Analysis and recommendations for the technology system used for procurement and inventory management at Eskom

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Executive Summary

Eskom is South Africa's national electricity utility company and it generates, transmits and distributes about 40 000 megawatts of electricity nationwide. For this to be possible Eskom has to buy material such as transformers, cables, poles, meters, industrial computers, etc. Other materials such as stationery, office furniture, property and services also have to be procured in order to assist with the daily operations of the business.

Currently Eskom uses the Systems, Applications and Products (SAP) system for procurement, inventory management, contract management, warehousing and other departments such as Human Resources but for the purpose of this project only the procurement and inventory management departments will be discussed.

The company wanted to find out if it is using the most efficient and cost effective system on the market currently and to find out which other equivalent systems are available on the market. The processes followed in both these departments were analysed along with the SAP processes to find shortfalls in either processes.

Analysis was done in both departments and it was found that the inventory management department had no problems with the system and it was effective in this department. The shortfalls that were identified were in the procurement department and further analysis on the procurement process along with the SAP process was done.

On conclusion of the analysis it was determined that although the SAP system is currently not the most cost effective system on the market, it is a world leader in its applications and is efficiently aligned with the business objectives and processes. It was also found that the cause of the gap between the SAP system and procurement processes was in some cases the element of human error. The shortfalls found can be corrected with the recommendations made for the department and the SAP system.

It was found that the SAP system is the most effective system for the company and application of the given recommendations would results in saving costs and the full utilisation of the SAP system and the system's potential.

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LIST OF ABBREVIATIONS

BASC   Business Applications Solution Centre

IT   Information Technology

JIT   Just-In-Time

MRP   Materials Requirement Planning

PO   Purchase Order

PR   Purchase Requisition

RFQ   Request for Quote

SAP   Systems, Applications and Products (on data processing)

ERP   Enterprise Resource Planning

CRM   Customer Relations Management

CHAPTER 1

INTRODUCTION

1. 1. BACKGROUND

Eskom is South Africa's national electricity utility company that produces approximately 40 000 megawatts of electricity every year to industrial, commercial, agricultural and residential customers. Eskom has three main lines of business, namely (Eskom, 2009):

- **Generation,** where the electricity is 'manufactured' or produced at power stations.
- **Transmission**, the electricity is transported via power lines. As it leaves the power station it is boosted by step-up transformers and when it reaches its destination it is 'stepped-down' to be distributed to customers.
- **Distribution** is a division where most customers buy and use electricity.

In order to effectively manage customers and electricity, Eskom has divided its distribution division into six different regions of operation in South Africa, namely, the Northern, Southern, Eastern, Western, North-West and Central regions.

To effectively run this business of producing electricity and supplying it to customers a company such as Eskom needs an effective supply chain management strategy which includes Procurement and Inventory Management Systems.

Some of the procured materials include stationery, office furniture, vehicles, transformers, poles, cables, measuring devices, etc.

As technology is growing at an exponential rate in and around the country, there is need to find the most effective and suitable software to continuously improve the technology systems. Procurement and Inventory Management systems are essential dynamic factors in making sure that the demand for electricity is met at all times.

Figure 1 below shows the process of generating power, which includes inputs and omissions in power stations, the transmission through substations and the distribution to customers.
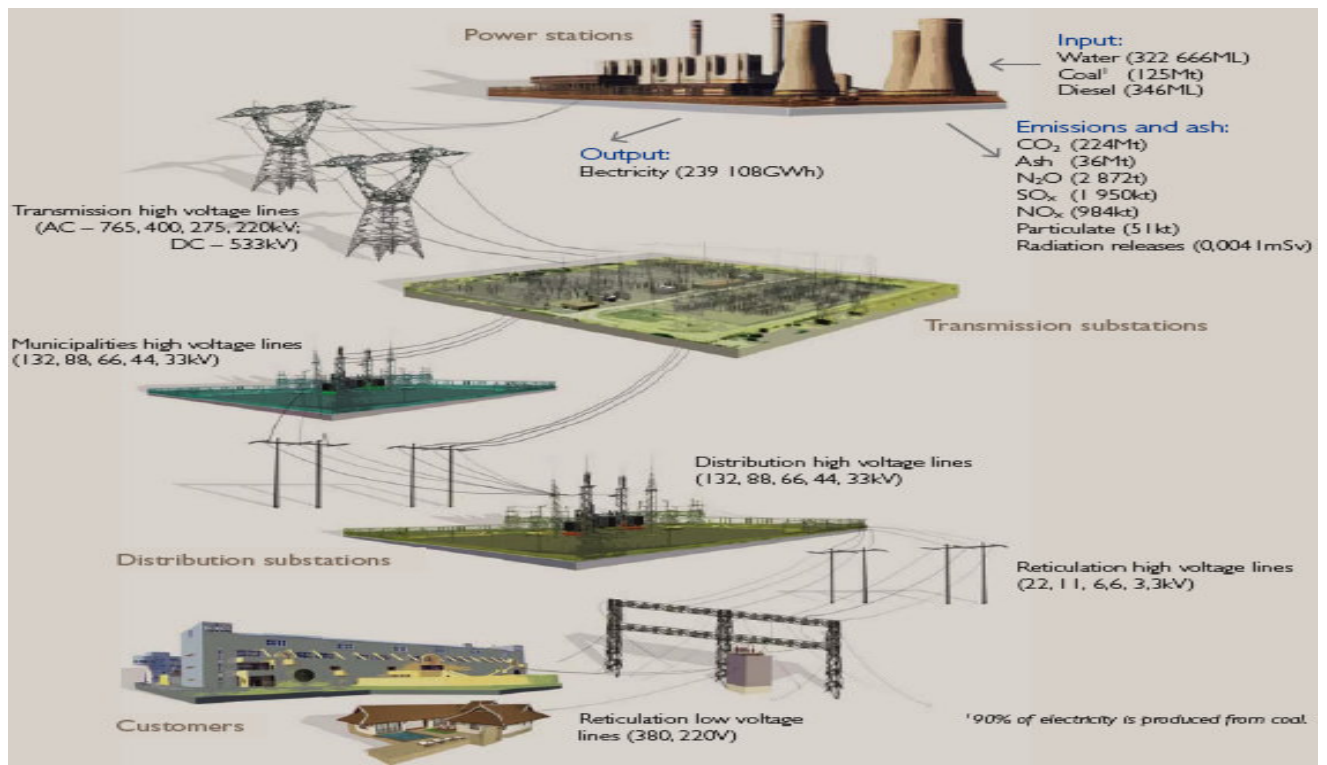
Figure 1: How electricity is generated and sent to customers

1.2. PROJECT AIM

The purpose of this project is to analyse the current system used by Eskom for procurement and inventory management to find out if it is most efficient and cost-effective solution for the company. The completion of this project will result in recommendations on the areas of improvement and a cost-effective system that meets all the requirements of the business.

1.3. PROJECT SCOPE

The scope of this project is not to invent or re-design procurement and inventory management systems analysed. Focus will be placed on analysing the system and identifying areas of improvement on the existing procurement and inventory management

systems used by Eskom. For the purpose of this project the distribution division in the Northern region will be analysed, however, the same processes are used across Eskom. Analysis will be done to ensure that the needs and processes of these departments are aligned with what the system is capable of executing**.** Information Technology (IT) experts will be consulted to scrutinise the different technologies to find the technical advantages and shortcomings of the systems. "Information Technology (IT) pertains the fields where information may be generated, captured, stored, retrieved and communicated by electronic means, destined for human interpretation" (Bosman, 1993).

This project will provide the necessary recommendations to suit the company by using the proper Industrial Engineering tools and the expertise of IT consultants.

The below Table 1 shows the difference in roles assumed by an Industrial Engineer (IE) and IT profession to support any business, (Bosman, 1993).

Table 1: Traditional focal points supporting business using IT

Factor	IT profession	Business	IE profession
Core activity	Development of IT solutions to support business activity.	Problem solving	Continuous improvement of business-rationale of optimality.
Aim	To provide the best IT solution based on business specification.	To attain and sustain a maximum level of wealth	To provide the best business solution using all available tools.
Focus	Use IT to provide a technical IT solution.	Mission	IE is a means of providing a business solution. Making more money now and in the future.

This table shows that, although these professions are different, they are interlinked in making any company successful.

1.4. PROBLEM DEFINITION

With the growing technology in South Africa, every company needs an effective and efficient supply chain system. In order to do this, there has to be a superior technology system in place. Eskom uses the SAP system for both Procurement and Inventory Management.
The limitations of this system are that:

1. There are perceptions that it is not thoroughly aligned with the physical procurement process at Eskom.
2. There are high maintenance costs.
3. Although courses are offered for the use of the system, it is still subjected to individual interpretation, i.e. ambiguities in procedures.
4. Functions such as Supplier Relationship Management (SRM), which come with the package, are not used. This results in poor utilisation of some of the features of the SAP package. The faxing application is not reliable due to faxes not being received on time or not being received at all or the fax being sent by mistake to the wrong supplier.
5. Each releaser (person who receives requisitions and sorts them by items) has their own inbox for incoming purchases; therefore if a releaser is not at work, the purchases will pile-up until they come back. This delays all the purchases that have to be sent out by the specific releaser.

CHAPTER 2

LITERATURE REVIEW

2.1. PROCUREMENT

The successful operation of a business largely depends on the resources available. Raw materials, buildings, vehicles, labour and equipment need to be acquired in order for the business to function.

Vogt (2005) describes procurement as "the process of purchasing items and services that are used by the business". For this process to be initiated, there has to be a demand or need for these items. Banks and Fabrycky (1987) advice that a receiving enterprise should purchase an item only when it perceives that the item has equal or greater value than the amount required to purchase it.

The procurement process includes, purchasing, transportation, packaging, warehousing and all activities related to inbound materials. "The procurement department should have trained experts in law and other sciences to assist the firm in buying the best quality items at the lowest possible prices" (Vogt, 2005). This department can be structured in either one of the two forms:

- Centralised- When one person or department in a group of companies is responsible for the procurement of the group's products and services
- Decentralised- When each of the departments or each subsidiaries of the company is allowed to buy its own products and services.

The advantages of centrally controlled procurement systems include: coordinate purchase volumes, reduced duplication of purchasing effort and the development of purchasing expertise amongst others. The authority can provide greater control over large capital expenditures (Monczka, Trent and Handfield, 2002).

According to Monczka, et al (2002), advantages of a decentralised procurement system would include: speed and responsiveness of decisions makers, understanding unique operational requirement and product development support.

Decisions of which form to operate on will vary from one business to another depending on their requirements.

The procurement department has to be managed effectively in order to acquire benefits such as:

- Cost Reduction
- Improved material delivery
- Shorter cycle time, including product development cycle times
- Access to product and process technology
- Quality Improvement

Supply Chain Management is the integration of all activities associated with the flow and transformation of goods, through improved supply chain relationships to achieve a suitable competitive advantage (Monczka, et al 2002).

Suppliers form very important links in the supply chain, therefore it is essential for every business to manage its suppliers properly. To do this, the suppliers have to be analysed, selected, screened, evaluated and chosen carefully.

The relationship formed will ensure that both parties reach a common goal and that the business gets a quick response from its suppliers, which results in negotiated prices and shorter lead times.

In order to reap these benefits, the procurement process in figure 1, has to be followed and understood, (Coyle, Bardi and Langley, 2003).

Procurement Process

```
┌─────────────────────────────┐
│  Needs Analysis             │
│   • Identify needs          │
│   • User requirements       │
└─────────────────────────────┘
              │
              ▼
         ╱ Make or buy ╲ ─────────────────────►  ┌──────────────┐
         ╲            ╱                           │     Make     │
              │                                   └──────────────┘
              │                                          │
              ▼                                          ▼
┌─────────────────────┐   ◄ ─ ─ ─ ─ ─ ─ ─ ─ ┐  ╭──────────────────╮
│        Buy          │                         │   Buy some       │
└─────────────────────┘                         │   components     │
              │                                  ╰──────────────────╯
              ▼
┌─────────────────────────────┐
│  Purchase type              │
│   • Straight re-buy         │
│   • Modified re-buy         │
│   • New buy                 │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────────────┐
│  Select Vendor                      │
│   • Market analysis                 │
│   • Potential vendors               │
│   • Pre-screen potential sources    │
│   • Evaluate remaining sources      │
│   • Choose vendor                   │
└─────────────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Product or service delivery│
└─────────────────────────────┘
              │
              ▼
┌──────────────────────────────────────────┐
│  Post -purchase performance evaluation   │
└──────────────────────────────────────────┘
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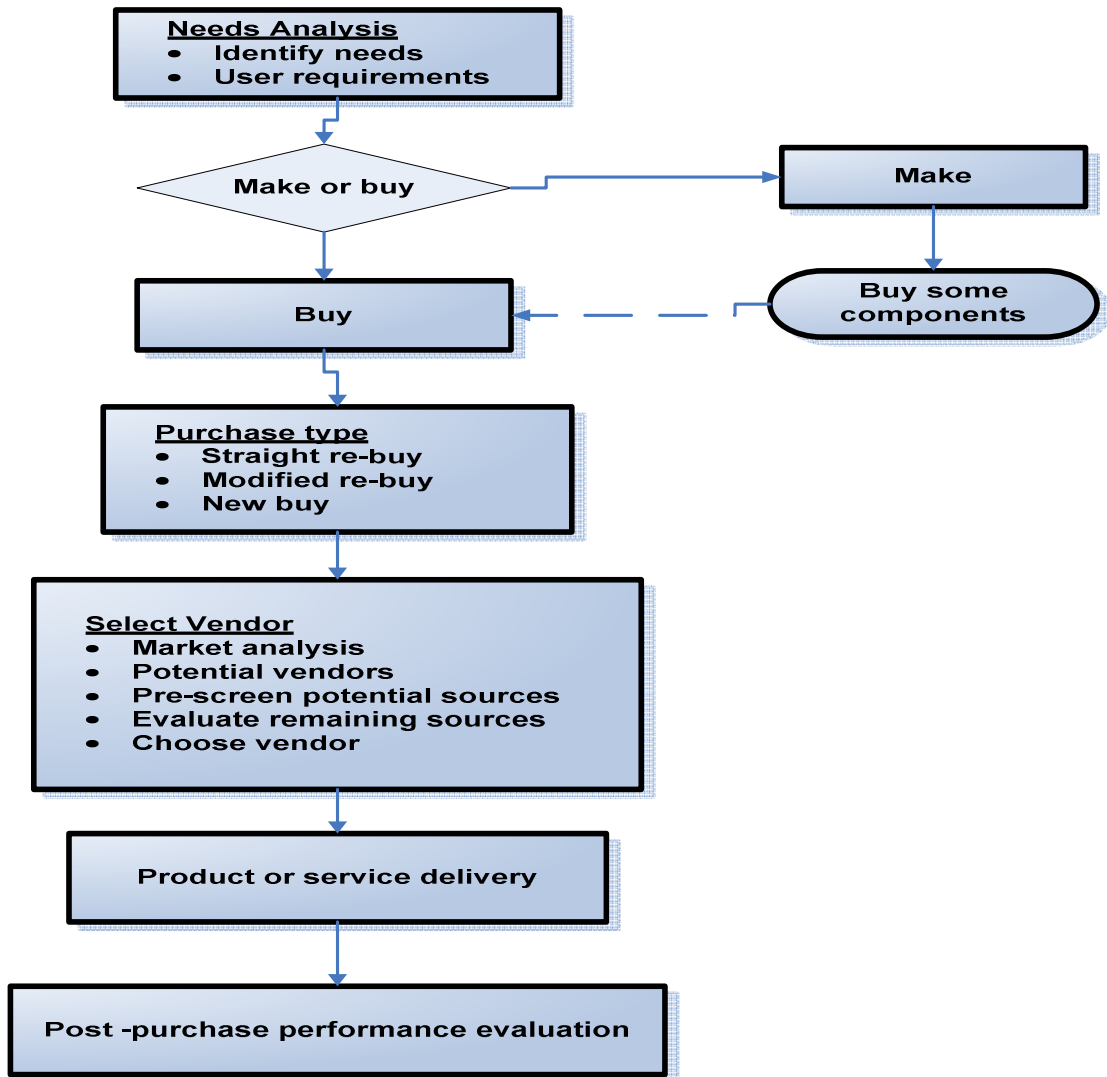
Figure 2: Procurement Process (Coyle, Bardi and Langley, 2003)

The above process however can, however, be altered to meet the requirements of the business.

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2.1.1. PROCUREMENT AT ESKOM

The procurement departments are hybrid, meaning that they have segments of both centralisation and decentralisation. Goods such as furniture, stationery, fax machines and printers can be procured across all divisions on national level with a national contract. This contract is centralised so any of the six existing regions can buy off it. Strategic commodities are items that are bought on departmental level as required by each division, thus making it decentralised. These are items such as, transformers, poles, cables and conductors that are used for individual projects.

The services provided by the department are (Introduction to purchasing, Eskom module number 21188):

- Determining the exact requirements of the organisation in terms of the most economic qualities and quantities.
- Continuously searching for and locating suitable suppliers.
- Placing orders and providing an expediting function to ensure on-time delivery.
- Negotiating with suppliers, as well as selecting and evaluating them in terms of reasonable process and other relevant conditions.
- Conducting purchasing research in order to improve purchasing efficiency.

Once the need or requirement has been identified by the end user, a Purchase Requisition (PR) form is filled in and then forwarded to the logistics department. Appendix A1 shows an example of a PR used at Eskom.

A PR is an internal document completed by a user that informs purchasing of a specific material need (Monczka et al, 2002). Each PR will have a clear description of the required material or service, quantity and date it is required on, estimated unit costs, date of requisition and authorised signatures. This PR will then be loaded on to the system by the user.

The PR document is filled in manually (on paper) and then loaded onto the SAP system. The reason for this is that as the PR goes through the process, it is used as a duplicate check ensuring that the information on the system and on the PR is the same. When the user has loaded the PR on to the system, he or she should go through the warehouse catalogue to check if it is a stock item or not. Stock items are those items that are used for projects, i.e., cables, transformers, etc, while non-stock items include furniture, vehicles, etc. Non-stock items go to the Cost centre manager for approval and then straight to the procurement department. If it is a stock item, it will go to the Cost centre manager for

approval and then to logistics. At the logistics department, a material requirement planner (MRP) will check whether the material is available or not, if it is not at the warehouse it will be forwarded to procurement for buying. A copy of the daily requisitions received by the material's planner when they do an MRP run which checks the availability of material is attached in appendix B. At the procurement department an adviser will receive the PRs, sort out the items and send them to the specific buyer for purchasing. One of the shortfalls with SAP is that if one of these advisors is not available, his\her inbox will pile up with PR's that the other advisors cannot access, which delays the time for the material required.

Every year Eskom negotiates national contracts with a number of suppliers. These suppliers can then be used nationwide for any form of purchase under the value of two hundred and fifty thousand rand (R250 000). For each contract, there is a contract number that must be quoted by the buyer when performing a purchase.

For a purchase where no contract exists, the buyer has to Request for Quotes (RFQ) from at least three different suppliers, evaluate and compare the quotes and then choose a suitable supplier. A contract is then be drafted for the supplier and a Purchase Order (PO), also known as a purchase agreement, will be completed and sent to the supplier.

With purchases that exceed the value of R250 000, suppliers are invited to tender for the specific product or service. The buyer will take the documents and evaluate them commercially, technically and financially on the day the tender closes. A supplier is chosen by the buyer and then a report with recommendations is sent to the tender committee who will award the contract to the supplier who meets the business requirements in terms of cost, quality and time. An order is then placed with the supplier and a PO is faxed to them. The faxing system is slow and not very reliable as the report for confirmation of the fax status could take days hence delaying the process.

On delivery, the order will be reconciled and if the order is correct, payment as stipulated in the contract will be made out to the supplier. The order will either be delivered at the Eskom warehouse or at the project location, where it is required. As soon as it is delivered, it is captured on the system in order to update the units of stock available. Anyone who needs to reconcile the number of items at the warehouse and on the system can do so by physically counting the stock and then comparing it with the number on the system.

If this is a long term contract where the supplier provides a service or products on a daily, weekly or monthly basis, then the contract will be sent to the end user on completion. The end user will release payments as stipulated by the contract continuously until the end of the contract. If the amount needs to be modified for any reason, the user will go back to the buyer, who will go to the tender committee for approval.

The process followed for any purchase in the business is shown in figure 2.
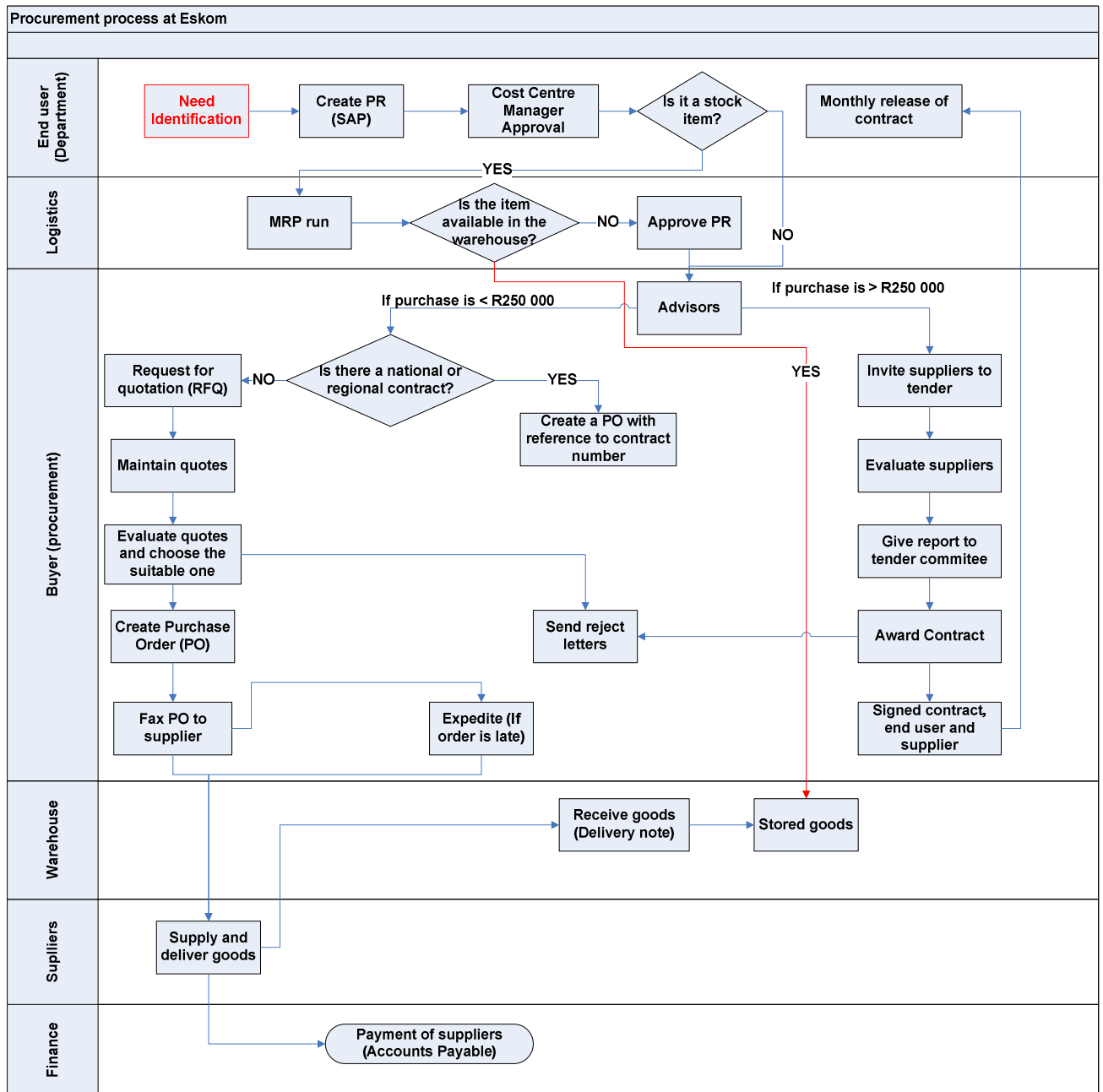
Figure 3: The Procurement Process at Eskom

The process extends further into other processes for vendor management and selection, tendering and awarding of contracts. Figures 6 and 7 below show the processes/cycles for a formal tendering process and an informal tendering process respectively.

Figure 4: Formal tendering process

Budget ⟷ **Business need** → **Description of needs** → **Project strategy** ⟷ **Line permission**

Project strategy → **Compile scope of work/supply** ⟷ **Asset number**

Compile scope of work/supply → **Squad check** → **Contract strategy and sourcing**

Contract strategy and sourcing — Sole source approval → **Tender committee approval** → **Negotiation** → **Contract award**

Contract strategy and sourcing — Competitive enquiry → **Enquiry** → **Evaluation** → **Squad check** → **Adjudication (Approval)** → **Contract award** → **Contract management**

Figure 4: Formal tendering process

Figure 5: Informal tendering process

Budget ⟷ **Business need** → **Description of needs** → **Project strategy** ⟷ **Line permission**

Project strategy → **Compile scope of work/supply** ⟷ **Asset number**

Compile scope of work/supply → **Contract strategy and sourcing** → **Enquiry** → **Evaluation** → **Sole signatory approval (Adjudication)** → **Contract/Order** → **Contract management**

Figure 5: Informal tendering process

2.2. INVENTORY MANAGEMENT

Inventory is the goods and materials held available in stock by a business in order for the business to be able to balance its supply and demand. Vogt (2005) defines inventory as 'the lifeblood' of a business as it is used in the manufacturing of goods and services and part of it is sold to customers directly. It consists of raw materials, components (parts), production consumables, tools, stationery, packaging material and finished goods.

For most businesses, holding inventory can be very costly. Coyle, et al (2003) advice that inventory must only be held by businesses if a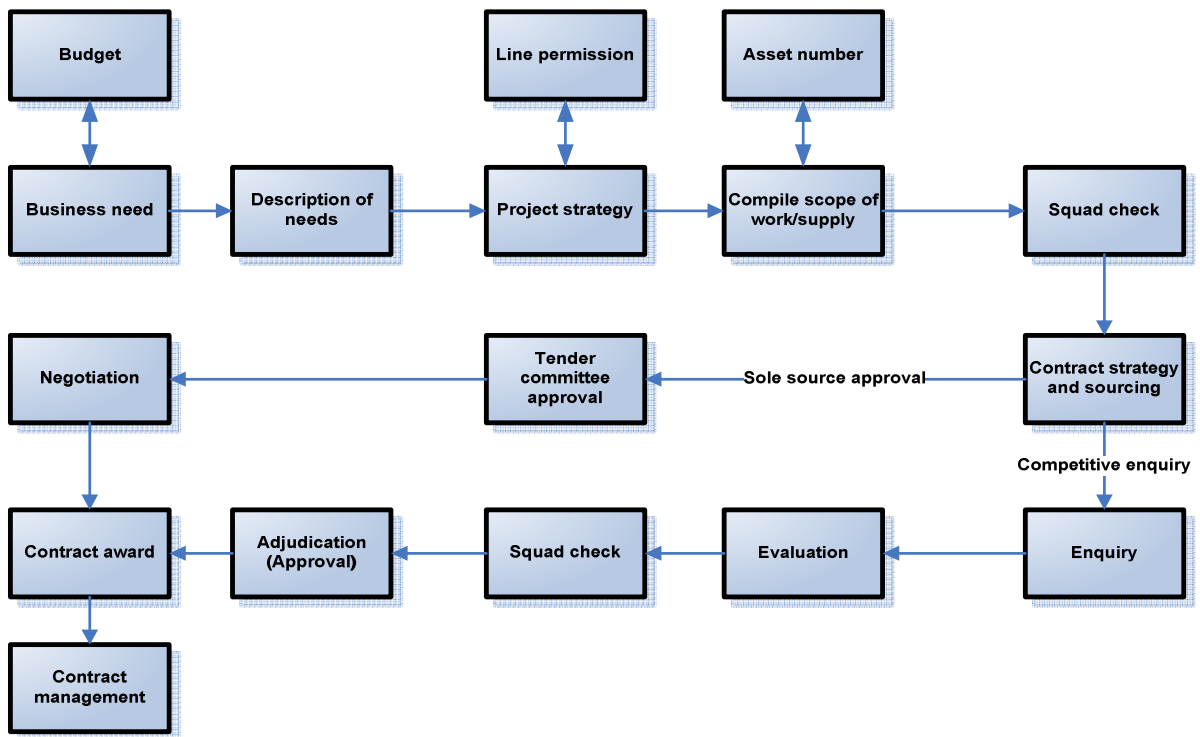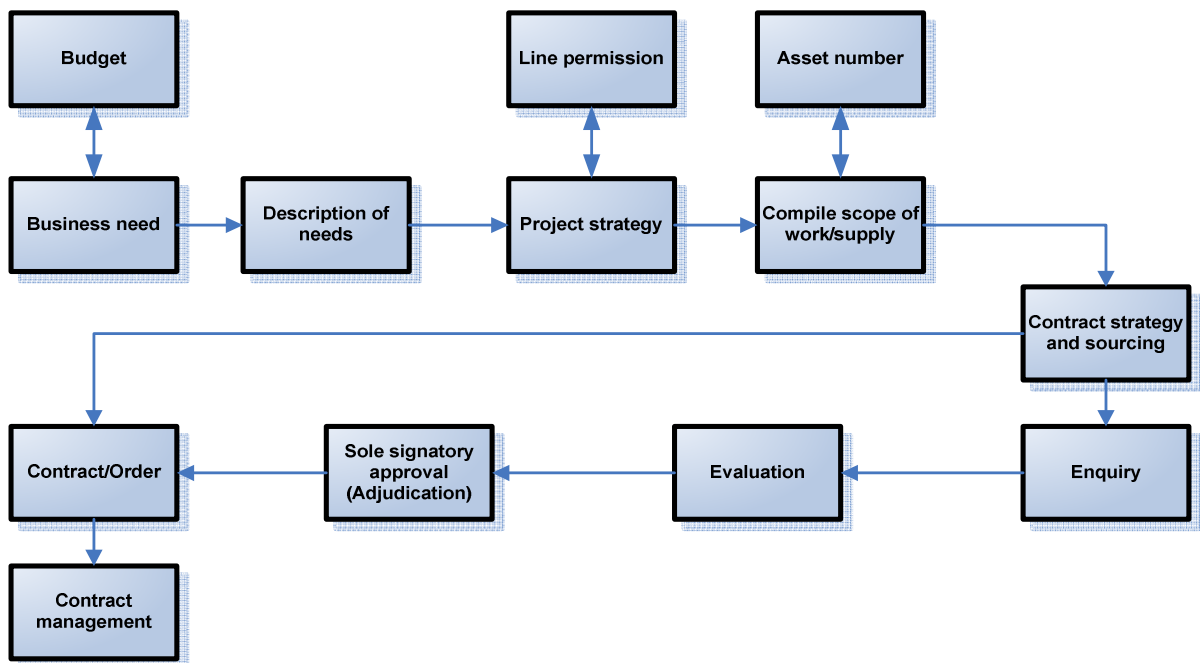nd only if the benefit received from holding the inventory exceeds the cost of holding it. Inventory Management approaches can either be push (which is also called the reactive system) or pull orientated. "The pull approach relies on customer demand to 'pull' the product through a logistics system" (Coyle, et al, 2003).

Inventory should be kept for the following reasons:

- To support production, operational and customer service requirements
- To achieve economies of scale
- To balance supply and demand
- To hedge against market place uncertainty

As demand will differ from one business to the next, it is important for each business to find a way to deal with its fluctuating demand without holding excess inventory to avoid loss.

"Demand forecasting entails estimating the future medium and long-term demand for products and services" (Vogt, 2005). Each product and service that needs to be purchased in order for the business to operate needs to be forecasted.

Inventory can be classified as follows (Vogt, 2005):

- Cycle stock: Arises from the three sources, acquisition, production and transportation, it is used or sold over time.
- Safety of buffer stock: A variety of activities or conditions can cause uncertainty in the demand. To warranty customer satisfaction at all times, this stock should be kept.
- Time/In-Transit and Work-In-Process stock: This stock is usually not considered as part of the firm's asset until they are delivered to the business or finished as complete product in the case of Work-In-Process stock.
- Seasonal stock: As discussed earlier, some products or services are only found during certain seasons, to provide for these products and services off-season, they have to be kept as inventory at all times.
- Anticipatory/Speculative stock: This stock protects the business enterprise against price increases and constrained availability.

Certain costs have to be incurred in order for inventory to be kept. These costs include capital costs, storage space costs, inventory service costs and inventory risk costs.

Common systems such as the ABC Inventory analysis, shown in figure 3 and Materials Requirement Planning (MRP) should be used to improve material flow as explained by Vogt, (2005).

ABC Inventory Analysis
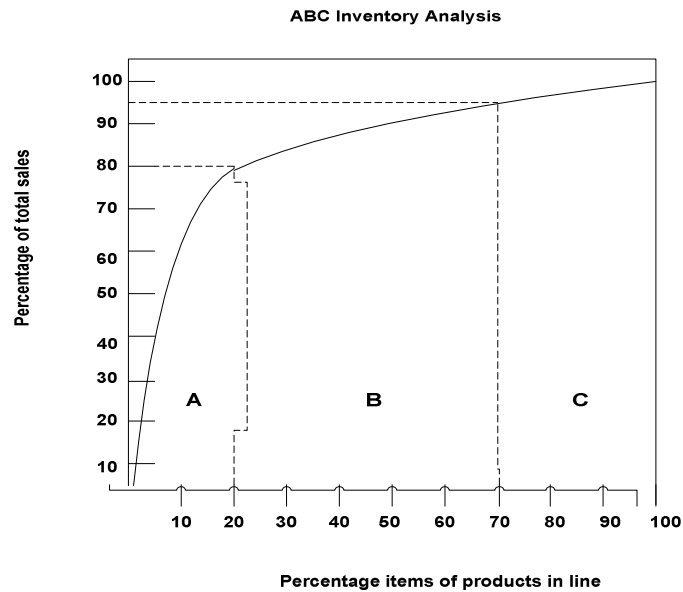
Figure 6: ABC Inventory Analysis

Class A inventory are the 20% of items that account for 80% of the value of Inventory which require more attention. Class B inventory items represent the 50% that account for a further 15% of the total value. The last Class C is the final 30% of inventory items that only account for 5% of the total value.

Coyle, et al (2003) also advances that the MRP programme develops a time-phased approach to inventory scheduling and inventory receipt. This system generates a list of required materials in order to assemble or manufacture a specific number of finished products.

2.2.1. INVENTORY MANAGEMENT AT ESKOM

Inventory is kept at warehouses to balance supply and demand of products required for projects. MRP assists with the scheduling of material and is done at the Logistics department. A requirement is sent to Logistics where the material will be checked at the warehouse. If this material is not available, MRP will be used to balance demand against supply amongst all the warehouses. A copy of a summary of outstanding material that has to be checked and balanced on a daily basis by a demand side scheduler is attached in appendix C. This is the stock that is required for projects but is not yet available at the warehouse. If there is a warehouse in a different Eskom region with the material in stock and there is no demand for that material, the material planner/scheduler is allowed to obtain that material from that warehouse. The material will be transferred on the system and then transported to the warehouse or location where it is required.

At each warehouse, there is a receiving area where the incoming material from suppliers is packed into the warehouse. This material will be stored until it is fetched by the contractors or owners of the project. The store-man will then pick it from where it is stored and place it at the dispatch area, where it awaits the contractor to fetch it.

Each warehouse is also divided into two sections for Capital Projects (new projects) and Maintenance Projects (maintenance on existing assets), which are separate projects and are carried out by different people. This is done so as not to confuse the material on order and in store as these projects use more or less the same form of material.

Poles, cables and measuring devices such as pre-payment and conventional billing meters form part of class A products. Some of the stock in the class B includes pole-mounted transformers and pole-mounted breakers (reclosers). Substation equipment such, a transformers and breakers form class C items.

Eskom does not keep seasonal stock but it has cycle stock which includes all its strategic commodities. Safety stock such as mobile transformers is kept at the warehouse and is normally used for quick electricity restoration. Work in process stock includes stock that is transported to the site of the project.

2.3. THE SAP SYSTEM

Systems Application and Products (SAP) is one of the top Enterprise Resource Planning software packages available for data processing. It aims at efficiency and measures to the bottom line of fundamental, mid-size and today smaller firms by redefining how business should be done (Citylinkspcs, 2009).

SAP Materials Management package system was adopted by Eskom in order to support the procedures and optimise the procurement process as explained by Silango (2009).

The capabilities of this package/system that are required for Procurement and Inventory Management include:

- Allocations of tasks to requirements for procurement offices.
- Procurement process management.
- Contract Management (Contract Duration and Payments).
- Vendor Management.
- Inventory Management (Units of stock available, types of stock available, replenishment required).

Currently Eskom is using SAP for procurement and inventory management as it is a core financial system.

2.4. ESKOM SOFTWARE REQUIREMENTS

Software requirement is defined by Leffingwell D and Widrig D as a software capability,

1. needed by the user to solve a problem to achieve an objective
2. That must be met or possessed by a system component to satisfy a contract, standard, specification or other formally imposed documentation.

Eskom requires software that will fulfil all the elements of the Gartner magic quadrant in order to ensure that this is the best system on the market and that the system will do what it is intended for. This system should also be cost effective for the company and user friendly so as to make sure that all the buyers do not get confused and end up making mistakes that could be costly to the company. This system must not only meet procurement requirements but should be able to be used by all the other departments in the supply chain and in the company, i.e., production.

The Gartner magic quadrant comprises of four elements of system requirements which are:

- Market—which explores if the software is a leader in its market or if it follows trends and trademarks of other products that are in the market. It also checks if the system has unique functions that make it better than the competing systems on the market.

- Commercial—this element checks the company background, compliance to standards and is cost effective. This is done to check if the company is reliable, has a good history, has been making a profit and has its tax clearances in order.

- Participants—this element looks at what other companies use the same software and how those companies have responded to the use of the software.

- Maturity—explores the different functionalities that the software has, i.e. what can the system do, how many quotes can be maintained on the system etc. This includes the system technicality, response times and security measures in place. Other aspects include the system maintenance over time and how long the system can be in operation for.

Care however is taken to express these requirements in terms of the needs of the system and company departments as opposed to in terms of the solution.

CHAPTER 3

SUPPLEMENTARY METHODS AND TECHNIQUES

3.1. PHASE 1

The first phase to execute this project is to analyse the SAP system in order to find areas of improvement on the system. Funds can be allocated to integrate the supplier relationship management function as it will decrease the lead times, improve efficiencies and limit any miscommunications between the suppliers and Eskom. Those suppliers that make use of SAP will be encouraged to register this function on their systems as well to improve their business relationships with their buyers and give them a competitive advantage.

An Information Technology specialist will be consulted to find out how these collaborative functions can be added to the system while keeping the costs as minimal as possible.

3.1.1. METHODS AND TECHNIQUES

Methods and techniques to be used to analyse the SAP system, are discussed below.

Table 2: Methods and Tool/techniques for phase 1

NO.	METHODOLOGY	DESCRIPTION/REASON
1	Business Requirement Analysis	To analyse the requirements, processes, procedures and business environment. To research and evaluate all the functions of the SAP system and find out how they can be improved.
2	Measure Benefit	Cost Effective Analysis to find out all the cost associated with using the SAP system even after improvement.

3.2. PHASE 2

The second phase of the project would be to find a system on the market for procurement and inventory management, which is cost-effective, user friendly and meets all requirements of the procurement processes. This system should have e-procurement functionality for fast and easy remote (internet-wise) communication with different suppliers. An IT specialist will still be consulted for assistance with the software engineering and other technical issues.

3.2.1. METHODS AND TECHNIQUES

Methods and techniques to be used to analyse the alternative system, are discussed below.

Table 3: Methods and Tool/Techniques for phase 2

NO.	METHODOLOGY	DESCRIPTION/REASON
1	Business Requirement Analysis and Process Analysis	To analyse the requirements, processes, procedures and Business Enterprise environment.
2	System Analysis (Gartner magic quadrant)	To research and evaluate all the functions of the system. To find out how the system operates and find advantages and limitations.
3	Measure Benefit	Cost Effective Analysis to find out all the cost associated with using the found system.

3.3. PROBLEM APPROACH

Figure 4, shown below will be applied in the analysis of the processes and the systems.
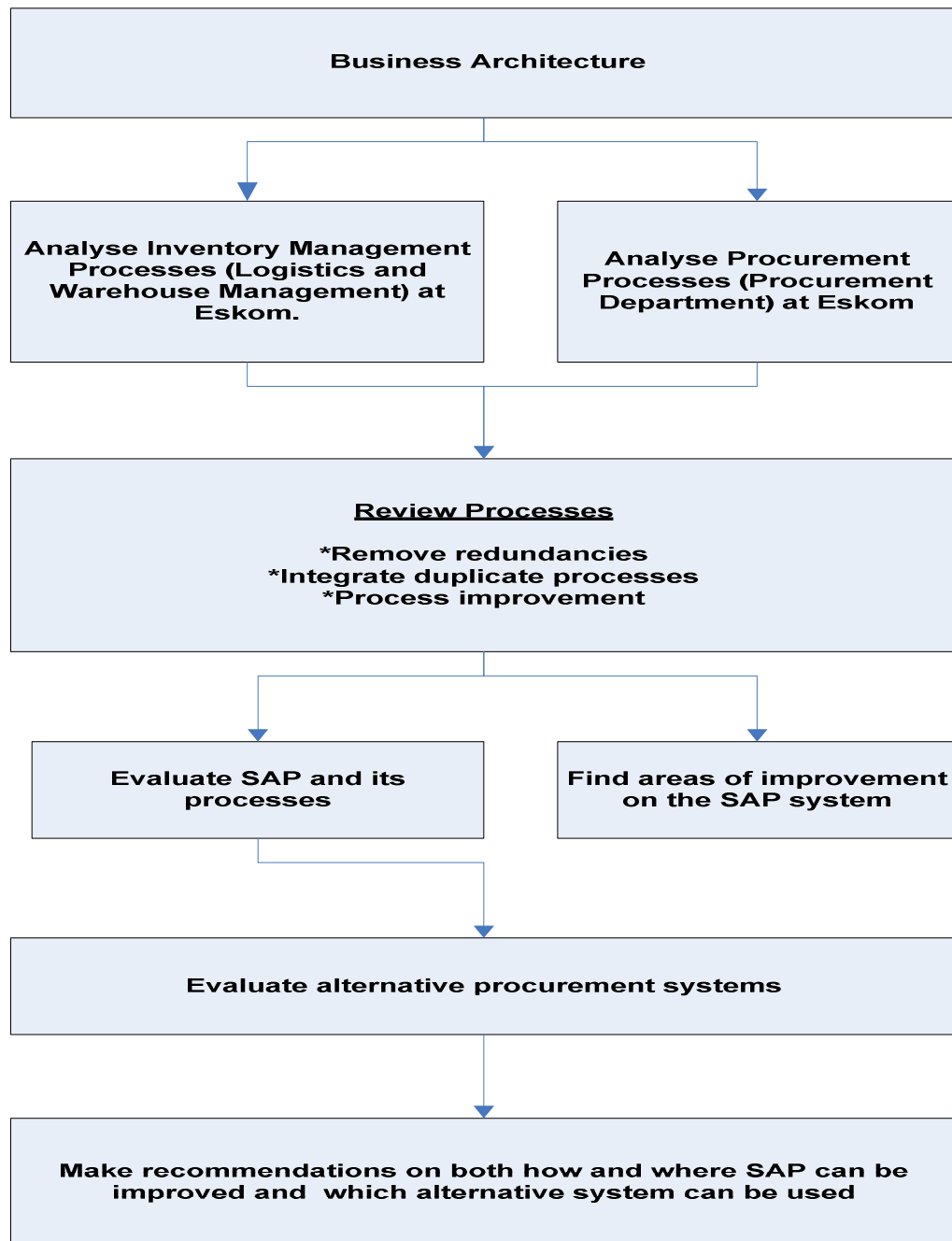

Figure 7: Project flow

The outcome of the analysis will be recommendations, which should be followed in order to improve the procurement and inventory management system.

CHAPTER 4

PROJECT ANALYSIS

4.1. PROCESS ANALYSIS

The analysis was done in the form of interviews with the IT specialists and current buyers to see if and how they understand the process as defined and how they have use it in conjunction with the system. The manuals used for training of buyers in supply chain management and introduction to purchasing were also used in analysing the procurement process as this is the basic framework for the buyers.

Analysing the procurement process that is shown in figure 3, it was found that the process was defined generically in order to avoid misunderstandings and individual interpretations amongst buyers and those who use the process. The process is easy to follow and standard to anyone who works through it and studies it.

Apart from the fact that it defines the process as it should be followed, it was also designed with the software to be used in mind, to illustrate to the buyers how to go about in procuring products.

It was also found that the process:

- was designed to minimise paperwork.
- was modified when the SAP system was adopted in order to align it with the system functions.
- does not have redundancies, repetitions and ambiguities.

The process also comprises of a number of formalities for security measures and to minimise corruption and fraudulent activities in the department.

"Procurement at Eskom is by far the most controlled commercial area and has numerous policies and procedures which buyers have to adhere to at all times" (Supply chain management, Eskom module).

The policies and procedures are put in place because there are huge amount of money involved in the process of buying products and services for the company.

The purpose of the procurement and supply chain management policy is to define the parameters and set out clear basis for the creation and application of appropriate processes and procedures that should result in efficient and value-adding supply chain within Eskom, as defined in the Introduction to Purchasing, module number 21188.

4.1.1. CRITICAL SUCCESS FACTORS

- Communication between buyers and suppliers
- Satisfied suppliers
- Filed documents
- Reports handed in on time
- Lead times not exceeded
- Responsiveness of buyers and managers
- Flexibility of suppliers
- Skilled work force

4.2. SAP ANALYSIS

Eskom adopted the SAP-R/3 system in 1999, as a risk management tool for the Y2K bug or millennium bug and to also integrate the company departments. Prior to SAP-R/3, each department operated on its own system and it was difficult and time consuming to communicate and send information to different departments. This system was chosen as it met all the requirements of the Gartner magic quadrant when they evaluated it before the adoption. On implementation, the system managed to put all the applications of the business together and was Y2K compliant.

SAP-R/3 is explained as a computer system that is designed to support complete business management tasks of a corporation, company or institution. This system is used in business to handle invoice payment, production resource management and financial control (exforsys.com, 2009). This system has application modules which are described by acronyms such as MM (materials management) and SD (sales and distribution).

In 2004/2005, Eskom upgraded to the SAP Enterprise Resource Planning system (ERP) which is an upgrade on the SAP-R/3. The ERP system embedded best practices for doing all applications in the different departments. The departments that are integrated by the system are shown in figure 6.

Figure 8: Integrated departments on the SAP ERP

Each department has its own module and applications in the system to support its functions and the training provided for different departments on the system depends on the need of the department.

Currently the application modules used at Eskom in different departments are (Academic, 2009):

- Financial Accounting (FI)—is designed for automated management and external reporting of general ledger, accounts receivable, accounts payable and other sub-ledger accounts with a user defined chart of accounts.
- Controlling (CO)—represents the company's flow of cost and revenue. It is a management instrument for organizational decision and it is automated and updated as events occur.
- Assets management (AM)—designed to manage and supervise individual aspect of fixed assets including purchase and sales of assets, depreciation and investment management.
- Project System (PS)—is designed to support the planning, control and monitoring of long-term, highly complex projects with defined goals.
- Workflow (WF)—links the integrated SAP application modules with cross-application technologies, tools and services.
- Human Resources (HR)—is a complete integrated system for supporting the planning and control personnel activities.
- Plant Maintenance (PM)—in a complex manufacturing process, maintenance means more than sweeping the floors. Equipment must be serviced and rebuilt. These tasks affect the production plants.
- Materials Management (MM)—supports the procurement and inventory functions occurring in day-to-day business operations such as purchasing, inventory management, re-orders point processing, etc.
- Sales and Distribution (SD)—helps to optimise all the tasks and activities carried out in sales, delivery and billing. Key elements are, pre-sales, support, inquiry processing, quotation processing, sales order processing, delivery processing, billing and sales information.

Figure 7 shows the business or enterprise operations of the SAP modules and applications.

The costs for operating the system are given in table 4.

Table 4: SAP System costs

Cost application	Year	Cost in Rand
Implementation cost	1999	273 million
Upgrade costs (v.3.1 to v4.6)	2004/2005	47 million
Licence cost	22% of purchase cost	60 million
Maintenance	2005-till date	21 million/year
Support: (Hardware maintenance, outsourcing costs and labour and training costs)	2005-till date	110 million/year

Eskom has an internal system support and maintenance department known as the Business Applications Solution Centre (BASC) which was established in 2004 and is located at the Eskom Academy of Learning in Midrand, Johannesburg.

BASC was established to provide strategic shared services for project and application management in their systems. The services offered include (Eskom, 2009):

- Application service support
- System bug fixes Bug
- Queries assistance
- User training
- Development requests
- Information requests and
- Outsourced technical support at Arrivia

The SAP ERP system is fully automated and once the PR is loaded on the system by the user, it is automatically forwarded to the next person (manager) for approval. The system has a workflow engine meaning that the signatures for a PR or any document are unlimited.

The company decides how many signatures they want on a PR then BASC will authorise it on the programme for control purposes. If the company decides they need more signatures or approvals on the PR, they simply fill in a request form to BASC and the signatures are increased on the system. The PR progresses on the system to the subsequent persons until it reaches the buyer who has to make a PO with reference to the PR and then automatically fax it to the supplier. The system has a supplier database and an automatic fax application where the buyer can simply add the supplier to the fax list and the system will automatically fax the PO to the supplier.

When a buyer sends out requests for quotations to the suppliers they should also put the suppliers on the system so that when the quotes return, they can maintain the prices and suppliers for future reference. The system also has an unlimited number for buyers to maintain quotes, so the buyer can maintain as many quotes on the system as it is needed for the item.

Security measures for the system include, user name and pass word requests, authorisation requests for different applications, error messages and confirmation messages.

At present, the operations and modules in the procurement and inventory management are interfaced with other systems like Maximo, which is a plant maintenance system and Pilog, which is a materials catalogue system. Other modules also have their interfaces with other systems.

4.3. ALTERNATIVE SYSTEM ANALYSIS

Accpac Africa was established in 2000 by Accpac International's acquisition of Jeremy Waterman's IT solution company in sub-Saharan Africa, which was established in 1989 (itweb.co.za, 2009). In 2004, Accpac Africa became Softline ACCPAC through its acquisition by the Sage group Plc which is the leading supplier of accounting and business management software solutions and services to 5.5 million clients world wide (itweb.co.za, 2009).

Business management applications include financial, distribution and warehousing, customer relations management (CRM), project non-alignment, service management, manufacturing and retail management solutions including reporting and business intelligence are provided by the Softline ACCPAC system (itweb.co.za, 2009).

Some of the product lines provided by this system are Accpac CRM, Accpac ERP and Accpac with new additions to the Sage family such as Sage ERP X3. Business analysis suite and these products are delivered to 130 countries through network solutions providers worldwide including over 150 through out Africa.

Analysing this system through the Gartner magic quadrant, it is found that:

Market:

Softline technology has a 16 year track record as a market leader focused on the development of accounting, payroll and CRM software solutions while the Sage group Plc has a much longer experience and track record in software worldwide. The Softline Accpac products are also part of the leading brands that Softline technologies and Sage have in store.

Commercial:

Softline was founded in 1988 and was established and listed on the Johannesburg Stock Exchange (JSE) Securities Exchange South Africa in February 1997. This shows its compliance to standards and regulations as any company is thoroughly investigated before being listed on the JSE. The Company has been expanding their product lines through the software industry since. They are also in compliance with the generally accepted accounting practices (GAAP).

Participants:

Companies in the engineering sector that have adopted the Softline products include, Anglo gold, De Beer diamonds , Total, BHP billiton and Rand gold resources. This shows that they have a good track record and that their products are reliable and usable.

Maturity:

"The Softline Accpac ERP system is a sophisticated, robust accounting and operations system for small and midsize businesses" (Accpac.co.za/brochures, 2009). The company has an option of using the modules required initially and then add on the other available modules as their need expands over time.

The modules included in the ERP system pack are (Accpac.co.za/brochures, 2009:

- Accounting and Operations which includes, accounts receivable, accounts payable, general ledger, intercompany transactions, multi currency, national accounts, order entry, project and job costing, purchase order, inventory control/management, return merchandise authorisation (RMA), system manager, transactional analysis and GL consolidation. All these applications come with standard reports.

- Business Intelligence consists of insight and cash book management applications. Insight is an enterprise-wise reporting; budgeting and consolidation application while the cash book management application maintains the company bank account and maintains the cash flow.

- CRM includes sales and marketing automation, customer care, outlook integration and offline synchronisation.

- Fixed Asset management is a complete asset solution to manage and control all company assets. The D-bit application provides, method of depreciation, automatic calculation of prior period assets, asset projections, web updates and a web based asset viewer function.

Softline technology has recognised training centres in South Africa in Johannesburg, Pretoria and other provinces. These centres operate as training centres and support centres for all client queries and user assistance.

The type of training and the environment will depend highly on how many users going for training and how the company wants the training to be structured.

The advantage of adopting Softline Accpac ERP comes in with annual cost savings as the company is smaller than SAP and their costs are still low with the annual costs of operation being approximately a third of the current SAP operational costs. Other   benefits include the fact that they have one employee who specialises on a full module, i.e. finance, who they can place in the company to support the users instead of having different people who specialise in different fields of the same module.

The system is also capable of handling any interface that the company has without damaging the interface.

CHAPTER 5

5.1. RETAIN THE SAP SYSTEM

The main recommendation would be to retain the SAP system in the company as it is the most effective and efficient solution for the company. The reason for this is that the system still has functional capability and the applications it provides are not utilised fully which causes the gap between the need and the solutions it provides. The other reason is that the cost implications for getting a new system are much higher and even though they would prove to be more cost effective than SAP, it would take a long time to break even on the new system.

5.1.1. PROBLEM SOLUTIONS

Looking at the problems in Chapter 1.4 on page four, the following solutions were found:

1. Analysis on the business process and on the system process was done and on completion of the analysis, the two processes were overlapped to see what their percentage fit was. Appendix D1 shows a table/matrix were the mapping of the two processes is done. The procurement processes are taken and the SAP functions that are used for these processes are shown. For manual processes, i.e., the tendering process, the functions are not applicable. From this table, a chart of the percentage fit for these two processes is found and shown in the chart in figure 9.

Process &function mapping

Non-Available functions 4%

Processes 96%

- Processes
- Non-Available functions
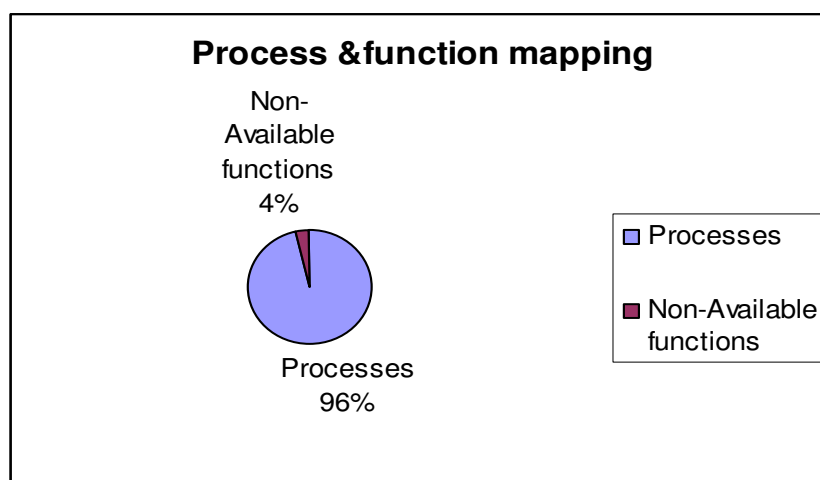
Figure 9: Percentage fit for Eskom and SAP processes

From the table and chart, it was found that the processes have a percentage fit of 0.96, meaning that the functions not available for processes are very small in number, proving that the processes are aligned.

The processes also have the same functionality to support the daily operations of the business. Their functional relationships are shown in a functional model as shown in parent functional model diagram in figure 10 below. The child functional diagram which shows the different processes is shown in Appendix D2. As shown in the parent diagram, these two processes have the same input, mechanisms, and output and are both controlled by Eskom's policies and procedures, which keeps them aligned.
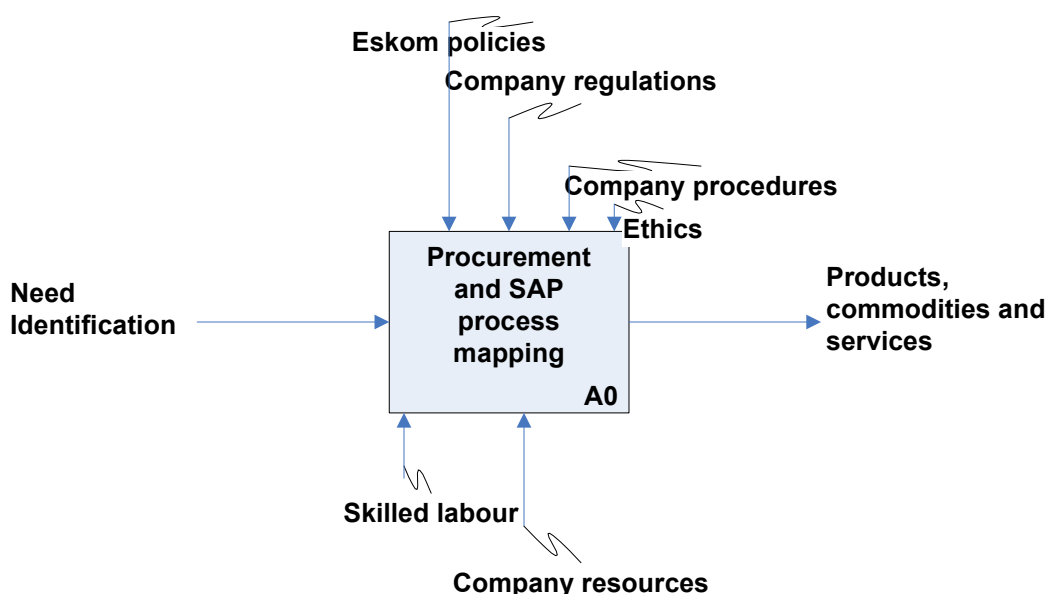
Figure 10: Parent functional model diagram for process mapping

2. The high maintenance costs are standard for all companies using the SAP system and the reason the costs are high is that it is a world accredited and highly rated company with costs that are charged globally. They increase with the number of users whether professionals or limited professionals.
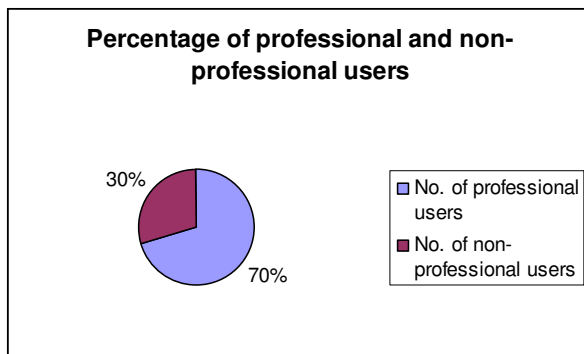
Figure 11: Percentage of professional and non-professional users

Currently Eskom has approximately a total of 37857 employees of which 30000 of them are all SAP users. This means that 79 percent of Eskom employees are registered on the system. Figure 11 above shows the relation of professional and non-professional users. In order for the company to decrease the maintenance costs, they can train the professional users to do other jobs done by non-professional users in order to decrease the number of users for the system. The non-professional users' functions can also be consolidated per department to have two to four people in a department working on SAP. This would reduce the R2.1 million per year;

- R21 000 000*0.3*1/3
  =R2 100 000per year.

3. Currently there are three SAP courses that buyers have to go through.
   - PR1-For end users, to create PRs, make good receipts and tracking of PRs on the system
   - PR2-For buyers, to create RFQs, maintain and evaluate quotes and make price comparisons.
   - PR5-Reporting, to draw reports on the system.

The cost of these courses is R1000/person/course independent of how many days the course is and the employee's department will pay for the cost including transportation and accommodation. The course is structured in a way that the employees sit in front of a computer and go through the SAP processes following the instructor. On completion of the course, the employee will receive a study manual that will assist them with the processes when get back and an on-line tutorial is

available where the employees can go through step-by-step proceedings with   the assistance of a tutor.

It is suggested that a refresher course be available for the users after every four-five years after training to familiarise them with any upgrades made on the system and to refresh the system functionality. These courses can be done in such a way that the trainer is called to the employees' premises so as to avoid accommodation and travelling costs. The course can also be for a day and be charged at half the price of the original course which is R500/person. The refresher course will be beneficial in reducing the human error and different user interpretation.

4. The SAP system does provide an automated fax solution were the users can retrieve the supplier details from the system and with a click on the fax button the system will fax the PR or RFQ to the supplier and receive confirmation on the system that the fax is received and viewed. The problem comes in where the users print out the copy and fax it manually to the suppliers and after this phone the supplier to make sure that they view the fax.

 The SAP SRM is a SAP business suite application that automates, simplifies and accelerates procure-to-pay processes and it cannot be used as a full substitute for faxing unless the suite application is operational (SAP.com).

5. The system has a proxy domain that can be switched on by the releaser when they are out of the office which enables other releasers or the manager to view their inbox and check for any PRs or mail related to procurement in the inbox. The proxy can be switched off by the releaser when they get back to the office.

5.2. COST IMPLICATIONS

Taking into account the changes in the inflation rate over the years since the SAP system was adopted at Eskom, the current net present value (NPV) for this system is calculated as follows:

Table 5: NPV calculations for the SAP system

	Period	Year	BTCF	Rate	NPV(Per period)	NPV
SAP system	0	1999	-273000000	5.2%	R -273,000,000	273
	1	2000	-70060000	5.4%	R -322,078,356.96	322.07836
	2	2001	-70060000	5.7%	R -380,311,756.82	380.31176
	3	2002	-70060000	9.2%	R -411,824,429.85	411.82443
	4	2003	-70060000	5.8%	R -488,545,590.76	488.54559
	5	2004	-70060000	1.4%	R -600,645,844.04	600.64584
	6	2005	-128060000	3.4%	R -672,152,126.76	672.15213
	7	2006	-49173200	4.7%	R -679,774,254.19	679.77425
	8	2007	-49173200	7.8%	R -641,783,361.09	641.78336
	9	2008	-49173200	12.7%	R -568,486,603.10	568.4866
	10	2009	-49173200	11.3%	R -608,356,035.89	608.35604

Table 6 below shows cost differences between the SAP system and the Softline ACCPAC that were found through analysis.

Table 6: Cost comparison between software

COST COMPANY	SAP ERP	Softline ACCPAC ERP
Software cost	R608 million (2009)	R250million (2009)
Maintenance cost	R21 million/year	R17 million/year
Licence costs	22% of original sale price	17% of original sale price
Upgrade costs	R52 million (2009)	TBD

Considering the worst case scenario (inflation increase) and the best case scenario (inflation decrease) over the years and assuming an increase/decrease by a rate of one percent every year for the next ten years, a future NPV value for the ACCPAC system is calculated. This value also takes into consideration an estimated initial training fee and software interface

approximation costs that would be incurred with the adoption of the Softline ACCPAC system. Table 7 shows the estimated NPV of the ACCPAC system in 2019 for the case of an increase in inflation over the years.

Table 7: The estimated NPV for ACCPAC in 2019

	Period	Year	BTCF	Rate	NPV(Per period)	NPV
Softline ACCPAC	0	2009	-422500000	11.3%	R-422500000	422.5
	1	2010	-83050000	12.3%	R -442,078,090.35	442.07809
	2	2011	-83050000	13.3%	R -494,701,965.10	494.70197
	3	2012	-83050000	14.3%	R -537,484,762.50	537.48476
	4	2013	-83050000	15.3%	R -570,836,321.49	570.83632
	5	2014	-83050000	16.3%	R -595,475,416.74	595.47542
	6	2015	-83050000	17.3%	R -612,332,683.07	612.33268
	7	2016	-83050000	18.3%	R -622,458,079.32	622.45808
	8	2017	-83050000	19.3%	R -626,939,704.32	626.9397
	9	2018	-83050000	20.3%	R -626,838,158.87	626.83816
	10	2019	-83050000	21.3%	R -623,138,165.97	623.13817

With these two calculations of system NPVs, a break-even analysis is done to find out when the costs for the software would break-even as shown in figure 11, meaning that the money lost by Eskom for the SAP system is covered at that point by the new system.
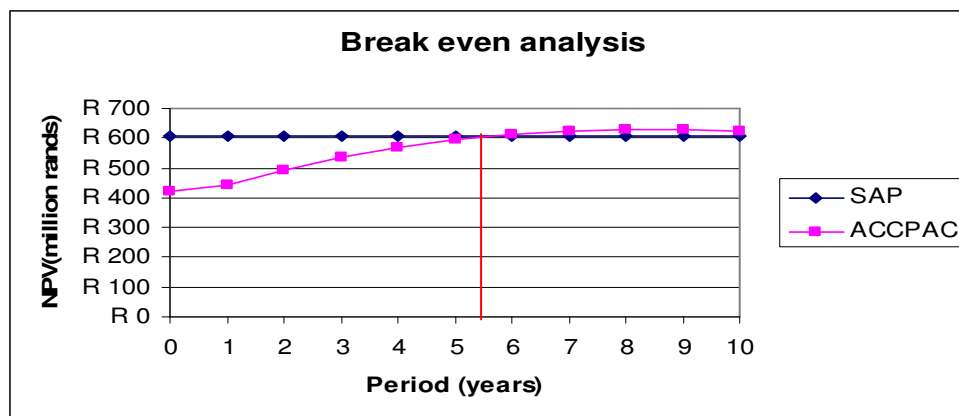
Figure 12: Software break-even analysis

From figure 11 and Appendix E it is seen that the costs of the two software systems will only break-even after five years of operation of the new system. This means that the new system will have to be in operation for a period of five years before the costs that were lost through

the use of the SAP system can be written off also taking in mind that with the change in inflation, these years could be slightly less or higher.

This analysis supports the suggestion that with the current economic situation, it would be cost-effective for the company to retain the current software and work on improving the system instead.

5.2. RECCOMENDATIONS

1. NEED ANALYSIS

As explained that when this system was adopted in 1999, it was a risk management tool against the Y2K bug and to integrate the main company departments, and these requirements were met. As the years progressed, the system has been upgraded to get better functionality. The SAP system still has more functions that can be used to improve the company's productivity and efficiency.

All the departments concerned should re-define what their current requirements are in terms of their current needs as departments. These needs and requirements must then be taking to the IT department or BASC and be looked at in terms of the functions that the system provides. Each department has to be upgraded on the system to suit their needs and requirements. This will ensure that the full potential of the system is explored and utilised by the company.

Other suites such as the SAP SRM, Customer Relationship Management and Supply chain management can then be explored and used to make daily operations simpler, faster and more efficient.

2. E-PROCUREMENT & E-MAIL

E-procurement is defined by procurement.pretosa.com as "the business-to-business purchase and sale of supplies and services using the internet".

Procurement.petrosa.co advances to explain that e-Procurement and e-mail share the following benefits:

- Automation and simplification.
- Reduced cycle times leading to increased productivity.
- Improved tracking and transparency.

Currently Eskom uses procurement to buy small and non-expensive items through procurement. E-procurement can be explored further to accommodate the purchasing of more expensive and bigger items that have longer lead times in order to reduce these times.

E-mail can also be used as a fast modem to get the PRs to the suppliers and to get the RFQs to the suppliers. E-mail is reliable, fast and effective but the shortfall is that it depends on how often the recipient checks their mail. If the suppliers know that they will receive RFQs over their mail, this will be encouragement for them to check their mail regularly and it is much easier for them to attach quotation documents and mail them back to the buyer.

The procurement processed can be streamlined through the use of e-procurement and e-mail to get on-time purchase orders and delivery dates that are met.

CHAPTER 6

CONCLUSION

From the analysis done on this project, it was determined that the Eskom processes and the SAP processes are properly aligned and have a 0.96 percentage fit. The SAP system can still be used by the company in the departments that have been using it and they can do more to integrate other departments and sections by making use of more SAP business suites. There is much more potential in the SAP system currently used by Eskom. This potential comes in the form of more applications and functions that need to be explored further and in more detail.

The company should however first look at their departmental need and see which areas in these departments have gaps and more requirements. Recognition of these gaps will assist the BASC section to explore the different business suites that SAP has to offer and put these functions and applications into use so as to close the gaps in the departments to meet their needs.

Other measures that were found to be useful in making sure that the system is used effectively include refreshment training courses for the users in order to mitigate the human error element.

E-procurement and e-mail was also found to be means that are not fully utilised and the increase use of these systems will prove to be beneficial to the company as they are fast and reliable. The increased use of e-procurement and e-mail systems can reduce lead times through their automated simplification.

Although other systems exist on the market that can do everything that the SAP system can do, it was found that SAP is currently the most efficient system for the company. It is not; however, the most cost-effective system on the market but adopting a new system will be costly for the company. To make the system more cost-effective for the company, minor internal problem areas can be solved.

CHAPTER 7

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APPENDIX A

A- Purchase Requisition Form
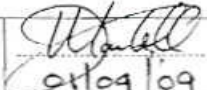
⊛ Eskom	CORPORATE SERVICES SUSTAINABILITY AND INNOVATION PURCHASE REQUEST	DATE OF REQUEST 29.08.08	Document Number

Please specify the nature of the request by inserting a Bold Uppercase X in the appropriate block:

New Contract	X	Purchase Order		Tender		Request for Information	Request for Proposal	Direct Foreign Supplier
Contract Modification		Contract No				Sole/Preferred Supplier	Vendor No.	

Purchase Request (PR No.) (Mandatory only on signed copy)	10306006	Asset No. (If more than one asset reference and attach spreadsheet with asset and appropriate numbers)

NB.
i)   Paste this entire unsigned document into the Internal Text Box of the SAP Purchase Request.
ii) Fax through signed copy to Corporate Buying to Fax (011) 800- 5220/2509

Project Name:	Centre for Carbon Capture and Storage				
The services / products are (short description)	Establishment of a Centre for Carbon Capture and Storage in SA				
Budget Commitment (available R)	R5 million				
Cost Assignment (Cost Centre or Asset Number)	CC/WBS	188700		GL Acc:	450307
Actual / Estimated Cost (2 yr Total)	Total per annum R1 000 000 spread over five years				
Period of service to be rendered	April 2009 – March 2014				
Deadline Date (Latest date by when service / product is required)	End of April 2009				
Physical address/es where service / product must be rendered / delivered and contact persons names and contact details (where applicable)	Corporate Services - ERID – TS&P ERIC Building, Lower Germiston Road, Rosherville, Johannesburg, Gauteng, South Africa.				
Name of person who created the PR	Zelda Martin				
Requester Name and Surname	Barry MacColl		Signature:		
Designation	Senior Manager		Date:	01/04/09	
Requester's Contact Numbers	Tel:	629 5585	GroupWise Address	barry.maccoll@eskom.co.za	
Person responsible to manage the contract (Eskom Employee)	Barry MacColl		Signature		
Designation:	Senior Manager		Date:	01/09/09	
Person responsible to approve payment (cc/wbs owner)	Wendy Poulton		Signature:		
Designation:	General Manager		Date:	wendy.poulton@eskom.co.za 2/4/09	
Approval in terms of delegation of authority	Name:		Wendy Poulton		
Corporate Services Division	Designation:		General Manager		
Max approval level of employee	Signature:				
R 5 000 000	Date:		2/4/09		

APPENDIX B

B-A list of material to be ordered

Requisitions have been actioned but Procurement haven't done anything yet..

Plan no #

Material Reqisn. S C R Qty	Item I A	Short text Requested qty. Ordered qty	Un	Delivy. date Release date	Un	Requester Trackg.no.	Pgp	Mat gp Plnt SLoc SP1 MC
0012720 1000963169 N R V RV	00010	BKR 132kV 2500A 31.5kA 3P 20 60 EA		18.02.2009		NJ Muda) JOSEPH	PBO	ELEPOWER 5710 5010 N6
0012972 1001003838 N B V NB	00010	ISOL 132kV 2500A 25kA 2 EA		11.01.2010 D 29.06.2009		D6150 PBO NORTHERN MRP		SWITCHGEA 5720 N6
0016958 1000989953 N B V NB	00010	OVERALL, WORKWEAR 2PC J54 BLUE 92 100 EA		11.08.2009 D 26.05.2009		NORTHERN MRP JOSEPH	PBO	SAFETY 5715 5000 N5
0170064 1001003313 N B V NB	00010	ISOL 22kV 400A 12kA P/S 31 105 EA		10.11.2009 D 29.06.2009		D6156 PBO NORTHERN MRP		SWITCHGEA 5525 N6
0170231 1001003857 N B V NB	00010	BKR KIOSK 33kV 800A 20kA 20 2 EA		10.11.2009 D 29.06.2009		D6266 PBO NORTHERN MRP		SWITCHGEA 5720 5010 N6
0171647 1001003640 N B V NB	00010	ED SOCKET, STANDARD (COMMON BASE) 222 EA		24.08.2009 D 30.06.2009		D3171 PBO NORTHERN MRP		METERS 5715 N6
0171694 1001003717 N B V NB	00010	METER,STD ED KEYPAD 60A 1,241 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5715 N6
0171694 1001003866 N B V NB	00010	METER,STD ED KEYPAD 60A 1,056 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5720 5010 N6
0171706 1001001509 N B V NB	00010	METER,STD ECU KEYPAD 20A 1,000 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5510 5015 N6
0171706 1001001510 N B V NB	00010	METER,STD ECU KEYPAD 20A 560 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5510 N6
0171706 1001001511 N B V NB	00010	METER,STD ECU KEYPAD 20A 3 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5510 N6
0171706 1001003682 N R V NB	00010	METER,STD ECU KEYPAD 20A 1,000 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5710 5015 N6
0171706 1001003799 N B V NB	00010	METER,STD ECU KEYPAD 20A 44 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5720 N6
0171706 1001003800 N B V NB	00010	METER,STD ECU KEYPAD 20A 2,069 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5720 N6
0171706 1001004102 N B V NB	00010	METER,STD ECU KEYPAD 20A 1,198 EA		28.08.2009 D 30.06.2009		D3145 PBO NORTHERN MRP		METERS 5720 N6
0171710 1001001438 N B V NB	00010	PASSIVE BASE UNIT,ECU/CBU WITH RAIL 100 EA		16.04.2009 D 28.08.2009		D3171 PBO NORTHERN MRP		METERS 5510 5015 N6
0172080 1000968224 N B V NB	00010	RAINCOAT,NAVY BLUE 3/4 SMALL 100 EA		16.04.2009 D 26.02.2009		NORTHERN MRP JOSEPH	PBO	SAFETY 5525 5000 N5
0182639 1001003801 N B V NB	00010	ISOL 33kV 1600A 20kA H/O 20 8 EA		10.11.2009 D 29.06.2009		D6157 PBO NORTHERN MRP		SWITCHGEA 5720 N6
0218655 1000989477 N R V NB	00040 F	RATCHET HOIST NYLON STRAP 1814Kg 6 EA		13.07.2009 D 22.05.2009		D12060 PHO RONICA AR92052009		MISCELLAN 5710 5050 OB7
0218655 1000989481	Info rec 00180	5300035605 Vendor 8011000144 Purch.org. 5000 RATCHET HOIST NYLON STRAP 1814Kg 6 EA		D 13.07.2009		D12060 PBO China		MISCELLAN 5710 5050

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APPENDIX C

C- Summary of outstanding reservations (material)

Summary of Outstanding Reservations

Plant Sloc	0-3 days Stock Avail	Stock Unavail	4-7 days Stock Avail	Stock Unavail	8-14 days Stock Avail	Stock Unavail	15-21 days Stock Avail	Stock Unavail	22-30 days Stock Avail	Stock Unavail	30 days plus Stock Avail	Stock Unavail
5720 5010	60	18	49	9	51	10	18	1	80	21	63	79
5720 5015	11	1	2	-	6	-	1	-	12	-	12	-
Totals	(78)	19	(51)	9	(57)	10	19	1	92	21	75	79

Number of days the WO has been outstanding for.

APPENDIX D1

PROCESS MAPPING TABLE

Department	NO.	Process	SAP function and code	SAP module
End user (Department)	1	Need Identification	Not applicable	
	2	Create PR	Purchase Requisition (ME51N)	Materials Management (MM)
	3	Cost Centre Approval	ME53N	Materials Management (MM)
	4	Stock Item or not	Not available	
	5	Monthly release of contract	Release (ME21N)	Materials Management (MM)
Logistics	6	MRP run	Inventory Management (MD06/05	Materials Management (MM)
	7	Stock Overview (Is material available or not)	Inventory Management (MMBE/MD04)	Materials Management (MM)
	8	Aprove PR	ME53N	Materials Management (MM)
Procurement (IF purchase < R250 000)	9	National or regional contract.	RFQ (ME33K)	Materials Management (MM)
	10	Create PO with reference to national or regional contract number	PO (ME21N)	Materials Management (MM)
	11	Request RFQ	RFQ (ME41)	Materials Management (MM)
	12	Maintain quotes	RFQ (ME47)	Materials Management (MM)
	13	Evaluate quotes and choose the suitable one	RFQ (ME43)	Materials Management (MM)
	14	Send reject letters	Eskom custom reports (ZL 25 RFQ)	Materials Management (MM)
	15	Create PO	PO (ME58)	Materials Management (MM)
	16	Fax PO to supplier	PO	Materials Management (MM)
	17	Expedite if orders are late	Custom reports (ZL 26/03)	Materials Management (MM)
Procurement (IF purchase > R250 000)	18	Invite suppliers to tender	Manual process done by tender committee	
	19	Evaluate suppliers	Manual process done by tender committee	
	20	Give report to tender committee	Manual process done by tender committee	
	21	Award contract	Manual process done by tender committee	
	22	Sign contract	Manual process done by tender committee	
	23	Load contract	Contract (ME31K)	Materials Management (MM)
Warehouse	24	Receive Goods	MIGO	Materials Management (MM)
	25	Store goods	MIGO	Materials Management (MM)
	26	Dispatch	MIGO	Materials Management (MM)
Finance	27	Payment of suppliers	APS	Accounting

	Flowchart Key	
		Decision
		Manual Input
		Manual Operation
		Terminator

APPENDIX D2

PROCESS MAPPING FUNCTIONAL MODEL

PARENT DIAGRAM

Eskom policies

Company regulations

Company procedures

Ethics

Need Identification

Procurement and SAP process mapping

A0

Products, commodities and services

Skilled labour

Company resources
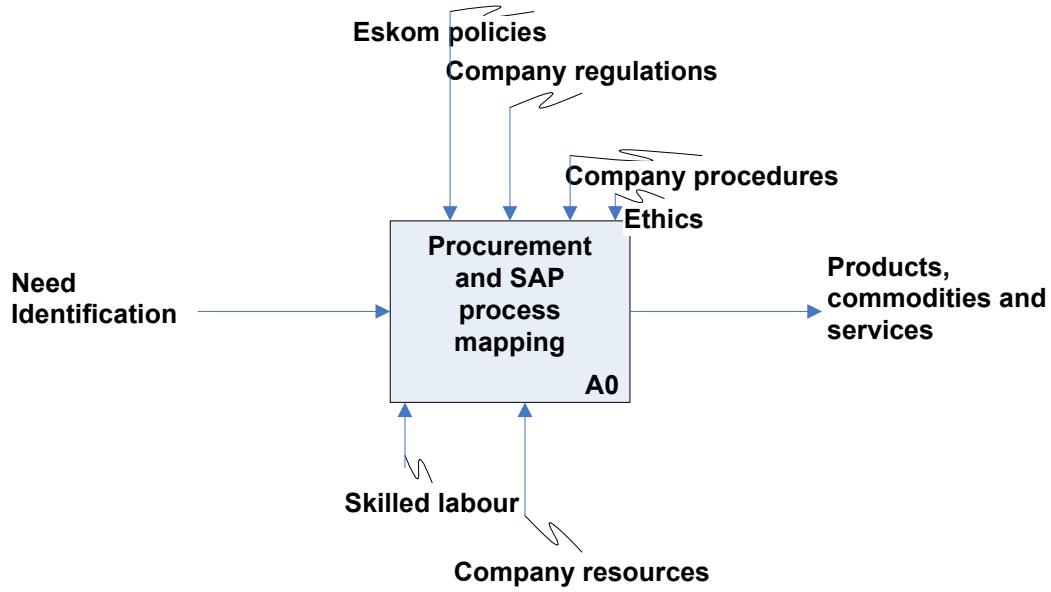
CHILD DIAGRAM
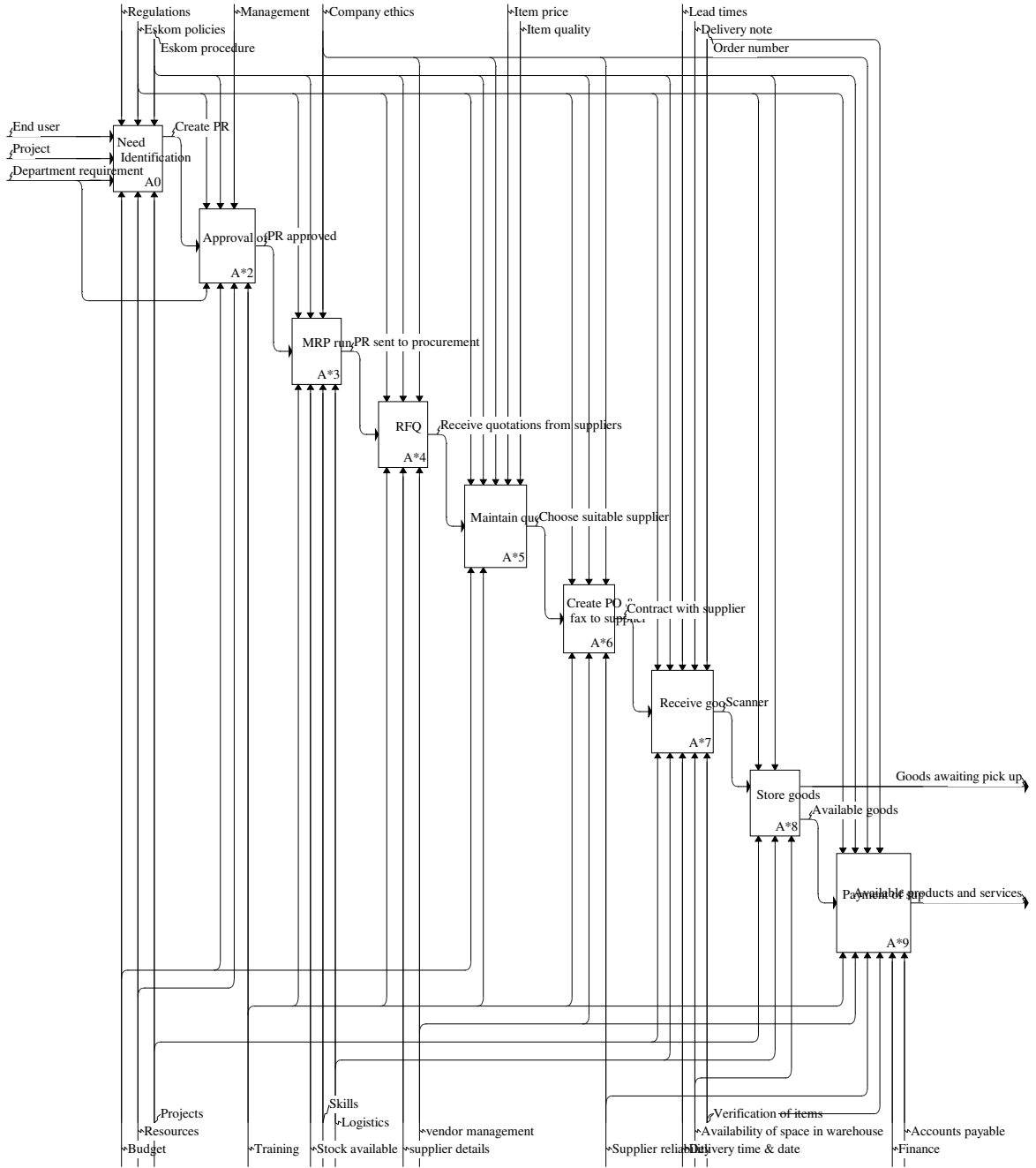
APPENDIX E

COST IMPLICATIONS ANALYSIS

	Period	Year	BTCF	Rate	NPV(Per period)	NPV
SAP system	0	1999	-273000000	5.2%	R -273,000,000	273
	1	2000	-70060000	5.4%	R -322,078,356.96	322.07836
	2	2001	-70060000	5.7%	R -380,311,756.82	380.31176
	3	2002	-70060000	9.2%	R -411,824,429.85	411.82443
	4	2003	-70060000	5.8%	R -488,545,590.76	488.54559
	5	2004	-70060000	1.4%	R -600,645,844.04	600.64584
	6	2005	-128060000	3.4%	R -672,152,126.76	672.15213
	7	2006	-49173200	4.7%	R -679,774,254.19	679.77425
	8	2007	-49173200	7.8%	R -641,783,361.09	641.78336
	9	2008	-49173200	12.7%	R -568,486,603.10	568.4866
	10	2009	-49173200	11.3%	R -608,356,035.89	608.35604

Worst case scenario (Increase in inflation)

	Period	Year	BTCF	Rate	NPV(Per period)	NPV	SAP NPV in 2009
Softline ACCPAC	0	2009	-422500000	11.3%	-422500000	422.5	R 608.36
	1	2010	-83050000	12.3%	R -442,078,090.35	442.07809	R 608.36
	2	2011	-83050000	13.3%	R -494,701,965.10	494.70197	R 608.36
	3	2012	-83050000	14.3%	R -537,484,762.50	537.48476	R 608.36
	4	2013	-83050000	15.3%	R -570,836,321.49	570.83632	R 608.36
	5	2014	-83050000	16.3%	R -595,475,416.74	595.47542	R 608.36
	6	2015	-83050000	17.3%	R -612,332,683.07	612.33268	R 608.36
	7	2016	-83050000	18.3%	R -622,458,079.32	622.45808	R 608.36
	8	2017	-83050000	19.3%	R -626,939,704.32	626.9397	R 608.36
	9	2018	-83050000	20.3%	R -626,838,158.87	626.83816	R 608.36
	10	2019	-83050000	21.3%	R -623,138,165.97	623.13817	R 608.36

Training cost for software 2		
Number of employees	number of users	Training cost for 5 days
35000	24500	122500000

Software interface costs estimate
50000000

Break even analysis
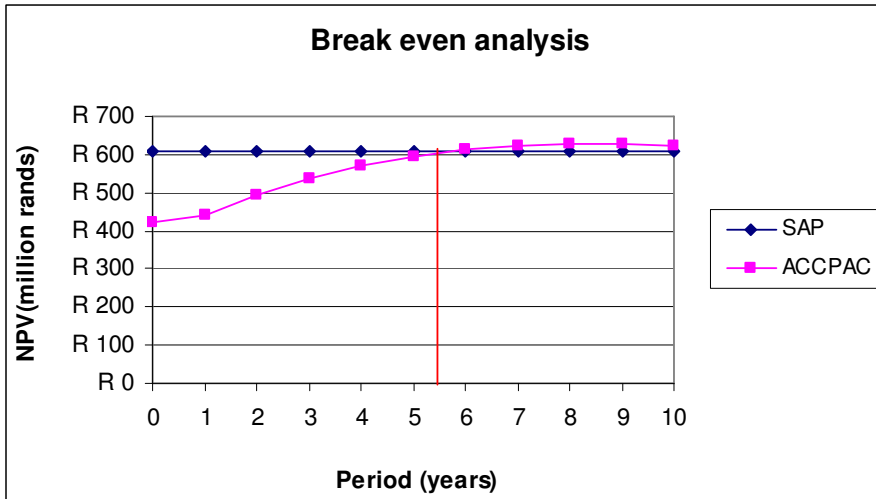
Best case scenario (Decrease in inflation)

	Period	Year	BTCF	Rate	NPV(Per period)	NPV	SAP NPV in 2009
Softline ACCPAC	0	2009	-250000000	11.3%	-250000000	250	R 608.36
	1	2010	-83050000	10.3%	R -294,918,087.90	294.91809	R 608.36
	2	2011	-83050000	9.3%	R -361,849,824.98	361.84982	R 608.36
	3	2012	-83050000	8.3%	R -427,400,374.99	427.40037	R 608.36
	4	2013	-83050000	7.3%	R -493,395,318.25	493.39532	R 608.36
	5	2014	-83050000	6.3%	R -561,618,149.38	561.61815	R 608.36
	6	2015	-83050000	5.3%	R -633,924,013.72	633.92401	R 608.36
	7	2016	-83050000	4.3%	R -712,359,429.30	712.35943	R 608.36
	8	2017	-83050000	3.3%	R -799,300,523.27	799.30052	R 608.36
	9	2018	-83050000	2.3%	R -897,625,091.14	897.62509	R 608.36
	10	2019	-83050000	1.3%	R -1,010,938,981.59	1010.939	R 608.36

Break even analysis