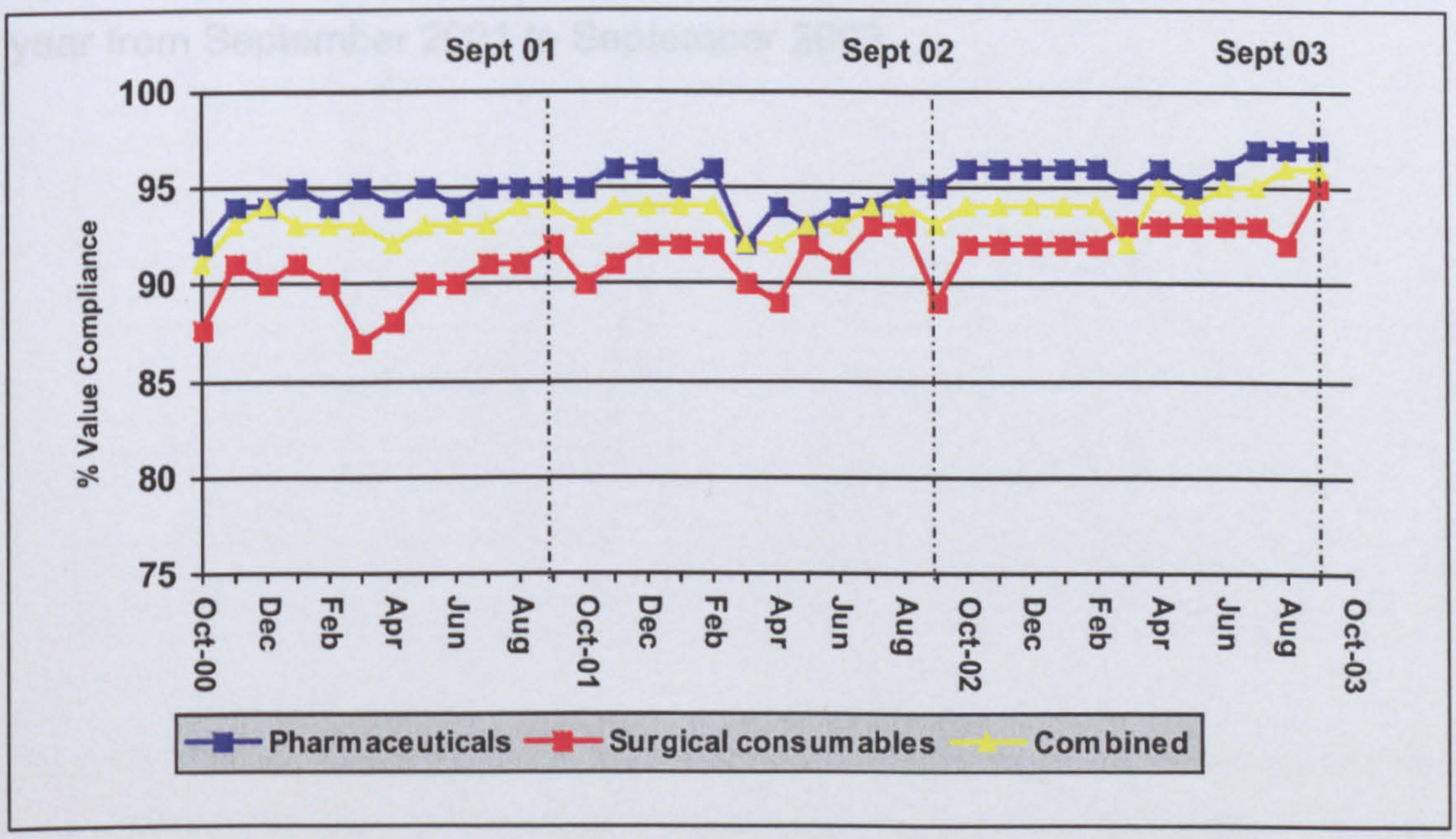


Figure 6.1: Formulary value compliance across all hospitals in AHL showing the total compliance as well as individual pharmaceutical and surgical consumable product value compliance: October 2000 – September 2003

Formulary compliance for both pharmaceutical and surgical consumable was sustained over the next three (3) financial years. The following factors affected compliance:

- The decrease in surgical consumable product value compliance during March and April 2001 was due to the change of a product during the formulary review process;
- The decrease in formulary value compliance across the group during March and April 2002 represents the implementation of the integrated system in the four (4) Amahosp hospitals that were acquired in January 2002; and
- The decrease in surgical consumable product value compliance during September and October 2002 was due to a stock-out following the September 11 disaster in the USA.

Table 6.3 shows individual hospital value compliance at the end of each financial year from September 2001 to September 2003.

Table 6.3: Individual hospital formulary value compliance at the end of the financial years: September 2001, 2002 and 2003

	Sep-01			Sep-02			Sep-03		
HOSPITAL	Pharmaceutical products	Surgical products	Combined	Pharmaceutical products	Surgical products	Combined	Pharmaceutical products	Surgical products	Combined
1	96.7	91.9	94.9	96.7	92.0	94.0	93.9	98.1	95.9
2	92.2	90.0	91.3	94.3	92.8	93.6	98.9	92.7	96.1
3	95.4	96.7	96.0	98.1	94.4	96.4	98.6	94.8	96.9
4	97.6	92.2	95.2	98.2	96.3	97.3	96.1	96.4	96.3
5	95.6	93.0	94.5	93.9	93.0	93.4	93.9	92.5	93.4
6	86.8	91.6	89.0	92.3	95.7	93.9	98.6	94.2	96.7
7	98.0	97.2	97.7	90.5	93.3	91.6	94.3	94.6	94.4
8	94.0	94.1	94.1	89.6	78.3	84.0	93.7	97.1	95.2
9	92.3	97.9	94.5	95.0	96.6	95.8	98.4	98.8	98.5
10	96.5	96.8	96.6	96.3	93.7	95.1	95.3	93.1	95.0
11	95.6	88.7	93.1	95.8	87.2	91.7	99.8	98.6	99.3
12	97.8	90.0	94.0	98.4	91.4	94.6	98.4	95.9	97.1
13	89.5	94.4	91.7	93.6	92.3	93.0	95.8	94.9	95.3
14	66.9	96.4	75.3	70.0	95.6	78.2	70.2	95.7	78.2
15	88.9	84.9	86.9	98.5	89.2	94.2	95.8	95.9	95.9
16	96.7	94.2	95.7	95.9	92.3	94.3	93.4	96.9	94.9
17	96.1	92.1	94.6	96.8	88.4	92.4	98.9	94.2	96.4
18	94.2	97.5	95.6	97.3	94.0	95.8	99.8	100.0	99.8
19	95.7	93.3	94.7	90.1	93.7	91.7	95.2	94.3	94.8
20	89.9	87.2	88.7	93.2	77.8	85.6	98.6	94.1	96.7
21	95.5	86.9	91.9	97.1	92.2	95.2	99.0	97.6	98.3
22	94.8	93.0	94.0	96.9	92.4	94.9	93.5	97.6	95.3
23	100.0	88.3	94.9	96.7	83.8	90.6	90.8	89.7	90.4
24	96.8	85.6	93.1	98.0	86.0	92.2	97.4	90.7	94.6
25	89.9	70.1	81.9	89.4	58.8	76.8	98.1	97.1	97.6
26	99.4	99.9	99.5	84.3	87.3	85.7	98.0	95.5	96.9
27	93.2	98.3	95.0	92.6	93.8	93.0	99.4	93.4	97.1
28	96.1	90.3	93.4	95.7	90.2	93.3	98.4	90.3	95.0
29	95.0	91.2	93.4	95.2	93.5	94.5	87.0	66.4	77.3
30	95.7	97.3	96.2	96.6	93.0	95.3	95.5	99.3	97.2
31	99.9	97.2	98.5	98.9	99.2	99.1	98.1	97.3	97.8
32	98.2	94.7	96.4	97.7	93.1	95.3	97.6	97.9	97.7
33	92.0	90.8	91.3	96.6	87.8	91.5	97.9	93.1	95.7
34	94.2	99.9	94.3	96.3	81.0	96.0	98.0	92.5	95.9
35	99.0	91.4	95.4	99.2	98.7	99.0	96.9	98.1	97.4
36	99.4	100.0	99.7	97.6	96.6	97.3	100.0	99.1	99.9
37	97.9	95.5	96.7	97.1	87.7	93.2	97.7	92.0	94.7
38	87.9	90.7	89.2	97.5	92.2	94.8	98.0	93.2	95.3
39	98.4	95.0	96.9	96.0	76.0	86.2	98.7	100.0	98.7
40	94.3	85.9	90.7	95.8	85.8	91.1	97.4	99.2	98.2
41	96.2	78.5	92.1	98.4	87.7	92.9	97.4	99.9	98.3
42	94.4	83.7	89.0	95.7	86.4	91.3	98.0	91.5	94.6
43	92.4	79.0	88.0	93.5	85.1	90.0	96.5	84.7	91.3
44				72.1	78.0	87.2	98.3	99.6	98.8
45				83.8	96.5	90.6	94.4	93.5	93.9
46				88.6	87.4	88.1	99.6	96.0	97.7
47				87.3	93.0	89.4	96.8	92.5	95.0
TOTAL	94.5	92.4	93.6	94.9	88.6	92.7	97.0	94.7	95.9

Results for the four (4) Amahosp hospitals (numbers 44 to 47) are shown as of September 2002 and 2003. Individual hospitals achieved a consistent improvement over time. Changes in any month were investigated and corrective actions implemented. In most cases these changes were a result of staff changes or unmanaged supplier representative activity. When a general decrease in compliance occurred it was mostly due to product changes from the formulary review process and occasionally due to supply problems that were subsequently addressed.

Figure 6.2 shows the total value compliance percentage versus percentage of total spend covered by the formulary and supplier-only standardisation process by September 2003.

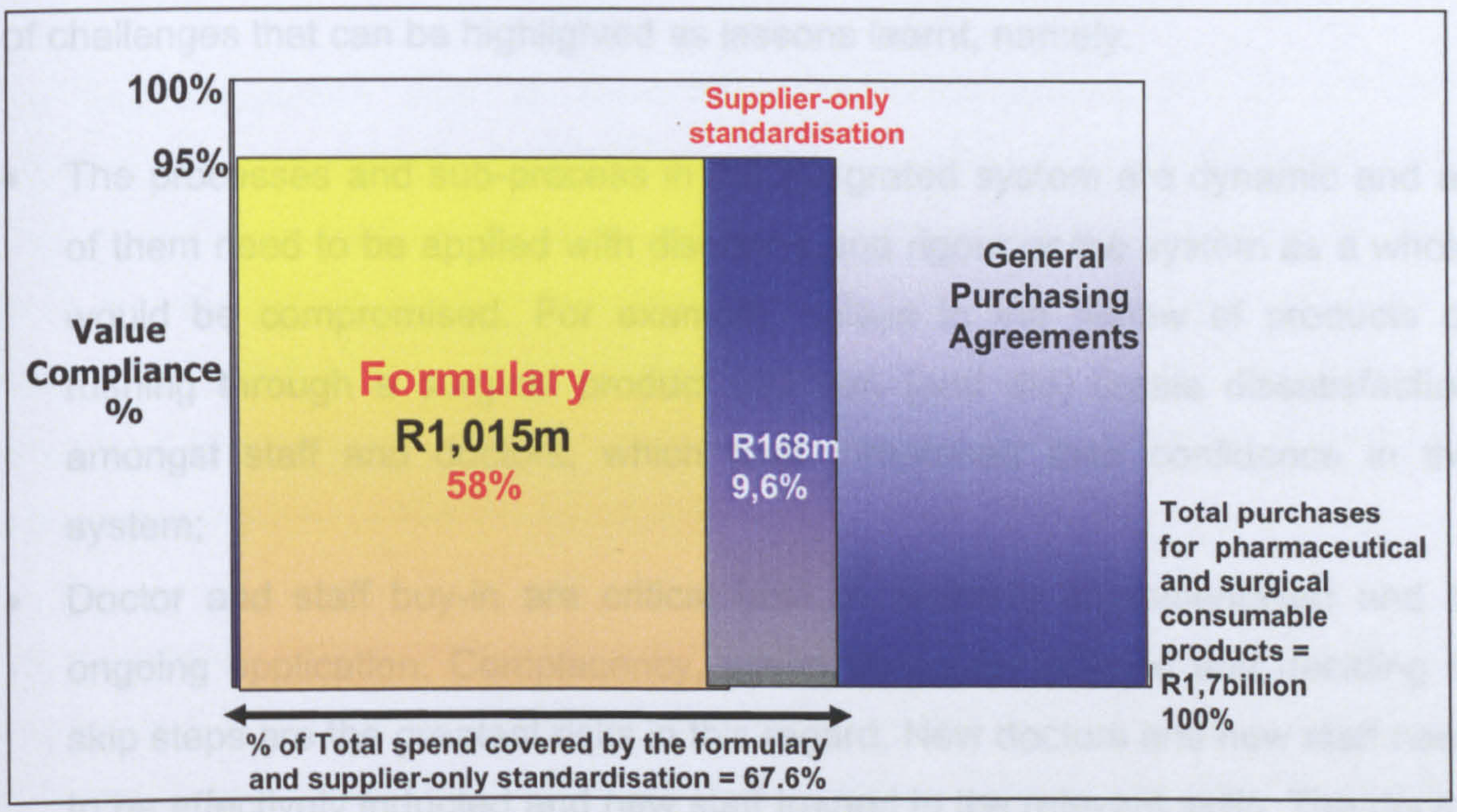


Figure 6.2: Total value compliance percentage versus percentage of total spend covered by the formulary and supplier-only standardisation process: September 2003

The total spend on pharmaceutical and surgical consumable products reached R1,7 billion by September 2003, which reflected the continued growth and acquisition strategy in AHL. The supplier-only standardisation in this graph includes application in the cardiac catheterisation laboratories where formulary suppliers were selected. The decrease in the percentage of the supplier-only standardisation represents a change in product mix due to the acquisition of new hospitals.

Overall the integrated system covered almost 70% of the value of product spend and of that 95% of the value of purchases across all hospitals complied with the selected formulary product and/or formulary supplier.

6.5 LESSONS LEARNT FROM ONGOING AND MORE RECENT APPLICATIONS

The ongoing and more recent applications of the integrated system had a number of challenges that can be highlighted as lessons learnt, namely:

- The processes and sub-process in the integrated system are dynamic and all of them need to be applied with discipline and rigour or the system as a whole would be compromised. For example, delays in the review of products or rushing through a surgical product trail can (and did) create dissatisfaction amongst staff and doctors, which then threatened their confidence in the system;
- Doctor and staff buy-in are critical both to effective implementation and to ongoing application. Complacency, taking things for granted and deciding to skip steps are the greatest risks in this regard. New doctors and new staff need to be effectively inducted and new staff trained in the relevant skills. The doctor constituency analysis tool must to be used properly and must also be updated on a regular basis. Decision support data and training material had to be updated to ensure that the credibility of product choices is maintained;
- The communication plan for all relevant stakeholders must be updated regularly. New ways of presenting data and creative ways of maintaining awareness and interest have to be developed to re-energise commitment to the integrated system; and
- The results from the ongoing measurement and monitoring within the integrated system must be reviewed with discipline and corrective actions must be implemented with regard to non-compliance.

Overall, the risks related to the further and ongoing application of the integrated system revolved around the temptation to leave out components of the system, take shortcuts and the failure to utilise the tools developed in the action research cycles. In the study, each time this occurred, I was able to take corrective action by going back to ensure the rigorous and disciplined application of the processes, sub-processes and tools in the integrated system.

6.6 SUMMARY

In this chapter I described and discussed the applications and outcomes of the study during the period September 2000 to September 2003.

The first application was to implement the integrated system in cardiac catheterisation laboratories (cathlabs) as a further cycle of action research. The outcomes showed that the processes and sub-processes of the integrated system could be applied to both pharmaceutical and surgical consumable products, including specialised products in cathlabs across AHL with resulting financial benefits. A higher level of interaction and interventions with specialists in cathlabs is however required to sustain synergies.

The second application was to implement the integrated system in four (4) hospital acquisitions known as the Amahosp group. Implementation followed the process of Cycle 3, as summarised in Chapter 3, and the outcomes were consistent with previous implementations in new hospitals.

Finally the integrated system continued to operate across all hospitals in AHL. Outcomes showed continuous improvement consistent with the input-process-output and ongoing feedback systems approach. Lessons learnt were highlighted and revolved around the discipline and rigour in the application of all the processes, sub-processes and tools within the integrated system.

I will now reflect on the business objectives of the project.

CHAPTER 7

REFLECTIONS OF THE BUSINESS OBJECTIVES

7.1 INTRODUCTION

I used action research as the generic research paradigm of the study because the emphasis was on the implementation of change across all hospitals, while at the same time ensuring that the aim of developing an integrated system for the management of pharmaceutical and surgical consumable products was achieved. As a result, I was both project leader of the business project and researcher the study, and throughout the study I emphasised the need to achieve both the business objectives and research aim as illustrated in the concept map contained in Figure 1.2:14.

In this chapter I will reflect on the business objectives and summarise the impact of the integrated system on AHL.

7.2 BUSINESS OBJECTIVES

The starting point of the study was the achievement of a critical mass from the acquisition of six (6) new hospitals and a subsequent strategic planning session in which existing practices for the management of pharmaceutical and surgical consumable products were reviewed, with a view to addressing the question of how to make the whole greater than the sum of its parts.

The motivation for the study in AHL was summarised in Chapter 1, and the goals of the project arising from the strategic planning session were stated as follows:

- To identify synergy opportunities and leverage the total group spend in pharmaceutical and surgical consumable products;

- To develop the capability of managing product selection and usage for both types of products by pharmacists, nurses and doctors across all AHL hospitals; and
- To manage and support the implementation of this process to meet financial targets, maximise leverage opportunities while at the same time maintaining quality of care.

In addition, the following three (3) driving forces arose from the external factors:

- The expected increase in risk-based, managed healthcare reimbursement systems for hospitals;
- The continued impact of the rising medical inflation of pharmaceutical and surgical consumable products on both the affordability of healthcare and profit margins in hospitals; and
- The threat of future legislation to control the cost of medicines in the private sector.

I will now discuss the impact of the decisions made during the project and the study on AHL.

7.3 INTEGRATING THE MANAGEMENT OF BOTH TYPES OF PRODUCTS

Arising out of the goal to identify synergy opportunities was the decision to develop an integrated system for both pharmaceutical and surgical consumable products. Table 7.1 shows the business reasons for the decision to integrate the two (2) types of products at the start of the project and summarises the outcomes and impact of the decision at the end of the study.

Table 7.1: Business reasons for the integration of the two (2) types of products and the outcomes and impact thereof

BUSINESS REASONS FOR INTEGRATING THE TWO (2) TYPES OF PRODUCTS	OUTCOMES AND IMPACT
• Surgical consumable products represented a high percentage of turnover in the fee-for-service environment and costs in the risk-sharing reimbursement tariffs in AHL.	• By September 2003 surgical consumable products represented 51% of the combined spend and 24% of total group turnover and continued to have a significant impact on overall costs in risk-sharing reimbursement tariffs. The improvement in financial performance was proportional to the ratio of spend on these products. Failure to include these products in the system would have resulted in this proportion of spend and turnover being unmanaged. In contrast to this, significant cost and margin benefits were realised by applying the system to both types of products.
• In order to achieve economies of scale, I set out to use the resources, expertise and infrastructure across both groups of products.	• The use of resources such as the information technology (IT) infrastructure, product selection process and hospital implementation process for both products, delivered the economies of scale as was set out to achieve.
• A quality assessment process was needed for surgical consumable products to address the lack of regulatory requirements in SA.	• The quality assessment processes used internationally for pharmaceutical products was also used for surgical consumable products. In addition a product trial process was introduced in the integrated system for these products to further meet the quality objective for surgical consumable products.
• To ensure that the total cost of products used in patient care was evaluated in the product selection process, and where appropriate, the product selection processes of the two (2) types of products could be combined.	• The use of one (1) product selection team and an integrated approach to product selection ensured that a holistic perspective was used for product selection and where surgical consumables impacted on pharmaceutical products the selection process was combined. Examples were provided in the study.
• The absence of regulatory requirements resulted in a proliferation of similar surgical consumable products entering the market, which presented an opportunity for a reduction in the number of products used.	• The identified potential reduction in surgical consumable products was realised. A 64% reduction in the number of products was achieved with considerable financial impact on costs.
• I hypothesised that a system to establish doctor acceptance of the rationalisation and standardisation of *pharmaceutical products* could be used to achieve the same objective with doctors and nurses in terms of *surgical consumable products.*	• The hypothesis using the same system to achieve doctor and nurse acceptance of the rationalisation and standardisation of surgical consumable products was validated by the compliance levels achieved and the financial benefits realised as summarised in Chapter 3.

Subsequent to the action research cycles, the application of the integrated system to specialised cardiac catheterisation laboratories (cathlabs) showed that with sustained effort, combining the two (2) types of products into one (1) system could also be applied in more specialised environments. The impact on AHL was a substantial reduction in costs of products in cathlabs and a further contribution to the improved financial performance (AHL, 2003b).

7.4 THE IMPACT OF FOLLOWING A SYSTEMS APPROACH ACROSS ALL HOSPITALS

To maximise leverage opportunities and meet financial targets the decision was made to follow a systems approach, and develop and implement the integrated system across all hospitals in AHL hospitals at the same time. This contrasted with the alternative option which was to pilot a system in one (1) hospital and then attempt to replicate it in the remaining hospitals over time.

To achieve this objective, a change management methodology was combined with the action research approach. The decision was vindicated by the results achieved for the group as a whole, as well as and per individual hospitals. The outcomes in individual hospitals were similar across hospitals and the combined effect resulted in significant changes in market share for products that was leveraged in order to realise the financial benefits (Figure 3.11:71).

By the end of the action research cycles, the six (6) processes within the integrated system were established and implemented across the group. No lapses in quality were experienced during the process due to the quality assessment process that was built into the product selection process, and the ongoing monitoring and feedback system that was established. The feedback system was enhanced by the inclusion of all hospitals in the system and differentiated local issues from genuine quality non-conformances. The ability to share benchmark data across all hospitals also contributed to the achievement of the financial targets as each hospital set out to reach "best in class" performance.

In terms of financial impact, replicating the implementation of the integrated system across the group of 19 newly acquired PresMed hospitals also resulted in the achievement of over R8 million savings. Following the three (3) action research cycles the integrated system was also implemented across a further group of four (4) hospitals acquired in 2002, known as the Amahosp group. The impact of the implementation included both a margin improvement and an improvement in costs in risk-based reimbursement tariffs in this group (AHL 2003a).

7.5 SUMMARY OF OVERALL BUSINESS IMPACT

As a result of the development and implementation of the integrated system for the management of pharmaceutical and surgical consumable products, the total group spend on both products was leveraged to achieve improved financial results in both the traditional fee-for-service environment and in risk-based reimbursement tariffs in AHL (AHL, 1999; 2000; 2001; 2002).

Margin improvement for both categories of products in the fee-for-service environment improved significantly while AHL remained the lowest cost provider in the private healthcare industry (AHL, 2003b). Risk-based reimbursement tariffs, such as per diem and fixed fee tariffs, increased to over 40% of turnover by January 2003. Improved costs of pharmaceutical and surgical consumable products contributed to both risk management and good financial performance in this component of the business. (AHL, 2002 and AHL, 2003a).

In response to the external factors identified:

- The expected increase in risk-based, managed healthcare reimbursement systems for hospitals had come to fruition and is expected to increase further in 2004/5 (AHL, 2004). As described above, the integrated system has significantly impacted on cost and risk management in this form of reimbursement;

- The integrated system contributed to the reduction in medical inflation of pharmaceutical and surgical consumable products and AHL had positioned itself as the lowest cost provider in the industry; and
- Legislation to control the cost of medicines in the private sector was promulgated in 2004, forcing other major private hospital groups to move to risk-based reimbursement systems. The integrated system provided AHL with a competitive advantage to deal with the legislative changes by ensuring that a system is in place across all hospitals to manage product usage and spend.

Overall, from a business perspective, the integrated system has delivered the objectives of the project, namely to:

- Maximise leverage opportunities;
- Meet financial targets; and
- Ensure quality and optimal therapeutic outcome.

In terms of the research objective, I will now reflect on the progression of the integrated system for the management of pharmaceutical and surgical consumable products across a group of hospitals as summarised in Chapter 4.

CHAPTER 8

FURTHER PROGRESSION OF THE INTEGRATED SYSTEM

8.1 INTRODUCTION

The progression of the integrated system over the three (3) action research cycles was presented in Chapter 4 and further conceptualised and improved as shown in Figure 5.1:97, following the review of the literature and comparison with international systems.

As stated by Reid and Koljonen (2000:4), organisational and customer needs are not static but are dynamic and change continually. As a result, a company's output and/or processes may be considered innovative today, but, may as a result of competitive forces and other environmental forces, be rendered commonplace or obsolete tomorrow (Flood, 1995:44).

In the integrated system, as presented in Figure 5.1:97, the input-transformation-output model is applied to the individual processes, the hospitals and the system as a whole and provides an ongoing mechanism for the continuous improvement of the integrated system.

However, whilst the concept of ongoing feedback ensures that the processes and sub-process are continuously updated and adapted based on the feedback mechanism, it does not provide a structured process to ensure that the integrated system is adapted to respond to the changes in the environment and the healthcare market.

In order to address this, I adopted concepts from the systems model used by Haines for strategic planning and management and as a result developed a further progression of the integrated system as will be discussed next.

8.2 ADAPTATION OF HAINES'S SYSTEMS APPROACH TO STRATEGIC PLANNING AND MANAGEMENT

Haines (2000:10) stated that planning and change are the primary responsibilities of management and leadership. He defined an organisation's strategic decision-making as a process driven by feedback mechanisms through which an organisation's managers try to monitor its internal conditions and aspects of its external environment, to direct and regulate the organisation's efforts and thereby adapt the organisation to a changing environment. Similarly, the progression of the integrated system introduces a further dimension and structured approach through which the management and leadership of AHL, and its pharmacy management company APMS, can adapt to the rapidly changing healthcare environment.

Haines's method differs from traditional planning methods, which start by analysing today's issues, problem-solve those issues and then conduct long-range forecasting and planning by projecting into the future (Booyens, 2001:73). In his approach, and the approach adopted in the integrated system, a systems approach is used that focuses on the outcomes and then looks at ways to bridge the gap between the present and the required outcomes. The basis of the approach is the established systems model of input, process/throughput, output and feedback. However, in Haines's model a fifth element, namely environment, is added and, as stated earlier in this paragraph, the order is changed to start with output rather than input as shown in Figure 8.1. As such, the approach emphasises and studies the organisation as a whole and its interaction with the environment.

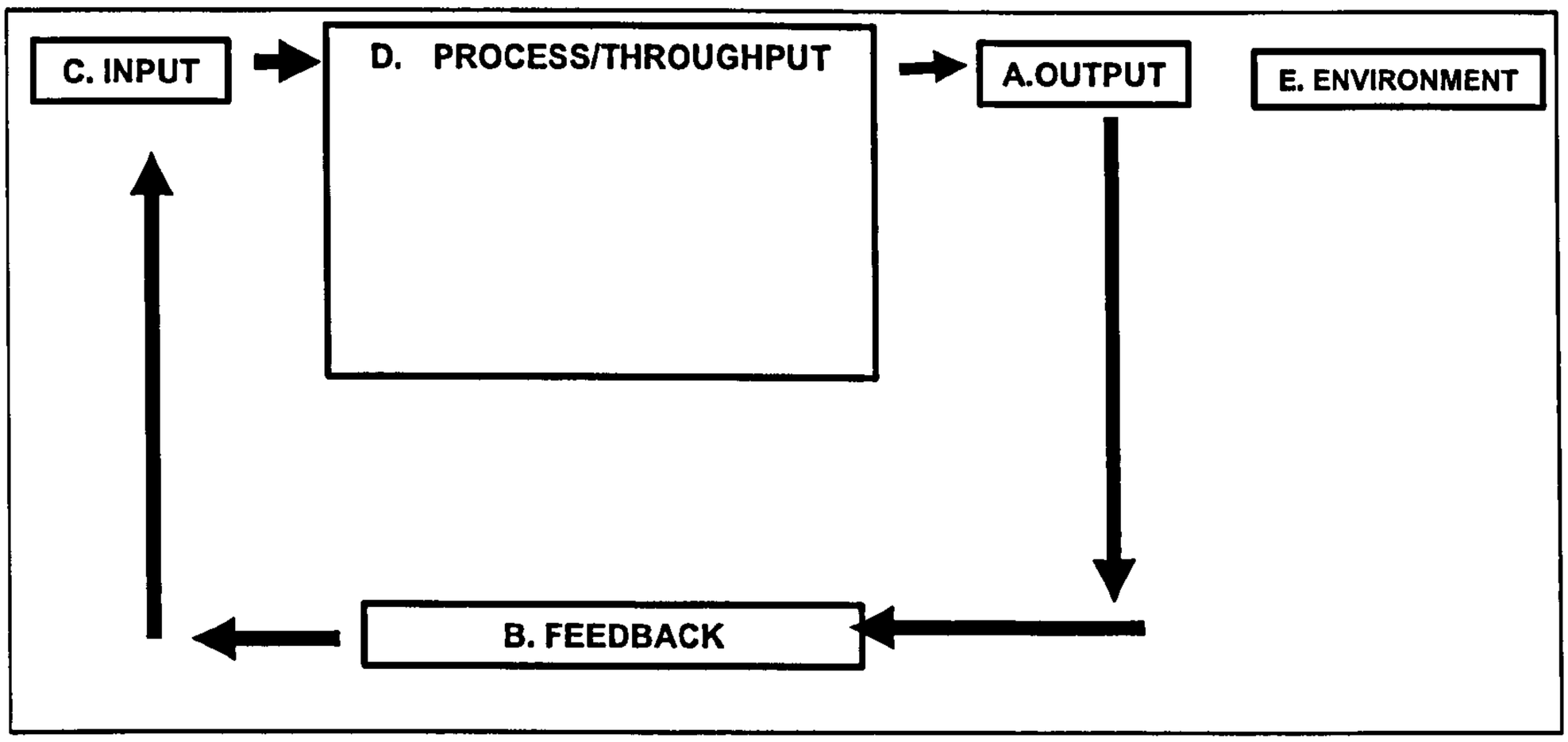


Figure 8.1: Haines's basic systems model: Five (5) key elements of systems thinking from theory to practice (Haines, 2000:37)

8.3 GRAPHIC REPRESENTATION AND DESCRIPTION OF THE FURTHER PROGRESSION

To further progress the integrated system, I used Haines's steps and systems approach to strategic planning and management (Haines, 2000:29) and incorporated them into the graphic representation of the integrated system as shown in Figure 8.2.

In Table 8.1 each of the key steps as numbered in the diagram is summarised and the application thereof to the integrated system described.

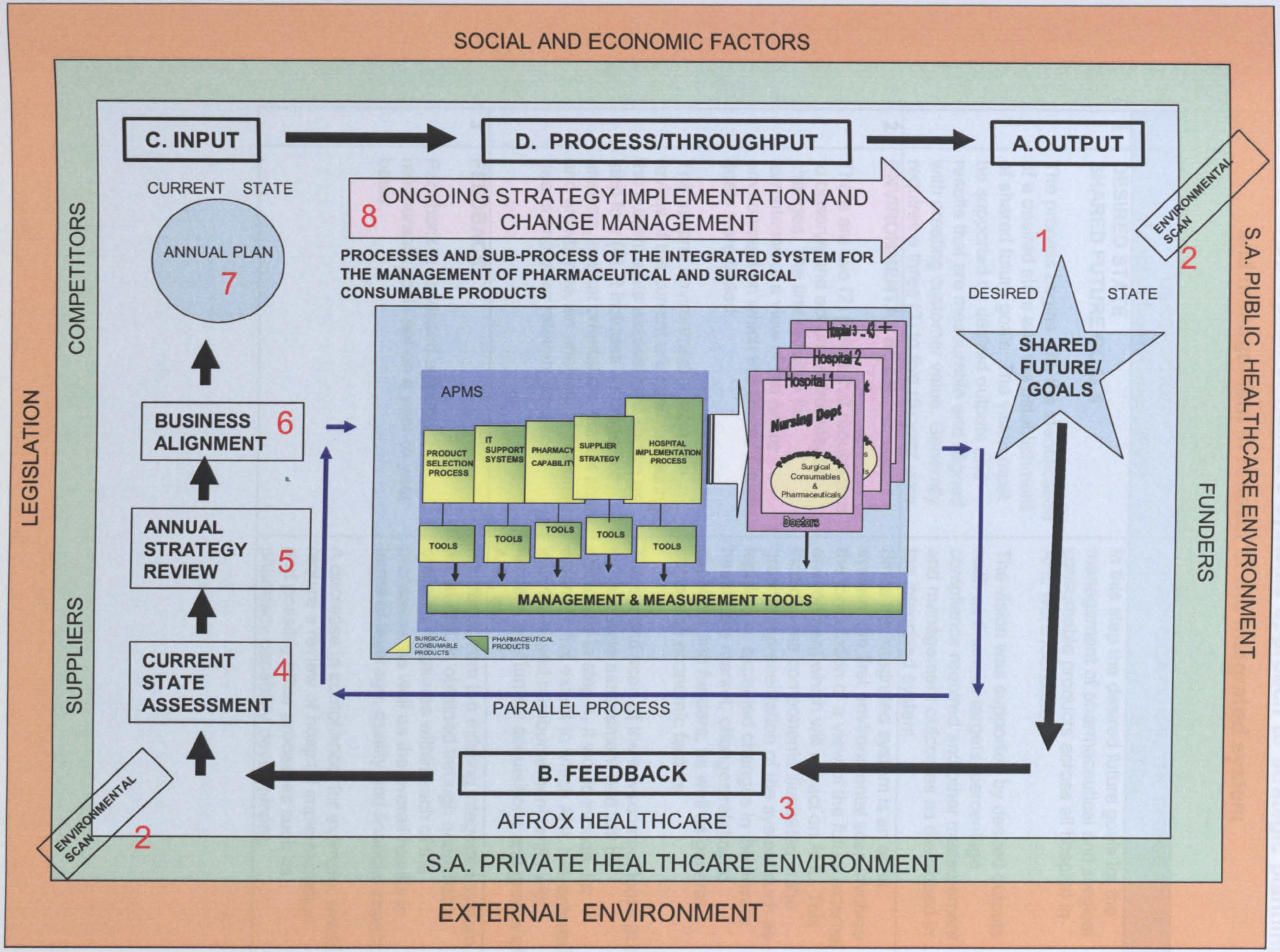


Figure 8.2: Further progression of the integrated system

Table 8.1: Application of Haines's systems approach to strategic planning and management in respect of the integrated system

	DESCRIPTION (Adapted from Haines, 2000)	APPLICATION IN THE INTEGRATED SYSTEM
1	**DESIRED STATE SHARED FUTURE GOALS** The process begins with the identification of a desired state and the establishment of shared future goals. The vision must be supported by desired outputs and results that are measurable and aligned with creating customer value. Generally requires a three (3) to five (5) year view.	In this step the desired future goals for the management of pharmaceutical and surgical consumable products across all hospital in AHL were identified. The vision was supported by desired outputs such as financial targets, percentage compliance required and other measurement and management outcomes as developed in the integrated system.
2	**ENVIRONMENTAL SCAN** There are two (2) points that require one to observe and act on environmental changes. The first requires the formulation of a view of the future environment on which the shared future goals were based. The second environmental scan is a review of the current environment during the current state assessment shown as step four (4). It includes a competitor analysis, market orientation, market share and growth rate, an analysis of customer needs and other relevant concepts.	Since the integrated system is an open system, the first environmental scan involves the formulation of a view of the *future* external environment which will impact on AHL. This includes the components illustrated in the graphic representation of the system such as legislation, expected changes in the private healthcare market, changes relating to suppliers and funders, as well as general social and economic factors. The second scan of the environment looks at a current state assessment and will be discussed in step 4. It would include, for example, the extent to which AHL has entered into risk-based reimbursement tariffs with funders, any further acquisitions and growth of AHL, etc.
3	**FEEDBACK** Feedback is assessed against measurable goals set on a year-to-year basis.	Feedback from the existing integrated system within AHL is obtained through quantifiable outcome measures within each of the processes, as well as the overall results in terms of leverage, quality and financial impact. A decrease in compliance, for example, would require a review of hospital implementation and possibly other processes such as pharmacy capability development.

	DESCRIPTION (Adapted from Haines, 2000)	APPLICATION IN THE INTEGRATED SYSTEM
4	**CURRENT STATE ASSESMENT** The current state assessment requires an honest assessment of where one is today versus the ideal future vision. It is used to determine how much energy, time and what resources are needed to get from where one is today to reach the desired state as defined in the shared future goal. This includes an internal assessment as well as an external assessment as described in the environmental scan (2). It requires one to take a step back into the bigger picture. Techniques such as an analysis of strengths, weaknesses, opportunities and threats (SWOT) can be used with a corresponding list of action implications for each.	Internally each of the processes within the integrated system must be reviewed and consideration given as to whether they are still needed, must be adapted and/or whether others must be added. This is over and above the ongoing parallel process feedback system that is monitored on a monthly basis. An annual SWOT analysis will ensure that strengths are harnessed and opportunities identified for inclusion in the annual plan. For example, the ability to shift market share from one (1) supplier to another can be applied to further categories of products to increase scope. The weaknesses and threats should be identified, e.g. the effectiveness of the supplier representative policy, and mitigating actions included in the annual plan.
5	**ANNUAL STRATEGY REVIEW** The annual strategy review is the step in which the core strategies and action items that will bridge the gap between the ideal future vision and the current state assessment is developed. The result is three (3) to seven (7) core strategies, which, when put into practice across the organisation, become the primary means to your desired end, the desired state identified in step one (1). Each core strategy should have corresponding strategic action items prioritised over the next 12 months. Buy-in of the organisation must be ensured through parallel processes conducted with relevant stakeholders.	In the integrated system, the overall strategies and action items must be identified to bridge the gap between the current state assessment and the future vision. For example, these may include extending the integrated system to further specialised products, adapting to legislation, addressing identified risks in risk-based tariffs, etc. In addition, each of the processes must be reviewed and adapted to ensure that the desired state is achieved through the implementation of strategic action items. Both overall strategies and strategic actions related to the processes must be prioritised over the next 12 months. Buy-in of the organisation is ensured through the continued collaboration and consultation with key stakeholders as identified in the communication plan that is included in the hospital implementation process.
6	**BUSINESS ALIGNMENT** In this step each core strategy is assessed to determine if any are outside the overall business strategy.	Importantly, the integrated system does not operate in isolation within AHL, but must be aligned with the overall business strategy. Input into this step is obtained during the current state assessment. Issues that need to be considered include AHL's growth strategy, changes in tariffs, the impact of other projects and initiatives in the business, technology changes in the group, etc. Alignment with the financial expectations for the management of pharmaceutical and surgical consumable products is also assessed in this step.

	DESCRIPTION (Adapted from Haines, 2000)	APPLICATION IN THE INTEGRATED SYSTEM
7	**ANNUAL PLAN** The development of the annual plan involves the process of sharing and prioritising and includes sharing of strategies across departments	The development of the annual plan involves the process of sharing and prioritising. Sharing of strategies across departments, individual hospitals and employees, enables the development of supportive planning across departments and all hospitals rather than separate strategies. Alignment of hospital and departmental budgets, as well as individual planning and performance measures related to the priorities for the integrated system, are completed in this step.
8	**ONGOING STRATEGY IMPLEMENTATION AND CHANGE MANAGEMENT** In this step plans are put into action and are tracked, monitored and adjusted as necessary.	The importance of the change management methodology was highlighted in the three (3) action research cycles of the study. The implementation of strategy related to the integrated system requires an ongoing change management approach. A number of tools were identified in the integrated system, such as the role map, constituency analysis and communication plan, which ensured an ongoing review of key stakeholders. The continued use of these tools, as well as the adoption of others as needed, is important to ensure effective change management and strategy implementation.
9	**PROCESSES AND SUB-PROCESS OF THE INTEGRATED SYSTEM** This step is an added step in the model and ensures a review of the processes and sub-processes in order to align these with the annual plans.	Step nine (9) involves aligning the processes and sub-processes of the integrated system with the core strategies and annual plans. It ensures that actions required to adapt and/or maintain the processes and sub-process are implemented across all hospitals in line with these strategies. As described in step three (3), there is also an ongoing parallel feedback process, which ensures that the integrated system can be adapted based on the monthly measurement of outcomes for both individual hospitals and the organisation as a whole.
10	**OUTPUT** The measurement of the actual output completes the system cycle and also begins it again. It identifies the extent to which the desired state has been achieved and is the start of the annual strategy review, assessment and feedback. Both positive and negative outcomes provide the essential ingredients for feedback, issues identification and renewal.	Measurement of the outcomes of the integrated system occurs monthly and is also reviewed as part of the annual strategic review process. The availability of measurable outcomes for each hospital and for the group as a whole is an important component of the feedback process in the integrated system.

8.4 BENEFITS OF THE FURTHER PROGRESSION OF THE INTEGRATED SYSTEM

The key benefit of the further progression of the integrated system is the provision of a systematic process and structure for the ongoing review of the system. This is important to ensure that the principle of continuous improvement is applied to the system as a whole, as well as to the individual processes and sub-processes.

Whilst the integrated system is a system in itself, it is also a sub-system of the larger system of AHL as a whole and the overall healthcare system in SA. The further progression provides a macro-process to ensure that the integrated system is adapted and enhanced in response to the ongoing changes in the healthcare environment.

In addition, through the inclusion of Haines's step 6, the alignment of the integrated system with the overall business strategy of AHL is facilitated. This has the additional benefit of ensuring ongoing executive management support for the integrated system.

The progression also provides a structured approach for exploring transferability to other contexts such as the South African public sector and possibly hospitals in other countries. This will be discussed further in Chapter 9 as focus areas for further research.

8.5 SUMMARY

In this chapter the further progression of the integrated system, adapted from Haines's systems approach to strategic planning is described and presented graphically. The application of each step is explained within the context of the integrated system and the benefits of the further progression discussed.

I will now reflect on the innovations of the study and focus areas for further research.

CHAPTER 9

INNOVATIONS AND FOCUS AREAS FOR FURTHER RESEARCH

9.1 INTRODUCTION

In this study the aim was to develop an integrated system for the management of pharmaceutical and surgical consumable products across a group of private hospitals.

As research practitioner in this study, I set out to develop new perspectives and bring new thinking to the opportunity/problems presented and thereby contribute to wider learning. At the same time, by combining research with business practice, I aimed to act on the new perspectives and ideas and test them in practice.

To meet these objectives I used an action research paradigm that included a participative collaborative process as well as independent critical review and conceptualisation by myself (the researcher).

The overall concept map of the study was presented in Figure 1.2:14. By the end of the action research cycles and further comparison to international systems, the overall aim to develop an integrated system for the management of pharmaceutical and surgical consumable products across a group of private hospitals was achieved. Further applications and outcomes of the system were described and reflections of the business objectives showed that the business outcomes for AHL were realised.

In order to provide a structured approach and systematic process for the integrated system to respond to changes in the environment, including the healthcare market, a further progression of the integrated system was developed based on Haines's (1998) systems approach to strategic planning and management.

In this concluding chapter of the Innovation Report I will summarise the innovations and discuss focus areas for further research.

9.2 INNOVATIONS

"*Innovative outcomes are generally the result of a creative thinking process that entails recognising gaps and missing elements, formulating hypotheses, revising and retesting these hypotheses and sharing the results with the interested community. Regardless of their forms these innovative outcomes must have value and demonstrate newness through combining and recombining of known elements*" (Khalil, 1996:32).

In the "*creative thinking process*" that initiated this study, I recognised a gap in the management of pharmaceutical and surgical consumable products in light of the health industry changes, and in particular the introduction of risk-based reimbursement tariffs such as per diem and fixed fee tariffs. In addition the growth in the organisation presented the opportunity to maximise leverage and realise synergy through the management of these products across all hospitals in the group.

Through the three (3) cycles of action research, hypotheses were formulated, revised and retested and outcomes shared. The main innovations that were initiated by this research project were:

- The development of an integrated system for the management of <u>both</u> pharmaceutical and surgical consumable products; and
- The systems approach that resulted in all hospitals in the group being regarded as a single system, i.e. the development of an integrated system across all hospitals in the group.

In both of these innovations "value" was demonstrated:

- In the impact on the financial performance as described in Chapter 7;

- In the ability to extend the integrated system developed in the study to further newly acquired hospitals as described in Chapter 6;
- In the sustainability of the outcomes over a prolonged period as indicated in Chapter 6; and
- In the implementation of processes that ensured the use of quality products across the group of hospitals.

Other innovations and key unique features in the integrated system were initiated within the framework of the main innovations, and will be highlighted in the discussion of each of these.

9.2.1 Integration of both pharmaceutical and surgical consumable products

The decision to develop one (1) integrated system for the management of both pharmaceutical and surgical consumable products was successfully carried out in the study and resulted in significant synergies through the use, for example, of one (1) product selection process, one (1) information technology (IT) system and a single approach to hospital implementation. No other systems of management that integrated these two (2) types of products were evident in the literature review conducted before and after the action research cycles.

As a result of this innovation a number of other innovations and key unique features were developed within the integrated system, which will now be described.

9.2.1.1 Surgical consumables classification system

Whilst international classification systems exist for pharmaceutical products no equivalent system was available for surgical consumable products. As a result, a surgical classification system based on functional therapeutic use was developed as a sub-process of the product selection process within the integrated system. The 7-tier classification system remains a competitive advantage to AHL, as it is the critical requirement for a product selection process for these products and is

also used as the basis for data and trend analysis. The absence of a classification system for surgical consumable products was identified in the literature review as an important factor limiting the development of management systems for these products.

9.2.1.2 Utilisation review capability for both products

Drug utilisation review (DUR) is an important component of management systems for pharmaceuticals (ASHP, 2000:137). The integration of both products into one (1) system, including the use of one (1) information technology (IT) system and database, resulted in utilisation review capability for pharmaceutical and surgical consumable products. This enables the management of the total cost of products in AHL of which surgical consumable products constitute 51% of combined spend and 24% of total turnover in the group. The ability to review and manage both types of products is critical in risk-based reimbursement tariffs, which increased from 5% at the start of the study to 40% at the end of the action research cycles and is expected to reach over 70% by 2005 (AHL, 2004). Whilst the high cost of surgical consumables was increasingly recognised in the literature review, management systems for these products were impeded by the lack of information and the absence of utilisation review capability.

9.2.1.3 Pharmacy departments responsible for management of both types of products

As a result of the decision to develop an integrated system for management of both types of products, pharmacy departments were given responsibility for all aspects of the management of surgical consumable products and were the key drivers of the hospital implementation process in each individual hospital. The result of this was the ability to utilise the skills of pharmacists in medicines management, drug information and interaction with healthcare professionals for both types of products. In addition the benefits of procurement, distribution and control is applied to surgical products, which increasingly have the same regulatory and safety requirements as pharmaceutical products.

9.2.1.4 The application of a formal quality assessment to surgical consumable products

Unlike the strict quality assessment processes applied to pharmaceutical products through the regulatory processes required for registration, there are no regulatory requirements for surgical consumable products in SA. The implementation of the integrated system resulted in a quality assessment process being applied to surgical consumable products. This was a first formal process in the South African private healthcare market.

9.2.2 The development of an integrated system across *all* hospitals

The decision to develop a single integrated system across all hospitals in the group was the second main innovation of the study. This was motivated by the objective to maximise synergy and the opportunity to leverage the spend of all products used across all hospitals. Unlike other international management systems that used individual committee structures in each hospital, the integrated system used one (1) product selection team across all hospitals and one (1) system of measurement that provided both individual hospital data and overall group data. Amongst others the benefits of this innovation included:

- The ability to move the market share of a product across all hospitals resulted in a corresponding financial leverage capability;
- The efficiencies realised as a result of resources being shared across all hospitals, e.g. product selection team, research data requirements, information technology (IT) infrastructure, training material development costs, etc.; and
- Small and medium size hospitals realised leverage benefits that could not be achieved on their own.

As with the decision to use one (1) system for both products, the decision to use one (1) system for all hospitals resulted in further key unique features within the integrated system.

9.2.2.1 Utilisation review across all hospitals

As a result of the decision to develop one (1) system across all hospitals, the technological development of measurement and management tools were also designed to cater both for multiple individual hospitals and to consolidate data for group purposes. AHL is considered to be the only private hospital group in SA that is able to accomplish this accurately (AHL, 2003b:7). The ability to consolidate data and provide utilisation review for the group as a whole ensured a focus on products that achieve high impact on the performance of AHL. In addition, progress can be monitored in individual hospitals and across all hospitals and is used in the supplier partnership process to identify gaps and develop action steps. Internal benchmarks are produced monthly and provide each hospital with a view of what is achievable at other hospitals.

The availability of data for all hospitals in a common database linked to classification and more recently to diagnosis and treatment codes, is also regarded as unique in the South African private healthcare sector and has positioned AHL as a leader in the availability of information and analysis capability for further risk management in risk-based reimbursement tariffs (AHL, 2003b:4).

9.2.2.2 Market share shift of products across the group

The ability to demonstrate the effectiveness of the integrated system in shifting market share of individual products is important in terms of leverage capability. This is especially important, because AHL represents over 30% of the private hospital market and a shift of product market share across all hospitals has a significant impact compared to changes in market share in isolated hospitals. The types of changes in market share and leverage realised as a result would not have been realised without the inclusion of all hospitals in the group. The fact the system operates as a whole also ensures that this process and leverage can be repeated with new products or opportunities without having to get each hospital to co-operate in terms of product by product.

9.2.2.3 Tools in the hospital implementation process

To balance the view of all hospitals as a group with effective implementation at individual hospitals that responds to local issues, tools such as the Doctor Constituency Analysis and Role Map Application Tool were adapted from existing change management tools and are used as needed during implementation. Whilst these concepts are common in change management literature, adaptations to the needs of the integrated system, and the incorporation thereof into the management system as a whole, are unique in SA and were not evident in the literature review of management systems for these products.

9.3 FURTHER IMPACT OF THE ACHIEVEMENT OF THE BUSINESS OBJECTIVES

As stated in chapter 1, in this study I chose not to use the conventional business approach of reengineering, but rather to connect business practice and research. In doing so, I not only brought new perspectives and thinking to the problems and opportunities but also acted on the new ideas and tested them out in practice.

Throughout the study I emphasised my role as both research practitioner and project leader of the business project. In Section 7.5 I summarised the overall impact of achieving the business objectives of maximising leverage opportunities and meeting financial targets whilst maintaining quality and therapeutic outcomes. The ongoing application of the integrated system has resulted in a further 2% reduction in the overall cost of pharmaceutical and surgical consumable products across the group over the period October 2003 to September 2004 (AHL, 2004b). The total spend on these products was over R1,5 billion for this period.

In addition, the *ongoing* application of the integrated system has had further impact on practice resulting from the achievement of the business objectives for the study. Examples of these include:

- The entrenchment of the concept of leverage;
- An ongoing collaborative approach across different disciplines and hospitals to organisational challenges and opportunities
- The systems approach of a hospital viewed as a system

9.3.1 The entrenchment of the concept of leverage

The successful implementation and results from applying the concept of leverage in the development of the integrated system have resulted in the concept being entrenched within the organisation. In addition the realisation that we can make the whole greater than the individual parts and how we do this, have been extended to other business practices. This has largely been due to the impact of the successful implementation of the integrated system across all hospitals through action research, in contrast to utilising more traditional methods of a pilot study followed by a roll-out to individual units.

An example of the further application of the concept of leverage is the development of a group wide virtual warehouse of pharmaceutical and surgical consumable stock. In this application, near expiry or underutilised stock from all hospitals is stored electronically in a data warehouse and is accessible to all pharmacy departments as well as the group pharmacy management department. This facilitates a consolidated approach to discussions with suppliers on the return of underutilised stock and ensures that hospitals that use products more frequently use up stock that would expire if it remained on the shelf in another (often smaller) hospital. The application also leverages off the data warehouse capability developed as part of the integrated system. The impact of this further application has been a significant decrease in stock written off that has decreased from over 5% to less than 3% of total stock within 12 months, an estimated saving of R2,7 million (AHL, 2004b).

As a result of the buy-in to the concept of leverage arising from the success demonstrated in the integrated system, individual hospital management teams and the executive management of the organisation are now willing to support other

opportunities that were regarded as too specialised. This includes leveraging the group spend in the procurement and maintenance of medical equipment, so that both large and small hospitals benefit. A recent application in anaesthetic machine replacement and maintenance has resulted in a further 15% saving on what was already regarded as preferential prices. Many of the processes from the integrated system were applied in ensuring that all 65 hospitals participated in the opportunity. This included the role map application, doctor constituency analysis and communication tools.

9.3.2 Ongoing collaborative approach

As a result of the collaborative approach to the implementation of the integrated system within the hospitals, different departments have applied the concept of working together to tackle other organisational challenges and opportunities.

The success of formulary implementation teams was recently emulated by the finance department. The delay in documentation and collation of the patient account had resulted in debtors' targets and organisational cash flow being negatively impacted. A project based on the collaboration of the nursing department and pharmacy department with the administration department was implemented in each hospital and replicated across the organisation. The result of this collaborative team approach, both within and between hospitals, has ensured that overall the group has decreased the time to deliver a final bill from up to 9 days at the start of the project to less than 4 days. This has had a positive impact on the debtors' target which has reached an all time best. The concept of targeted actions which have high impact, as used in the integrated system in the formulary compliance reports, was also utilized in this initiative. This allowed the collaborative team to focus on high impact changes rather than work through previously lengthy reports. In addition each department was able to focus on their role in implementing the required changes and achieving the common target. Furthermore, the teams requested benchmarking data as they received on formulary compliance in the formulary implementation teams.

9.3.3 Systems approach of a hospital viewed as a system

As a result of the successful implementation and ongoing application of the integrated system, the systems approach of a hospital viewed as a system has been more and more accepted by different departments and further applications explored.

In July 2004, a new customer service initiative was launched across the organisation that centred on the concept of the hospital as a system. I played a key role in the design and development of this initiative which aims to ensure a positive patient experience throughout the hospital value chain. Importantly the launch of the customer service initiative has drawn from the attitudes and new 'mental models' of staff and management resulting from the success of the integrated system.

As with the examples in sections 9.3.1 and 9.3.2, a number of the concepts in this initiative have been derived from the integrated system developed in this study. Examples include, the collaborative team approach, the development of group and individual measurement and management tools and capability development of staff. An extensive process of training in customer service skills has been in progress across all hospitals that includes the concept of continuous quality improvement. Early results show that the hospital-as-a-system approach has resulted in new solutions to long-standing customer complaints. For example, the hospital admissions process has been reviewed. Collaborative teams, involving mainly the administration and nursing services departments, have worked together to develop a more customer friendly process. The process is also more efficient in that steps previously duplicated in the administrative and nursing departments are now streamlined and only done once.

An electronic customer satisfaction measurement tool has been developed and implemented across all hospitals and benchmark data is collated and distributed monthly. The ability to leverage the technology infrastructure, as was done in the integrated system, has ensured that all hospitals, large and small have

implemented the measurement system. A positive improvement trend is emerging both within and across all hospitals in the group, with overall customer satisfaction across all hospitals increasing by 4% over 6 months (AHL, 2005).

Overall, the success and ongoing impact of the implementation of integrated system across all hospitals, has resulted in further application and benefits of the concepts that were the key innovations of this study.

9.4 FOCUS AREAS FOR FURTHER RESEARCH

Ongoing review is an integral part of the integrated system as a result of the inbuilt feedback system. The incorporation of the strategic planning systems approach as described in Chapter 8 provides a structured approach to respond to external factors impacting on the integrated system, and the alignment of the system to the overall business strategy. A number of recent changes in the "environment" will provide the opportunity for further research. For example, the promulgation of the long anticipated pharmaceutical pricing legislation will result in a faster acceleration of the shift to risk-based reimbursement tariffs in the private healthcare care industry. Further research regarding the impact of this legislation on the integrated system will have to be conducted and the relevant changes must be implemented. The possible sale of AHL and the threat of the sale of individual hospitals could seriously impact the leverage capability, which will require a review of the integrated system. The use of the final integrated system, incorporating the strategic planning structured process, can be further tested in the above two (2) examples.

In addition, there are a number of other focus areas for further research, which will now be described.

9.4.1 Test the integrated system in other contexts

This study was a contextual study conducted across a group of private hospitals in SA. AHL has been acknowledged as one (1) of the largest private hospital groups

outside the U.S.A and has recently entered the U.K healthcare market in partnership with a listed company, Care U.K (Dash, 2004:341). The introduction of the integrated system into private healthcare treatment centres in the UK will provide the opportunity to test the integrated system in a different country and different context. However, these treatment centres are similar in size to small hospitals in AHL, and since they are new centres, they have no existing systems of management in place. Further research should be conducted to establish whether and how the integrated system could be applied in larger hospital organisations and organisations with existing management systems for these products, such as those found in the USA.

There is increasing use of private health care systems and organisations by national healthcare organisations internationally (Dixon et al., 2004:223) The integrated system has not been tested outside the South African private healthcare sector. Its application in the public sector should be explored, starting with public-private healthcare partnerships, which are developing in SA.

9.4.2 Impact on quality of care

As indicated in the study, the measurement of the impact on quality of care was limited to product complaints feedback. Further research should be conducted to develop a more rigorous measurement and assessment system regarding the impact of the integrated system on quality of care.

9.4.3 Extension of the integrated system to other areas of healthcare

The integrated system was applied to acute care hospitals only. Further research is required to establish how it can be extended to primary healthcare provision and specialised areas such as ambulatory chronic care.

9.4.4 Extension of the concepts in the integrated system to other areas within AHL

The systems approach to the development of the integrated system provided a new view of the management of pharmaceutical and surgical consumable products. Further research should be conducted to explore applications of this approach to other areas within AHL.

9.5 CONCLUSION

*"Engineers say that a new idea has been **invented** when it is proven to work in a laboratory. The idea becomes **innovation** only when it can be replicated reliably on a meaningful scale at practical costs"* (Senge, 1990:5).

In this study I used action research as the generic research paradigm, because my intention was not to only "invent" an integrated system in a "laboratory", but also to be able to implement and replicate the invented system across all hospitals in the group "*at a practical cost*".

As project leader of the business project and the researcher in this study, I achieved both the business objectives and objectives of the research study. Importantly, as a result of developing and implementing the integrated system, including the final progressions of the system, I have set a path of ongoing learning, research and possible further innovations in the integrated system for the management of pharmaceutical and surgical consumable products across a group of hospitals.

REFERENCES

AFROX HEALTHCARE (AHL). 1998. Business Plan. Johannesburg: Unpublished.

AFROX HEALTHCARE (AHL). 1999a. Business Plan. Johannesburg: Unpublished

AFROX HEALTHCARE (AHL). 1999b. AHL Annual Report and Financial Statements. Johannesburg.

AFROX HEALTHCARE (AHL). 2000. AHL Annual Report and Financial Statements. Johannesburg.

AFROX HEALTHCARE (AHL). 2001. AHL Annual Report and Financial Statements. Johannesburg.

AFROX HEALTHCARE (AHL). 2002. AHL Annual Report and Financial Statements. Johannesburg.

AFROX HEALTHCARE (AHL). 2003a. AHL Annual Report and Financial Statements. Johannesburg.

AFROX HEALTHCARE (AHL). 2003b. Competitor Analysis. Johannesburg: Unpublished.

AFROX HEALTHCARE (AHL). 2003c. Business Plan. Johannesburg: Unpublished.

AFROX HEALTHCARE (AHL). 2004. Business Plan. Johannesburg: Unpublished.

AFROX HEALTHCARE (AHL). 2004b. Internal Financial Management Report. Johannesburg: Unpublished.

AFROX HEALTHCARE (AHL). 2005. Customer Feedback Report. Johannesburg: Unpublished.

AL-SHAQHA, W.M.S. & ZAIRI, M. 2001. Pharmaceutical care management: A modern approach to providing seamless and integrated health care. International Journal of Health Care Quality Assurance, 14(7): 282-301.

AMERICAN SOCIETY OF HOSPITAL PHARMACISTS (ASHP). 2000a. Coalition Working Group: Principles of a sound drug formulary system. Am J Health-Syst Pharm, 45:137

AMERICAN SOCIETY OF HEALTH SYSTEMS PHARMACISTS (ASHP). 2002b. ASHP leadership conference on pharmacy practice management executive summary. From management to leadership: The building blocks of professionalism. Am J Health-Syst Pharm, 59: 661-665.

AMERICAN SOCIETY OF HEALTH SYSTEMS PHARMACISTS (ASHP). 2004. ASHP guidelines on the pharmacist's role in the development, implementation and assessment of critical pathways. Am J Health-Syst Pharm., 61: 939-945.

AMERICAN SOCIETY OF HOSPITAL PHARMACISTS (ASHP). 1983. ASHP statement on the formulary system. Am J Hosp Pharm., 40: 1384-1385.

AMERICAN SOCIETY OF HOSPITAL PHARMACISTS (ASHP). 1996. Code of ethics for pharmacist. Am J Hosp Pharm, 53:1805.

ANDERSON, R.W. 2002. Health-system pharmacy: New practice framework and leadership model. Am J Health-Syst Pharm., 59: 1163-1172.

ANDREWS, J. 2000. From the sharps safety front. Materials managers, clinicians team up to resolve sticky issue. Materials Management in Health Care, November: 14-16.

ANDREWS, J. 2001. Branching into finance. Duties expand beyond the realm of purchasing and supply chain management. Mater Manag Health Care (US), 10(6): 19-21.

ARONSON, D. 1996. Using systems thinking to increase benefits of innovation efforts. [Online]. Avaialble at: <http:// www.thinking.net/Systems_Thinking/ systems_thinking>. Accessed on 16/04/2004.

ARMENAKIS, A.A & HARRIS, S.G. 2002. Crafting a change message to create transformational readiness. Journal of Organisational Change Management. 15(2):169-183.

BABBIE, E. & MOUTON, J. 2002. The practice of social research. South African Edition. Cape Town: Oxford University Press Southern Africa.

BINYON, D. & COOKE, R.P.D. 2000. Restrictive antibiotic policies – how effective are they? Hospital Pharmacist, 7: 183-187.

BISSEKER, C. 1999. Medical Aid: The load shifts. Financial Mail, February 28: 39.

BOOYENS, S.W. 2001. Introduction to Health Services Management.2nd ed.Lansdowne: Juta

BOWDITCH, J.L. & BUONO, A.F. 1997. A primer on organizational behavior. 4th edition. New York: John Wiley & Sons, Inc.

BRIDGE, I. 2001. The big health squeeze. Financial Mail, 28 June: 79.

BROWN, L.D. 1993. Social change through collective reflection with Asian non-governmental organizations. Human Relations, 46(2): 249-273.

BURNS, N. & GROVE, S.K. 2001. The practice of nursing research: Conduct, critique and utilisation. 4th ed. Philadelphia: W.B. Saunders.

CAMBRIDGE INTERNATIONAL DICTIONARY OF ENGLISH. 2004. [Online]. Available at: <http://www.dictionary.cambridge.org>. Accessed on 18/06/2004.

CHAMPY, J. 1995. Reengineering: A light that failed. Across the Board, 32(3):27-31.

CONNOR, D.R. 1995. Organisational development research (ODR): Instruments. Atlanta: Chamber-Tucker.

COOPER, B. 1997. Systems thinking: A requirement for all employees. CSWT Reports. [Online]. Available at: <http://www.workteams.unt.edu/reports/bcooper>. Accessed: 02/07/2004.>

CORMACK, D.F.S. 2000. The research process in nursing. 4th ed. Oxford: Blackwell Science Ltd.

CORNWALL. A. & JEWKES. R. 1995. What is participatory research? Social Science and Medicine, 41(12): 1667-1676.

CRAWFORD, S.Y. & MEYERS, C.E. 1993. ASHP national survey of hospital-based pharmaceutical services – 1992. Am J Hosp Pharm., 50: 1371-1404.

DASH. P. 2004. New providers in UK health care. BMJ, 328: 340-342

DE BRUIN, W. 2000. Focus on health care. Why costs are going up and up. Finance Week, May: 24

DEAN. P., ROBSON, J. & WALTERS, P. 2004. Pharmacy intervention monitoring – a clinical tool. Hospital Pharmacist, 11: 201-202.

DICK, B. 2000. Postgraduate programs using action research. Brisbane: Griffith University.

DICTIONARY.COM. 2004. [Online]. Available at: <http://www.dictionary.com/integrate>. Accessed on 18/06/2004.

DIXON, J., LEWIS, R., ROSEN, R., FINLAYSON, B. & GRAY, D. 2004. Can the NHS learn from US managed care organisations? BMJ, 328:223-225

DORLAND'S ILLUSTRATED MEDICAL DICTIONARY. 1994. 30th ed. Philadelphia: Saunders.

ELDIN, M. & LEVIN, M. 1991. Cogenerative learning. In. WHYET, W.F. (ed.). Participatory action research. London: Sage.

ESKEW, M. 2002. Forcing costs down. Mater Manag Health Care (US), 11(10): 24-28.

FELDMAN, M.L. & SPRATT, M.F. 1999. Five frogs on a log: A CEO's field guide to accelerating the transition in mergers, acquisitions, and gut wrenching change. New York: Harper Collins.

FIJN, R, BROUWERS, J.R.B.J. & DE JONG-VAN DEN BERG, L.T.W. 1999. Rational pharmacotherapy in the Netherlands: Formulary management in Dutch hospitals. Pharm World Sci., 21: 74-75.

FITZPATRICK, R.W., MUCKLOW, J.C., & FILLINGHAM, D. 2001. A comprehensive system for managing medicines in secondary care. Pharm J, 266: 585-588.

FLEMMING, M. 2002. In AFROX HEALTHCARE LIMITED (AHL). AHL Annual Report and Financial Statements. Johannesburg.

FLETCHER, M.A. 2003. Reflections on reciprocity in professional development: Learning partners as professional learning teams. ALARPM 6th World Congress & PAR 10th World Congress. [Online]. Available at: <www.up.ac.za/academic/education/alarpm/ proceedings.htm,>. Accessed on 29/08/2004.

FLOOD, R.L. 1995. Total systems intervention: critical success factors for a systems based problem solving system. In Critical Issues in Systems Theory and Practice. K.ELLIS (ed.). New York: Plenum Press.

GIAQUINTA, D. 1994. A view from a managed care provider. Drug Formularies, 85: 30-35.

GOLDSMITH, J.C. & JEFF, C. 1994. The illusive logic of integration. Healthcare Forum Journal, September/October: 26-31.

GREENWOOD, J. 1994. Action research: A few details, a caution and something new. Journal of Advanaced Nursing, 20: 13-18.

GRUNDY, S. 1986. Action research and human interests. In. EMERY, M. & LONG, P. (ed.). Symposium, May: 22-23. Research Network of the Australian Association of Adult Education.

HAINES, S.G. 1998. The manager's pocket guide to systems thinking and learning. Amerherst: HRD Press Inc.

HAINES, S. G. 2000. The Systems Thinking Approach to Strategic Planning and Management. Florida: St. Lucie Press.

HAMMER, M. & CHAMPY, M. 1993. Reengineering the corporation. New York: Harper Business.

HELLING, K.D. 2000a. Fortress and formularies. Am J Health-Syst Pharm., 57: 858-859.

HELLING, K.D. 2000b. Implementing yesterday's promises. Am J Health-Syst Pharm., 57: 576-581.

HHNMAG. 2002. Material strategies. [Online]. Available at: <http://www.hospitalconnect.com/jsp/article.jsp>. Accessed on 09/04/2004.

HOBAN, V. 2003. Equipped to care and save. Supply Management, November: 28-29.

HOGBEN, RLH. 1999. In AFROX HEALTHCARE LIMITED (AHL). AHL Annual Report and Financial Statements. Johannesburg.

HOGERZEIL, H.V. 1995. Promoting rational prescribing: An international perspective. Br J Clin Pharmacol, 39: 1-6.

JANKELOW, M. 2000. Afrox Healthcare: Patients will reward patience. BOE Securities Report. 2711 302 1231. August, 22: 1-31.

JOUBERT, M. 1997. Ready for change. Financial Mail, July 18: 106-107.

KACHIENG'A, M.O. & BOONZAIER, D.A. 1999. Health care technology assessment -- the South African health care system in transition. S Afr Med J., 89(2): 149-155.

KARLSEN, J.I. 1991. Action research as method. In. WHYTE, W.F. (ed.). Participatory action research. London: Sage.

KEMMIS, S. & McTAGGART, R. 1992. The action research planner. Victoria: University Press.

KHALIL, O.E.M. 1996. Innovative work environments: The role of information technology and systems. SAM Advanced Management Journal, 61: 32-35.

KHAN, F. 2002. Using medicines wisely. Hospital Pharmacist, 9: 159-163.

KOTTER, J.P. 1995. Why transformation efforts fail. Harvard Business Review, March/April: 59-67

LANGLEBEN, D. 2001. Managing manpower, managing medicines. Pharm J., 267: 470-481.

LARSEN, K., MCINERNEY, C., NYQUIST, C., SANTOS, A., SILSBEE, D. & FAERMAN, S. 1996. Learning organisations [Online]. Available at: <http://www.home.nycap.rr.com/klarsen/learnorg/>. Accessed: 02/07/2004.

LINCOLN, Y.S. & GUBA, E.G. 1985. Naturalistic inquiry. Newbury Park: Sage.

LIPTON, H.L., BYRNS, P.J., SOUMERAI, S.B. & CHRISCHILLES, E.A. 1995. Pharmacists as agents of change for rational drug therapy. International Journal of Technology Assessment in Health Care, 11(3): 485-508.

MARTINEZ BENGOECHEA, M.J., MESSORI, A., BERTO, V., BECAGLI, P., FONT, M. & MARTINI, N. 1997. Hospital formulary and drug selection. Eur Hosp Pharm., 3: 89-90.

MERRIAM-WEBSTER ONLINE DICTIONARY. 2004. [Online]. Available at: <http://www.m-w.com/cgi-bin/dictionary>. Accessed on 18/06/2004.

MORTON-COOPER, A. 2000. Action research in health care. Oxford: Blackwell Science Ltd.

MOUTON, J. & MARAIS, H.C. 1992. Basiese begrippe: Metodologie van gedrag-wetenskappe. Pretoria: RGN

MOUTON, J. 1998. Understanding social research. 2nd ed. Pretoria: Van Schaik.

MULLINS, D.C., THOMAS, S.K. & ROFFMAN, D.S. 2001. Pharmaceutical restrictions – possible effect on patient/physician buy-in of disease management programs. Disease Manage Health Outcomes, 15: 69-74.

NEIL, R. 2004. Joining sides. Materials Management in Health Care. [Online]. Available at: <http://www.hospitalconnect.com/matmanmag/jsp/articledisplay>. Accessed on 09/04/2004.

O'BRIEN, R. 1998. An overview of the methodological approach of action research. [Online]. Available at: <http://www.web.net/~robrien/papers/artinal.html.>. Accessed on 24/11/2001.

PERRY, C. & ZUBBER-SKERRITT, O. 1992. Action research in graduate management research programs. Netherlands: Kluwer Academic.

POLIT, D.F. & HUNGLER, B.P. 1999. Nursing research principles and methods. 6th ed. Philadelphia: Lippincott.

REID, R. & KOLJONEN, L.E. 2000. A systems-based framework for continuous improvement: A service sector application. Journal of Business Strategies, 17: 4-10.

ROOS,J. 1996. Organization in health services. In BOOYENS, S.W. (ed.). 1996. Introduction to health service management. Cape Town: Juta

SAMWAYS, D., WIND, K. & PAGE, J. 2001. Toward "intelligent" purchasing. Procurement of pharmaceuticals in secondary care has traditionally been undertaken by pharmacy staff. How well do they perform in changing NHS? Hospital Pharmacist, 7: 144-146.

SCHECHTER, L.N. 2004. Advances in postoperative pain management: The pharmacy perspective. Am J Health-Syst Pharm., 61: S15-S21.

SENGE, P.M. 1990. The fifth discipline. New York: Doubleday.

STEPHENS, J., TOMLIN, M.E. & MITCHELL, R.D. 2000. Managing medicines: The optimising drug value project. Pharm. J., 7: 256-259.

SUMMERS, B. 1991. Mirror to hospital pharmacy in Southern Africa. Braamfontein: PSSA Publications.

TAMBOLAS, S. APRIL. 2004. Reining in the sales reps. Health Forum Journal. [Online]. Available at <http://www.hospitalconnect.com/healthforumjournal/ jsp/ article>. Accessed on 09/04/2004.

THURMANN, P.A., HARDER, S. & STEIOFF, A. 1997. Structure and activities of hospital drug committees in Germany. Eur J Clin Pharmacol, 52: 429-435.

TUFT, R. 1997. "The Health Business: Assessing Managed Health Care." Indicator SA, 14: 30-33.

UK MEDICAL DEVICES AGENCY (MDA). 2003. About MDA – historic. [Online]. Available at: <http://www.medical-devices.gov.uk/mda/mdawebsitev2.nsf/>. Accessed on 15/07/2003.

US FOOD AND DRUG ADMINISTRATION (FDA). Centre for Devices and Radiological Health. 1998. Is the product a medical device? [Online]. Available at: <http://www.fda.gov/cdrh/devadvice/312.html>. Accessed on 25/07/2003.

VAN DEN HEEVER, A. 1999. The way I see it. A view of the private health care system. Private Health Care Industry Review. Hospital Association of South Africa. 8th Annual Publication: 163-168.

VAN DER MERWE, A. 1998. "Overview of the South African Health-Care Industry", Private Health Care Industry Review. Hospital Association of South Africa. 7th Annual Publication: 24-42.

VICE, R. 1999. In AFROX HEALTHCARE LIMITED (AHL). AHL Annual Report and Financial Statements. Johannesburg.

WATSON, R. 1999. "Formularies: Who benefits?" Private Health Care Industry Review. Hospital Association of South Africa. 8th Annual Publication: 131-136.

WHYTE, W.F. (ed.). 1991. Participatory action research. Newbury Park: Sage Publications.

WHYTE, W. 1995. Encounters with participatory action research. Qualitative Sociology, 18(3): 289-299.

WILLOCK, M. & MOTLEY, C. 1998. Financial and material management. Int Anesthesiol Clin., 22: 41-57.

WINTER, R. 1996. Some principles and procedures for the conduct of action research: New directions of action research. London: Falmer Press.

WORDSMYTH ENGLISH DICTIONARY. 2004. [Online]. Available at: <http://www.wordsmythe.net/live/home>. Accessed on 18/06/04.

ZUBER-SKERRITT, O. 1995. Models for action research. In PINCHEN, S. & PASSFIELD, R. (eds.). Moving on - Creative applications of action learning and action research., Brisbane: ALARPM.

ZUBER-SKERRITT, O. 1996. New directions in action research. London: Flamer Press.

ZUBER-SKERRITT, O. 2000. Action learning, action research and process management: theory, practice and praxis. Brisbane: Griffith University.

ZUBER-SKERRITT, O. 2001. Action research: The basis for teaching, learning and professional development. Technikon Pretoria. Unpublished.