An Investigation on the Challenges of Enterprise Resource Planning Systems Implementation in Zambia (a comparative study of three organisations)

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Abstract— Enterprise resource planning (ERP) is business management software typically a suite of integrated applications that a company can use to collect, store, manage and interpret data from many business activities, including: product planning, cost, development, manufacturing or service delivery, marketing and sales. The purpose of this study is to establish the challenges faced by organisations regarding ERP systems implementation. The study focuses on three organisations, one of which is from the private sector and the other two are from public sector. In this study, a qualitative methodology has been applied to determine the challenges of ERP systems implementation in Zambia. An extensive review of literature has been done. The literature revealed that despite some organizations facing challenges undertaking ERP implementations, others have enjoyed the benefits that the systems have brought to the organizations. Most of the respondents believe that ERP systems have at least a moderate chance of hurting their businesses because of the potential for implementation problems. The findings indicated that the organization may enjoy intangible benefits by implementing an ERP system including, reduced downtime, better customer satisfaction, efficiency, increased flexibility, reduced quality costs, improved resource utility, improved information accuracy and improved decision making capability. In spite of its appeal, ERP has challenges and difficulties in its realization. The study captures the difficulties encountered during and after implementation and these includes; lack of local expertise, inflexible systems, erratic internet services, user errors, network failure, return on investment not quantified, integration issues, lack of system audit trails, and organisations suffer serious time and/or cost overruns in ERP implementation. Technological investment, customization, new procedures, managerial and technical support, and extensive training were found to be essential for smooth implementation process. The results of this study apply, to a large extent, to other organisations in both private and public sectors apart from the ones under study.

Keywords-Enterprise Resource Planning ;Implementation; Technological Investment;Training;Customisation

I. INTRODUCTION

Enterprise resource planning is business process management software that allows an organization to use a system of integrated applications to manage the business and automate many back office functions related to technology, services and human resources [1]. ERP software is considered an enterprise application as it is designed to be used by larger businesses and often requires dedicated teams to customize and analyze the data and to handle upgrades and deployment [2, 3]. ERP systems are integrated information systems that support value-added processes of enterprises. Based on modular software structure and centralized database, information flows in manufacturing, finance, sales, distribution as well as human resources processes can be integrated in real time [3]. As the businesses are growing and technologies improving every day, there is need also for ERP applications or systems to be developed so as to match the demand in the industry [4].

Recent research studies reported that enterprises are finding difficulties to achieve the benefits expected from the implementation of ERP systems. Rao as cited in [5] estimates that 96.4% of ERP implementations failed, whereas Al-Mashari as cited in [5] reports that 70% of the ERP implementations do not achieve their estimated benefits. This suggests that the prospect of implementation of integrated systems is a very bleak picture of the future within small and medium enterprises (SMEs). Although SMEs have advantages such as organizational simplicity, they usually face major problems in shortage of resource and funds [5].

The objective of this study is to establish the challenges of ERP systems implementation and add insight to the discourse of ERP implementation in the Zambia by focusing attention on the perceptions of the derived benefits from such systems to organisations. Particularly, concentration is

on private and public organisations. The sole purpose is to bridge the gap of what existing ERP systems are not able to do and help improve delivery of services and goods to customers and would be consumers [6]. ERP systems are often viewed as the most strategic computing platform for organizations [7]; however, over 70% of ERP implementations have been judged as unsuccessful [8]. ERP implementation success studies typically deal with issues such as ERP project implementation problems, critical success factors, and risk management [9]. As a consequence, a great deal of effort has been expended in an attempt to identify the key factors responsible for successful ERP implementation. Therefore, such issues raise some serious questions: what are the advantages and disadvantages of ERP systems implementation in organisations? What are the challenges faced by organisations when implementing ERP systems? Is it possible to create a model to suite the Zambian market? This paper attempts to deal with such concerns.

II.   LITERATURE REVIEW

A.   Background

According to Mohamed and Noorliza [10], ERP systems evolved from materials requirement planning (MRP) earlier in the 1970s. Subsequently, in the 1980s, manufacturing resources planning (MRPII) provided production as well as tactical and strategic decision-making capability, and were used as decision support systems (DSS) and executive information systems (EIS).

B.   Systems, Application, And Products in Data Processing

The SAP ERP application is the software foundation that large enterprises and midsize companies can use to provide the best business insight and enable operational excellence and innovation. The rapid expansion of organization's implementing SAP worldwide has led to a shortage of skilled SAP users and technicians as indicated by Khoury et al [11]. Academic institutions understand the need to ensure that logistics and supply chain management or information systems graduates possess hands-on skills in ERP that integrate common business and logistics process. Studies have pointed out that students that have been exposed to common business and logistics processes within an ERP framework are more equipped to handle similar situations they are likely to encounter on the job [12]. However SAP has the following advantages;

SAP ERP delivers a fast return on investment. It can increase productivity and control costs through effective management of key business processes across the organization. It can improve operational efficiency and productivity by extending the reach of business processes within and beyond the enterprise. It can speed the response

to market changes and competitive challenges. With SAP ERP, the company can evolve to achieve enterprise competitive edge, giving it the flexibility the organization needs to improve process standardization, efficiency, and adaptability.

The application enhances access to transactions, information, and collaboration functions across a broad business community and makes it cost effective to add new functionality as business requirements evolve. The deployment is fast, and easy to customize. Many configurations can be done as per the need of the business.

On the other hand it has the following disadvantage; there are so many different modules that span across different business core functions, but a larger data volume could mean slower queries. Also too much personalization can do more harm than good.

Integration is often misunderstood. The main challenge of integration is communication.

Having all the information available in real time immediately after inputting a transaction is the key to understanding the current status of the business. This, on the other end, imposes serious requirements in making sure the information entered does not include any errors. The new user of SAP ERP finds it difficult to understand the design.

C.   ERP Sofstwae for manufacturers (M1)

According to the ECiM1 report in their paper, M1 by B&G is an ERP software system designed for small to medium manufacturers including job shops, custom and mixed mode manufacturers and makes to order manufacturers. M1 by B&G provides total integration and automation from quoting through invoicing and is capable of flexible and fully supported customization that ensures most valuable & unique business processes can be handled with ease. Most common modules on M1 include; customer relationship management (CRM), quoting and estimating, job costing and analysis, advanced planning and scheduling, purchasing and materials management, quality management and reporting, shop floor bar code data collection, accounting and payroll, executive dashboards, product configurator, customization development tools and mobile smart phones apps.

M1 has the following disadvantages; Quality module lacks reports and some linking of data, however, reports can be created using crystal reports, and importing of products is complicated since some of the items in the product setup are in different database files. Therefore, manual entry or several imports are required. It is also moderate in accounting, weak in quality, weak in revision control.

D.   Passport Business Solution

PBS is a complete, back office accounting package that also offers complete business solutions to meet the needs of

small to medium sized companies. The modules include; accounting, manufacturing, distribution and retail. The focus is on the smaller company and solutions are "right sized" and affordable, that means you don't need to invest money in applications you don't need. Instead, PBS allows you to invest in a decision support system designed to meet your needs.

PBS is a real accounting program with good audit trails. Additionally, in the context of PBS overall cost compared to other programs, it is very cost competitive. It is ease of use. The only problem is setting up direct printers. It is more flexible in setting up financial statements. PBS has great reporting capabilities, especially for payroll, all the way through the months' information and magnetic file reports for sending to Social Security (MacDonald & Headlam).

III. METHODOLOGY

Company A was selected based on the experience and country wide client-base the company has in manufacturing, distribution and transmission. The Company has grown over the years to be one of Zambia's largest producers of electricity. Company B was chosen based on the country wide coverage and experience the company has in telecommunication sector. Since its inception, the company has grown to be a leading company in telecommunication. Both Company A and B are public companies and have had issues with ERP systems implementation. Company C is one of the largest supermarkets in Zambia. The Company was selected based on the experience they have had over the years since 1930's of operations in other countries and yet with challenges in ERP systems implementation in Zambia.

The research steps included literature review, interviews, single case analysis, and comparative analysis as shown in Figure 1. For this study three organisations where identified, two from the public sector and one from the private sector. The study used a descriptive method approach to determine the challenges of ERP systems implementation in the organisations. To determine the challenges of ERP systems implementation, qualitative research approach was utilized.

Descriptive research design was used because of its potential to explain the state of affairs as it exists [13]. The study employed the use of well-structured questions for interviews which were conducted for the purposes of gathering information. After the data was collected, thematic analysis technique was used to analyze the data. Thematic analysis is a way of seeing, as well as a process for coding qualitative information [14]. The phases of the thematic analysis technique employed included; familiarizing with the data collected, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report.
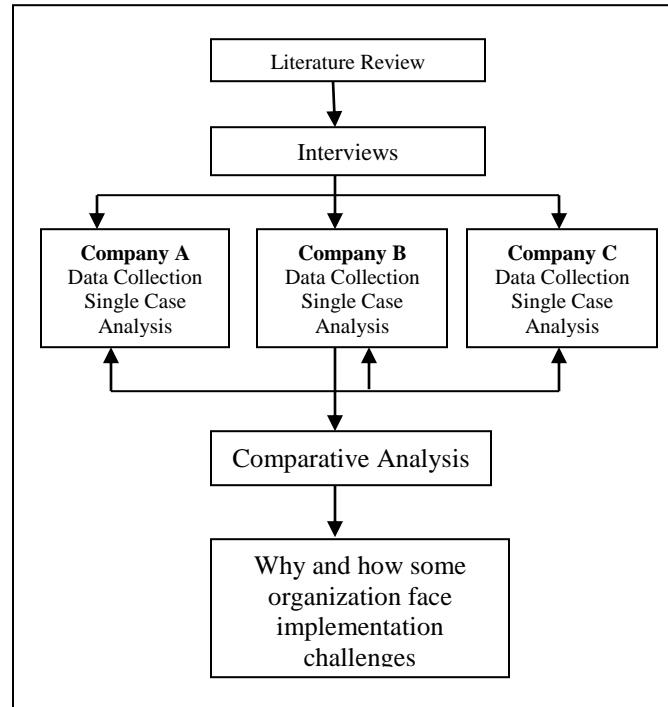

FIGURE 1: OVERVIEW OF THE RESEARCH DESIGN

IV. RESULTS

This section presents findings of the study for the three organisations. It reveals the benefits, success factors, and challenges that come with the implementation of ERP systems in both public and private organizations in Zambia. The study focuses on Company A, B and C.

A. The Case of Company A

Company A is a public company and is one of the largest power companies in Zambia, which generates, transmits, distributes and supplies electricity in Zambia. It produces about 80% of the electricity consumed in the country. Company A first implemented the integrated business information systems in 2003 with the aim of improving the operations of the power utility. The company contracted an international organization for a major upgrade of Information Communication Technology (ICT) infrastructure systems. This upgrade was intended to improve the processing turn-around of all business processes within the utility firm and in turn improve customer service delivery. The ERP system at Company A has the following modules; Payroll and human resources information system (PHRIS), Integrated information system (Business management system) – (IIS), Finance management system (FMS), Stock and procurement management system (SPMS), Transport management

system (TMS), Customer relations management system (CRM), Design construction system (DCS), Plant equipment and maintenance system (PEMS).

The ERP system has proved to improve efficiency, time management and accountability in the organization. Further employees have gained ICT skills in the process of learning how to system. All the respondents concurred that the system was more efficient and helpful in the expedient of transactions processing for the organization. The ERP system has integrated different modules that were stand-alone previously, making it easier for work to be done in the most efficient manner by different departments. As such, it was eluded that most projects and activities were now completed and achieved within the timeframe. Time management is a key component in any application, and the ERP system has helped the organization to run efficiently and achieve its goals in reasonable time. The audit trail of activities and transparency in the process of escalating issues has improved accountability and also encourage some people to work on item on time. The introduction of ERP system in the organization has helped users to gain new ICT skills and be keen to learn new technologies and applications; this has necessitated even late adopters to be interested in acquiring basic ICT skills and learning how to use the system.

The two key factors that facilitated the use of the ERP system are friendly user interface and security of the system. The usability of the system was reported to be simple with easy navigation enabling users to work through the workflows with little or no difficulties. With the paper-based system before, users found it difficult to get information in good time and security of documents was almost non-existent; it was difficult to know who last worked on the documents. Respondents found the ERP system to have strengthened security, with users having individual profiles that required a password for access and reinforced by role-based security. It was further reported that it helped to know who last worked on a document which made it easier to follow up in case of anything. However, the system had a number of challenges ranging from software, system support, poor internet connectivity, limited adaptation to local realities to lack of local expertise to support the system.

One of the main challenges noted by all the respondents was frequent system breakdown, which usually took a long time to be resolved because they had to wait for the vendors from outside the country to fix the software. Often, the system malfunction was caused by users who are not well conversant with the system; some of the errors made though minimal affected accuracy of the output in terms of reports. User errors were a challenge reoccurring time and again, and constantly being resolved by the ICT department personnel or consultants. Most users required to be retrained

as they only has start-up training. User errors are very common and make it a challenge to the administrators of the system who constantly have to deal with these errors. The support from vendors was online with a contract of less than 45 days in a year within which all the issues should be fixed. In the event that the 42 days elapse, the organization pays extra money for any work beyond the agreed days, which proved to be expensive to maintain and could affect the operations of the system at times. The reliance on external support from another continent rendered the system to be inflexible; it was found that when policies changed it would take a long time to be effected in the system as the developers could not make changes as and when required sometimes. The main problem contributing to this was lack of local expertise to support and maintain the system. It was established that Company A had spent close to 10 million dollars on support and maintenance since the ERP system was implemented in 2003, money that could have been used in other operations of the business for the benefit of the country i.e. reduce the power outages or connect more people on the power grid as only 12% of the population is connected.

B. The Case of Company B

Company B is a Company incorporated in Zambia under the Companies Act Chapter 388 of the Laws of Zambia. The sole shareholder of the Company is the Government of the Republic of Zambia. The Company falls under the jurisdiction of the Ministry of Transport, Works, Supply and Communications pursuant to Gazette Notice No. 183 of 2012 and the Statutory Functions Act Chapter 4 of the Laws of Zambia. The company provides a modern Internet service through the company's On-line, founded in 1997, including digital subscriber lines (DSL) and wireless access. The company provides fixed lines, mobile, internet and other value adding services for any business and personal needs.

In the recent past, Company B acquired Oracle e-business suite ERP software as a solution package to the operations of the organization. The Oracle e-business suite ERP system consists of the following modules; financial modules, procurement modules, inventory, HR, Talent management module, Customer Relationship Management, system administration module and order management.

With the introduction of the Oracle e- business suite ERP application, all business processes were automated within Company B. The automation of business processes brought about efficiency as it has made work easier and faster for the users, reducing on time taken to complete a transaction and producing reports for informed decision making in good time. Respondents concurred that the system had improved planning in both management and technical teams and things got to be done on time. The effectiveness of the system was more attributed to the

automated messages staff received notifying them of any new request, event, or pending work that needed their attention. These notifications were sent directly to individual profiles and they were able to act on them accordingly. For instance, the system allowed monitoring of stock levels in the procurement department and it flagged users when stock levels were below the required the minimum. The inventory could be configured in the procurement module to allow suppliers make orders. The system also encouraged sharing of resources and transparency since it showed any updates to the database as and when they occurred for others to act on them, and also allowing the same module to be used by different users at the same time. The system was generally reliable and able to handle most of the business transactions and processes. The vendors of the Oracle e-business suite ERP offered support online, and were usually available as long as internet connectivity was stable, and this reduced downtime allowing key operations such as unplanned maintenance to be carried out with no or minimal disruption.

The workflows in the Oracle e-business suite ERP system were properly defined making it easier for the users to navigate through the forms for any transaction. The central database allowed for updates to be shared in real time i.e. users could raise requisitions internally and the requested items could be approved within the system and delivered to the user in good time. The system had role based security, viewing of transactions and approvals were done according the roles of users. System security was generally good; user configuration was based on individual passwords for authentication to access the system resources.

The system also faced challenges of lack of local expertise for support and maintenance of the system. The local personnel lacked technical skills to support application servers and database; they relied on online support. After implementation costs, the organization continued to be pay vendors' maintenance and support charges per year. However, this online support was dependent on internet connectivity which is slow or not available at all sometimes. The erratic internet services were reported to also affect file conversion when the network was slow. Relying on online support that is not guaranteed considering internet connectivity in the country made it difficult for most bugs to be fixed on time and/or completely. The system has some bugs which are constantly worked on by vendors in the America. The local team's job was to contact the vendors so that the bugs could be fixed, and the vendors take a long time to work on the code and fix the bugs.

C. The Case of Company C

Company C is a supermarket which was founded with the vision that 'through united co-operation everyone profits' in the early 1930's. Through over 80 years of united

co-operation. Company C started operating in Zambia in December, 2003, with the opening of their first supermarket in Lusaka. For more than ten years, the wholly Zambian owned and managed company operates six (6) corporate and seven (11) franchise stores in six towns and cities across the country, out of which, in 2014, four (4) stores joined the Company C's Zambia family.

The findings showed that RMS ERP for Company C improved efficiency of sales operations as it turned out to be faster and easier to use compared to the manual way of transacting. The reporting tool produced reports that could be exported into Microsoft excel or word format for easier understanding and interpretation by users and management to make informed decisions. The system as designed, with a central database at the head office, also made sharing of resources across the network easier. Updates were only done at the head office server and this would be pushed to all other service points. For example, in the pricing department, if prices were adjust either upwards or downwards, the changes made would immediately be reflected on the sites of Spar supermarkets. In other words the pricing would be done once on one worksheet from Head Quarters (HQ) and all sites got to be updated. The RMS ERP system had also the benefit of allowing users at the HQ to view all the sales done in all the sites around the country and be able to make decisions based on the daily report produced. The POS module implemented at all the supermarkets did not require internet connectivity to work on site; it had the capability of operating in the offline mode.

One of the factors attributing to the smooth operations of the system was comprehensive training. System orientation was mandatory for everyone joining the organization, and refresher trainings were encouraged. This made it easier for operational level staff to use the POS module with much precision and minimal error. However, challenges like lack of internal ICT support could affect system operations with prolonged downtime at times. The supermarket did not have a support service level of agreement with the owners of the system. Instead they used a local company which could take long in fixing some of the bugs. Furthermore, Company C used to purchase system updates and patches from the system owners through online support as and when required to fix some bugs. The delay in updates or fixes usually affected the supply chain i.e. updating suppliers on time at different times during working hours which affected payments. The system needed to be updated so as to see which suppliers were eligible for payment. The ICT team reported of some file conversion challenges especially when the network is slow, which affected the workflow and business processes of the organization making it difficult to finish processing the transactions on time. It was observed that the human resource module lacked system audit trail. They could not tell who logged in and out at a particular

time, making the system vulnerable to internal attacks and manipulations. Lastly, the RMS ERP system did not allow or accept more than two people from the HQ to connect to a remote site. If two users from HQ are logged on, others have to wait until they logged out to access remote sites; this delayed key operations at times.

D. Comparative Analysis

After coding the data into themes, it was clear that all the organizations had some similarities and differences in terms of benefits, success factors, and challenges. Table 4 shows the benefits for the three organizations. Efficiency and improvement in business management were found to be common in all the organisations. Improved time management was found to be common with Company A and B, whereas, effectiveness and sharing of resources were found to be beneficial to Company B and C

TABLE 1: BENEFITS OF ERP SYSTEMS

	Company A	Company B	Company C
Efficiency	Yes	Yes	Yes
Acquisition of knowledge	Yes		
Time management	Yes	Yes	
Cost benefit (vehicle usage)	Yes		
Security	Yes		
Accountability	Yes		
Reduced down time		Yes	
Effectiveness		Yes	Yes
Sharing of resources		Yes	Yes
Elimination of paper		Yes	
Reliability		Yes	
Customization		Yes	
Rectification of issues			Yes
Improve business management	Yes	Yes	Yes

Table 2 shows the success factors of ERP systems for the three organizations under study. Provision of business intelligence was found to be a common factor for all the three organisations. Improved functionality and user training was found to be a common success factor of Company B and C.

TABLE 2: SUCCESS FACTORS OF ERP SYSTEM

	Company A	Company B	Company C
Dedicated team	Yes		
User interface	Yes		
Improved functionality		Yes	Yes
Properly defined workflows		Yes	
Provides business intelligence	Yes	Yes	Yes
No resistance by employees		Yes	
Integration to a banking system		Yes	
Transactions done efficiently to authorities(ZRA,NAPSA)		Yes	
User training		Yes	Yes

Table 3 shows the challenges of ERP system implementation and post implantation challenges faced by the three organizations. According to the respondents, application and software challenges, online support difficulties, erratic Internet services, and late release of updates were found to be the common challenges at the three organisations

TABLE 3: CHALLENGES OF ERP SYSTEMS

	Company A	Company B	Company C
Application and software challenges	Yes	Yes	Yes
Mobility	Yes	Yes	
Manual computations	Yes		
Online support	Yes	Yes	Yes
System slow	Yes		
Adaptability/Customization realities	Yes	Yes	
Approvals are slow	Yes	Yes	
Lack of local expertise	Yes	Yes	
Erratic Internet services	Yes	Yes	Yes
Inflexible systems	Yes	Yes	Yes
User errors	Yes		Yes
Release of updates	Yes	Yes	Yes
Return on investment	Yes	Yes	
Integration of modules	Yes	Yes	
User interface		Yes	
Abuse of system		Yes	
System not fully actualized		Yes	
Network failure	Yes	Yes	Yes
Roll out of the system	Yes	Yes	Yes
File conversion		Yes	Yes
Lack of system audit trail			Yes
Cost updates			Yes
Outdated version			Yes
Payment delays			Yes

Figure 2 shows a pie chart representation of the challenges at the three organisations with Company A, B, and C having 35%, 37%, and 28% respectively.

FIGURE 2: CHALLENGES OF ERP SYSTEMS

V. CONCLUSION

We observed that 70% of the respondents believe that ERP system implementation can hurt their business and that chances of failure are high in all the organisations. The literature cites many factors contributing to the success of ERP implementation. [15] Lists eight such factors including; strategic planning, project management, IT skills, business process skills, executive commitment, training, learning and change readiness. In our study only four of these were alluded to by the respondents out of which training topped the list, followed by IT skills, then change readiness and finally executive commitment.

Many ERP vendors claim that their products are customizable and support business processes of any organization regardless of the products or services organisations offer [16]. In our findings it was observed that the ERP systems in use at these organisations are not customizable to the local market and are written to support the country of origin. The literature suggests that ERP implementation is different from other systems development projects [17]. In our study, technological investment, customization, new procedures, managerial and technical support, and extensive training were found to be essential for smooth implementation process.

Implementation of ERP systems is a costly venture as seen in the findings and organisations need local expertise to manage and maintain the system after implementation. Training of staff will help to improve how users manage the system and having knowledge on the system will help reduce the user errors. Further, for integration of different modules to be a success, organisations will have to manage the requirements from inside-out; they have to acquire equipment from trusted vendors so as to avoid challenges of using different equipment from different vendors and manufacturers.

Figure 3 shows our proposed model which can help mitigate the challenges faced by the organisations in Zambia with regard to ERP systems implementation. The Financial application collects a synchronized output from the budgetary, budgeting modules and from the income taxes sub functionality and sends its informed data to the Accounting subsystem which also collects part of the information from the bookkeeping sub module. The Human Resources subsystem relies heavily on the information provided by the Personnel management and Health modules.

The service subsystem is integrated with the central module manager we have referred to as fleet manager. This module will manage all logistics and storage facilities. Sales and distribution subsystem is integrated also with the service applications subsystem. This system is connected to other modules as shown in figure 3. Customers are interfaced to the Sales and distribution subsystem which integrates with the business report management subsystem that will provide various reports. The transport management and Inventory management subsystems also have modules integrated to them as shown in figure 3. Suppliers are interfaced to the Inventory management subsystem. All the subsystems are connected synchronously to the central database where the Business report subsystem takes its functionality of handling report mechanism.

VI. FUTURE SCOPE (RESEARCH)

Disaster recovery sites have to be instituted to help organisations carry on with their work even in the event that the system is down. Further Data centers can be used also to help mitigate big data storage challenges. The systems have to be tailor made to suite the local market requirements and applications need enhancement and upgrading. The applications have to be more robust so as to help users to factor in the possible future requirements.

As of today, the research on challenges of ERP systems implementation in Zambia is new and not much has been done. Hence there is a great scope for refining the research on this topic in future.

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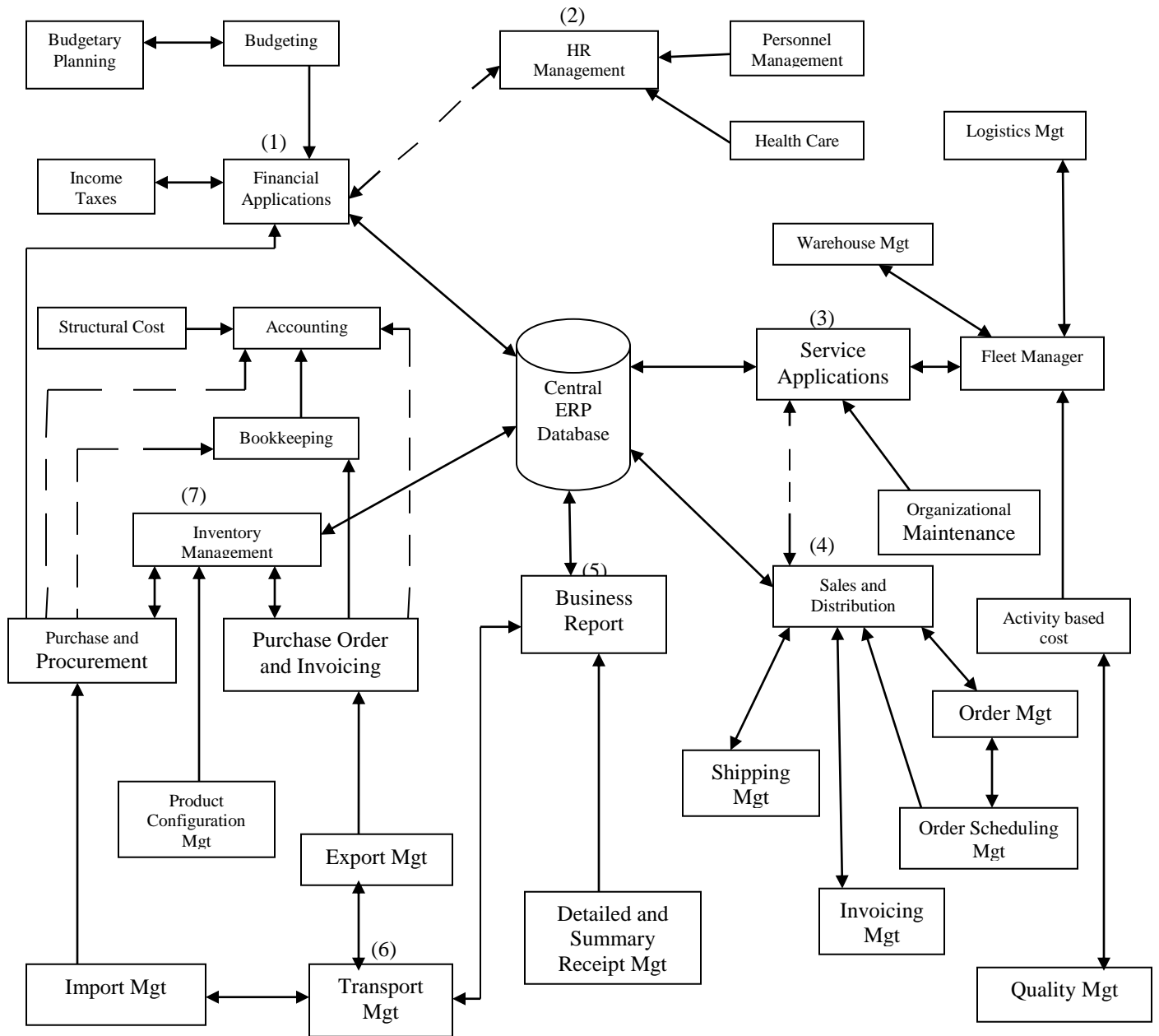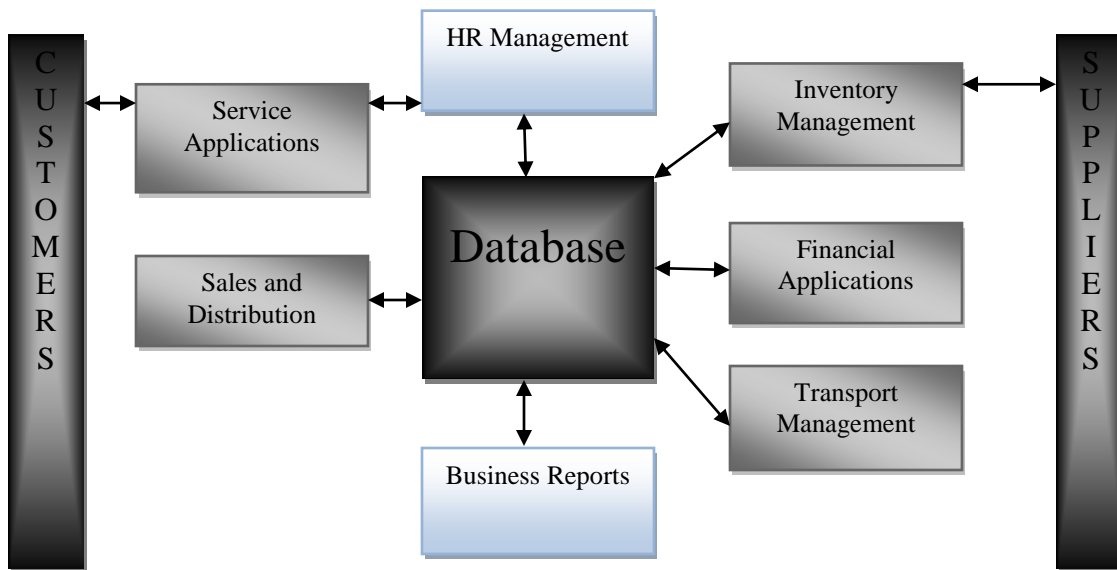
FIGURE 3: PROPOSED MODEL – (SCHEMATIC DIAGRAM)

FIGURE 4: PROPOSED MODEL