

**DEVELOPING AN INFORMATION SYSTEMS (IS) ACQUISITION,  
DEVELOPMENT AND IMPLEMENTATION FRAMEWORK (ADIF) IN  
ZAMBIA**

**BY**

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A dissertation submitted to the Graduate School of Business in fulfilment of the requirements for the Degree of Master of Science in Operations, Projects and Supply Chain Management.

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**LUSAKA**

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## **DECLARATION**

I, the undersigned, declare that this dissertation is a preparation of my original research work and that it has not been submitted or being concurrently submitted in candidature for any degree. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature and acknowledgement of collaborative research and discussions.

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## APPROVAL

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## **DEDICATION**

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## **ABSTRACT**

The value expectations of Information Technology (IT) for socio-economic and human development in developing countries have been high, but the real benefits and the positive impacts have been somewhat disappointing. Most developing countries in Africa are at the emerging stage of e-government development and lag far behind developed nations despite having had national e-government strategies in place for a considerable period of time. The harsh socio-economic and infrastructural context makes the sustainability of an Information System (IS) a major issue. Technology transfer to Africa has been too dependent on external factors, like international donor aid, and emphasized on technology itself.

Despite government and public sector entities allocating huge sums on their budgets into Information Systems implementations with an objective to ameliorate service delivery, promote accountability and transparency and improve overall operations, benefit and value realization from these investments are hardly achieved. There is a need for locally developed, appropriate information systems, which are based on local needs and structures. This research argues that the Information systems acquisition, development and implementations should be done using appropriate methods in a Zambian (African) context based on local needs and structures. The research has been done by surveying 5 public interest user companies in Zambia, literature review in information systems acquisition, development and implementations in South Africa, Kenya, Nigeria, India and in the context of developing and developed countries.

The Information systems acquisition, development and implementations in Zambia is ambitious, and capable of providing solutions for local companies, but the resources for investments are scarce. In Zambia, low I.T Infrastructure, People, Technology and poor implementation approach are some of the identified hindrances to the growth of the sector. Human capital requirements require further nurturing and mindset change of citizens to begin to appreciate locally designed and produced products and services. Appreciating our baby steps and the need to exercise patience to nurture our talents at our budding stage in information systems development and implementation as we acquire information systems will ameliorate the growth of the sector. The study provides a model, (The Acquisition, Development and Implementation Framework; ADIF) for effective and efficient implementation of Information systems and ensure benefits realization of Information systems investments.

## **KEY WORDS**

<b>ADIF</b>	Acquisition, Development and Implementation Framework
<b>ASYCUDA</b>	Automated System Custom Data
<b>COBIT5</b>	Control Objectives for Information and Related Technology
<b>COTS</b>	Commercial off-the shelf software
<b>eZamTIS</b>	Electronic Zambia Transport Information System
<b>FCUBS</b>	Oracle FLEXCUBE Universal Banking System
<b>IS</b>	Information Systems
<b>ISACA</b>	Information Systems Audit and Control Association
<b>IT</b>	Information Technology
<b>ITIL</b>	Information Technology Information Library
<b>ITSM</b>	Information Technology Service Management
<b>NAPSA</b>	The National Pension Scheme Authority
<b>PRINCE2</b>	Projects in Controlled Environment
<b>RTSA</b>	The Road Transport and Safety Agency
<b>ZANACO</b>	The Zambia National Commercial Bank
<b>ZRA</b>	The Zambia Revenue Authority

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# **CHAPTER ONE**

## **INTRODUCTION AND BACKGROUND**

### **1.1 Introduction**

Information systems are a major corporate asset, with respect both to the benefits they provide and to their high costs. Therefore, organizations have to plan for the long term when acquiring information systems and services that will support business initiatives. At the same time, firms have to be responsive to emerging opportunities. For example, certain projects may have to be carried out immediately to satisfy a new government reporting regulation or to interact with a new customer's information system. Other projects may be given a higher priority because of their strategic role or greater expected benefits.

Information system acquisition, development and implementation are simultaneously taken business decisions by organizations for their information systems maintenance and sustenance of their competitive advantage. The decision to acquire, develop and or implement an information system requires thorough considerations of all its three dimensions (acquisition, development and implementation). The goal is to evaluate, develop, maintain and dispose information systems for business survival, benefit realization and to sustain competitiveness. The neglect of one or two of these dimensions frequently accounts for a greater percentage of not realization of the desired business objectives.

Information system acquisition; Once the need for a specific information system has been established, the system has to be acquired. The acquisition of information systems can either involve external sourcing or rely on internal development or modification. However, with today's highly developed IT industry, organizations tend to acquire information systems and services from specialized vendors. The principal tasks of information systems specialists involve modifying the applications for their employer's needs and integrating the applications to create a coherent systems architecture for the firm. Generally, only smaller applications are developed internally.

According to Jones (1992), Information system development; refers to the 5 first stages of the classic systems development life cycle namely: the feasibility study, systems analysis, systems design, programing, testing and installation of an information system. Information system development can be external (when the software development is outsourced or developed by specialized vendors) or internal (when the software is developed internally by the organization).

According to Jones (1992), Information system implementation refers to the process of realizing the design into a computer program. In the context of change management acquisition, development, and implementation is to ensure that all changes are assessed, approved, implemented, and reviewed in a controlled manner to production and applicable non-production environments with minimal impact and risk. Implementation also includes aspects of information systems maintenance for continued benefit realization from the information system throughout the system lifecycle.

It is important that a framework for information system acquisition, development and implementation in Zambia is developed. A good framework is imperative and critical for planning and managing information system acquisition, development and implementation and for alleviating many problems associated with the process. Failing to properly manage the processes of information systems acquisition, development and implementation may lead to loss of productivity, loss of maintainer credibility, loss of system and maintenance process quality, and sometimes, even loss of business.

## **1.2 Problem Statement**

There is a problem in Zambia in both the public and private sector in the information systems acquisition, development and implementation. Despite government and public sector entities allocating huge sums on their budgets into Information Systems implementations with an objective to ameliorate service delivery, promote accountability and transparency and improve overall operations, benefit and value realization from these investments are hardly achieved. There are notable information systems implementation disaster cases where the non-application of essential tenets of information system acquisition, development and implementation seems to have negatively affected the operations and revenue streams of the enterprises. Information systems implementation failure at The Road Transport And Safety Agency (RTSA), Zambia Telecommunication Limited (Mobile Money), Zambia Revenue Authority (Tax-online system), The University of Zambia (Student Billing system), Zambia National Commercial Bank(Core Banking System) and National Pension Scheme Authority (NAPSA) just to mention a few could have been prevented before they could occur had they adopted an ideal enterprises information systems (IS) acquisition, development and implementation model. This problem has negatively affected organizations, government and the citizenry at large because poor service delivery, unaccountability of financial resources (from the revenue streams) and corruption continue to appear to be on the increase due to lack of transparency. A possible cause of this problem is Information system implementation failure. The difficulty arising from this problem is that both private and public institutions have lost confidence in information systems solutions yet the solutions to the mentioned problems lies in automation an attribute that is dependent on proper information systems implementation. The

cost of these implementations does not come cheap it costs firms' huge sums of capital investments resulting into huge losses and great inconveniences to the organizations customers.

### **1.3 Aim of the Research**

To develop a framework that can be adopted and adapted by organizations to improve information systems acquisition, development and implementation.

### **1.4 Research Objectives**

1. To identify the cause of Information systems acquisition, development and implementation failure at The Road Transport and Safety Agency (RTSA), Zambia Telecommunication Company Limited (ZAMTEL), National Pension Scheme Authority (NAPSA), Zambia National Commercial Bank (ZANACO) and Zambia Revenue Authority (ZRA).
2. To develop a framework for information systems acquisition, development and implementation that enhances successful information system acquisition, development and implementation in Zambia.

### **1.5 Research Questions**

1. What are the common causes of Information systems implementation failure?
2. How can a framework for information systems acquisition, development and implementation enhance successful information systems acquisition, development and implementations in Zambia?

### **1.6 Scope and Limitations**

Information system acquisition, development and implementation is a broad topic and a lot of research in the subject matter have been made. In this era of Information Technology (IT), most of the organizations are involving IT in their culture and functioning. The main reason of involving IT is to make any organization more and more competent in information sharing so that it can survive and meet the challenges like efficiency and competitiveness (**Qasim Zia, 2011**). The study focused on the challenges encountered with information system acquisition, development and implementation. It involved benchmarking conducted at RTSA, ZANACO, ZRA, NAPSA and ZAMTEL. The major outcome of the study was the statistical analysis of the data collected and the development of the proposed Acquisition, Development and Implementation framework (ADIF).

The limitations encountered was the lack of information systems project implementation documentations. As a result, most of the primary data was collected from individual perceptions on their experience. Time was also another constraint because the subject matter is broad and required more time to extrapolate more evidence.



## **1.7 Research Significance**

The research will be helpful to the nation, region and world at large as it will assist in addressing the information system acquisition, development and implementation challenges. These challenges are not peculiar to Zambia but are prevalent in most parts of the world. The analytical results of the study and recommendations will be shared with The Road Transport and Safety Agency (RTSA), Zambia Telecommunication Company Limited (ZAMTEL), National Pension Scheme Authority (NAPSA), Zambia National Commercial Bank (ZANACO) and Zambia Revenue Authority (ZRA) with the hope that the information will ameliorate the success rate of the organization's future information system implementations.

## **1.8 Organization of the Dissertation**

This study is divided into five chapters. Chapter 1 introduces the study and describes the problem statement, research aim and objectives, research question, scope and limitations, significance of the study and the organization of the entire research paper. Chapter 2 looks at the frame of reference of the subject matter. It contains previous research and opinions on the subject and a summary of the key findings of the literature reviewed by the researcher. Chapter 3 details the research design and methodology. It provides details of the research sample and sampling procedure, research instruments, data collection and analysis procedures and a model of the proposed framework (ADIF). Chapter 4 presents the research findings and discussion and lastly Chapter 5 sets out the research summary, conclusion and recommendations.

## **1.9 Summary**

The chapter presented the information system acquisition, development and implementation challenges experienced in both the public and private sector organizations in Zambia. The problem is clearly illuminated in the problem statement by the provision of justifications that it is a research subject matter lurking for research advancement and provide solutions to the Information Communication Technology (ICT) growth in the country and region. A succinct aim and objective to solve the identified problem is provided which forms the basis of the research objectives and design of the research approach. A synopsis of the proposed research problem resolution through this study is hinted at, the development of a framework to address the envisaged challenges so as to create a standardized approach in the acquisition, development and implementation of information systems project in the country.

## CHAPTER TWO

### FRAME OF REFERENCE

#### 2.1 Introduction

This chapter presents the IS acquisition, development and implementation domains as described in the current scientific literature. Its goal is to provide contextual to the IS acquisition, development and implementation domains and its related subjects. The chapter first presents a review of some Information system acquisition approaches in Section 2.2, then the Information systems development strategies in Section 2.3 followed by the information system implementation strategies in Section 2.4. An analysis of some best practice information systems frameworks is delved into in Section 2.5, a review of related works is presented in Section 2.6 and lastly Section 2.7 sets up the summary of the chapter.

#### 2.2 Information System Acquisition Approaches

Acquisition is typically a process by which organisations and individuals obtain an object or asset. Information Systems acquisition process conjures management's decision making; to buy (outsource) or make decisions (in-house development). The procurement process of acquisition involves activities such as selecting suppliers, approving orders and receiving goods, products and services from suppliers. Information systems are a major corporate asset, with respect both to the benefits they provide and to their high costs (outlay) (Mantel et al. & McIvor, 2003).

Information systems dependability in every aspect of our lives has exceeded the level expected in the recent past (Lamddi, 2017). Because of our high dependency on technology in most, if not all, aspects of life, a system failure is considered to be very critical and might result in harming the surrounding environment or put human life at risk (Lamddi, 2017). According to Sillanpaa (2015), organisations have to plan for a long time when planning to acquire information systems and services that support the business initiatives (Sillanpaa, 2015). On the basis of long-term corporate strategic plans and the requirements of various business units from the data workers to top management, essential applications are identified and project priorities and decisions to acquire information systems solve the business problems or exploit business opportunities are set. It is for this reason, that information system acquisition requires an acquisition strategic that enhances successful information systems acquisitions and enhances value realisation to the acquirer (Sillanpaa, 2015). The information system acquisition strategy must be aligned to the organisational strategic objectives. A holistic and comprehensive acquisition strategy is required to meet an organisation's strategic objectives (Gay and Airasian, 2012)

The acquisition strategy is a comprehensive, integrated plan developed as part of acquisition planning activities. It describes the business, technical, and support strategies to manage program risks and meet

program objectives. The strategy guides acquisition program execution across the entire program or information system life cycle. It defines the relationship between the acquisition phases and work efforts, and key program events such as decision points, reviews, contract awards, test activities, production lot/delivery quantities, and operational deployment objectives (Sillanpaa, 2015). The strategy evolves over time and should continuously reflect the current status and desired end point of the program. In many agencies, the term "acquisition strategy" typically refers to the contracting aspects of an acquisition effort. This view tends to ignore other factors including technical, cost, and schedule that influence a successful outcome and often have interdependencies that must be considered to determine how to acquire needed capabilities. An acquisition strategy typically includes several component parts (or strategy elements) that collectively combine to form the overall strategy (or approach) for acquiring via contract(s) the products/supplies or services needed to fulfil an agency's needs. However, a common element of most acquisition (program) strategies is structuring the program in terms of how and when needed capabilities will be developed, tested, and delivered to the end user. In general, there are two basic approaches to delivering the capability:

1. All at once, in a single step (sometimes referred to as "grand design" or "big bang") to fulfil a well-defined, unchanging need.
2. Incrementally in a series of steps (or spirals) to accommodate changes and updates to needs based on feedback from incremental delivery of the capability. This approach is often referred to as evolutionary or agile acquisition (actual definitions may vary).

Information system acquisitions adopts either options depending on the urgency of the business need. According to Moschuris (2007) as cited by Sillanpaa (2015), the most important make or buy triggers are cost and quality problems.

Software acquisition can be outsourced or insourced (in-house development). The Four-Stage outsourcing framework suggested by Mantel et al. & McIvor, 2003 illustrated in Figure 1, proposes that all non-core activities should be outsourced but that also core activities can be outsourced. McIvor's (2000, 2003) outsourcing framework integrates three concepts associated with the decision-making process: value chain analysis, core competency thinking and supply base influences. It is important to notice that the framework is not a remedy for all of the problems associated with making an effective outsourcing decision (McIvor et al., 1997; McIvor, 2003, 2008).

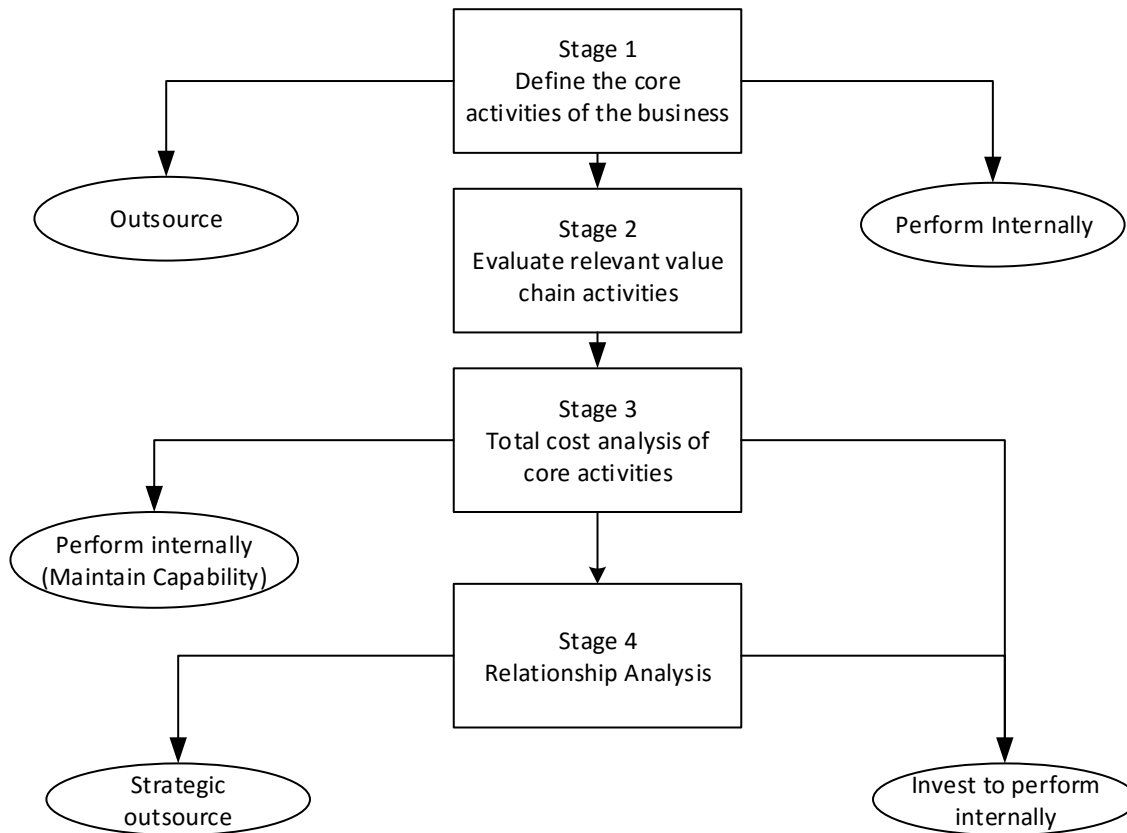


Figure 1 The Four-Stage outsourcing framework (Mantel et al. & McIvor, 2003)

Mantel et al., 2006; McIvor, 2003, suggest that the trend towards outsourcing activities in the value chain are attributed to the following reasons (Sillanpää, 2018);

1. Most competent source.

Outsourcing policy is based on the best available source (internal or external) being chosen to carry out the activity or group of activities.

2. Increased flexibility.

The company believes it can be more flexible by outsourcing more activities rather than performing activities internally by being in a better position to react rapidly to market changes and be more responsive to customer change.

3. Reduced risk exposure.

Through outsourcing, the company is reducing its level of risk (converting fixed costs into variable costs). It is argued that suppliers are better able to cope with demand fluctuations through economies of scale and have more scope for alternative sources for this excess capacity.

4. Cost reduction.

In some cases, the activity can be performed at a lower cost by outside suppliers.

5. Supplier management.

It is argued that it is possible to reduce the level of risk associated with high bought-in content by employing effective supplier management and partnership building approaches.

The make or buy hypothesis has been under discussion for a long time beginning from the industrial revolution. Yet, until now, its strategic role has not been admitted, at the same time as the strategic role of sourcing has started to have been appreciated. Probably the known and the most classical theoretical approach to a make or buy decision-making is the transaction cost theory made by Williamson (1985). According to transaction cost economics, a company will make the outsourcing decision on the basis of reducing production and transaction costs. This research is not primarily focused on the buy or make decision but acknowledges its importance in the ADIF. This decision helps determine the information systems development approach (in-house or outsourced) to be adopted. There are several information systems developed approaches, below is a review of some of them.

## **2.3 Information Systems Development Strategies**

Information system development is the process of examining a business situation/ problem with an intent of improving it through better procedure and methods. Information Systems development may be achieved through purchasing the system (commercial off the shelf (COTS) or outsourced systems development) or developed in-house (Mantel et al., 2003).

With the totally in-house development strategy, the requirement is defined, analysed, programmed, maintained and developed using the firm's own resources, while in the case of the totally off the-shelf commercial offering, you buy and effectively have to work with the package as it comes out of the box (Gay and Airasian, 2012). External consultants, systems analysts, programmers, and project managers might be used to deliver a ground-up "in-house" information system; while no sophisticated commercial product is likely to be useable without some configuration and tailoring to meet the customer's needs (Boehm, 2002).

### **2.3.1 Systems Development Lifecycle**

Before Information Systems are developed, they must have undergone a process called Systems Development Life Cycle (SDLC) using an appropriate methodology. The SDLC consists of phases varying from author to author. However, an in-formation systems project can only be successful with intense interaction amongst stakeholders i.e. the project manager, systems analyst, system designers and the end users and value addition to the business requirements. Viewed from the project manager's perspective, the SDLC lacks the essence of project management activities. Similarly, end user's involvement is not clearly specified. Philip et al. (2010) proposed a framework for information systems management and development process which accommodates the views of the different participants and

sharpens the concept of conventional SDLC and for an enhanced information systems development and management process.

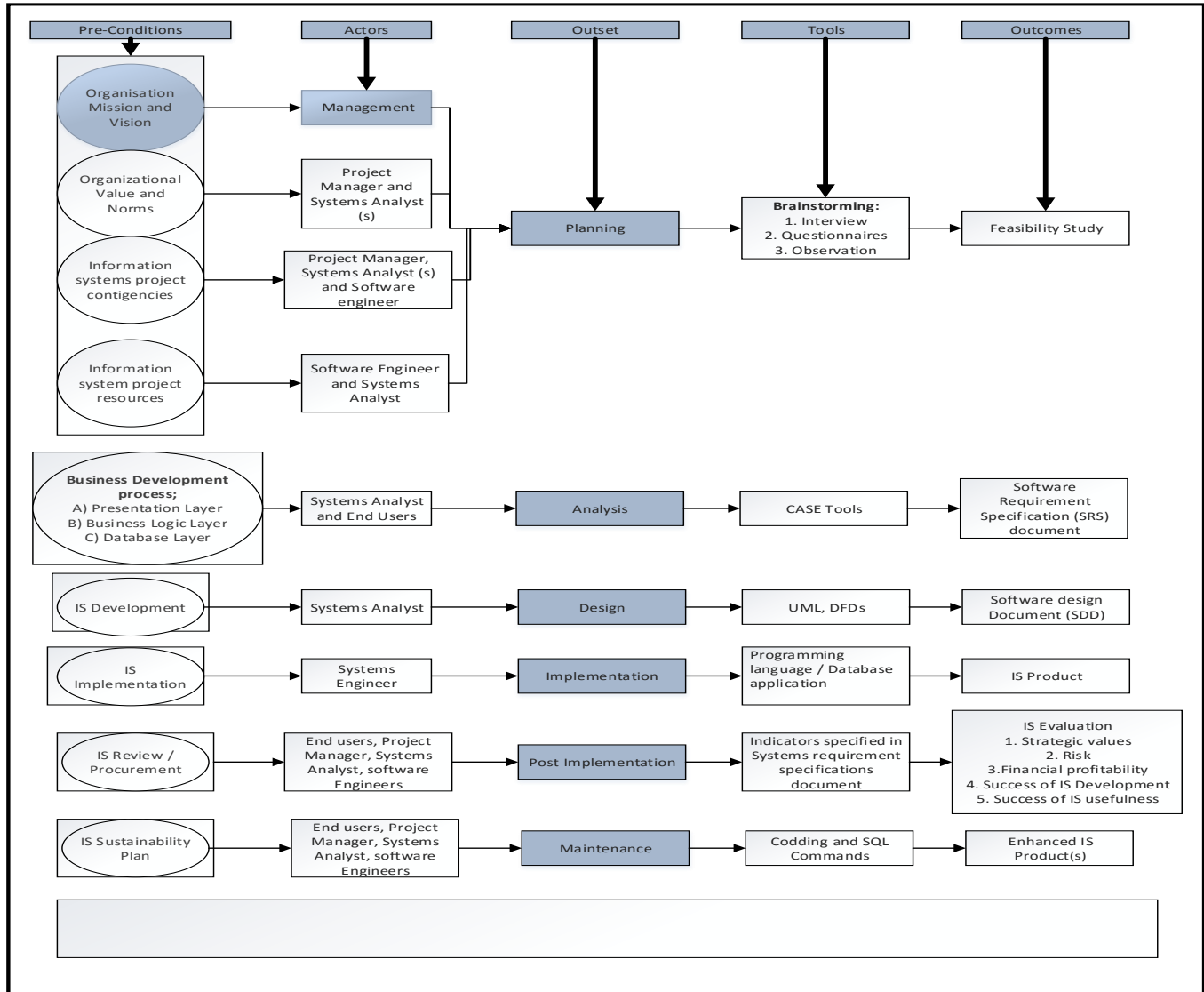


Figure 2. Conceptual framework for Enhanced Information systems development and management process (Phillip et al , 2010).

This study adopts and augment the conceptual framework for enhanced information systems development and management process illustrated by Philip et al 2010 by including the Organisation mission and vision precondition and management as one of key actors of the planning process.

### 2.3.2 Feasibility Study and Analysis

A major problem in this area is the development of predictions about the future of the organization and its environment. The strategic planning process typically involves a fairly small number of high level people (executives) who operate in a non-repetitive and often very creative way (Gay and Airasian, 2012). The

complexity of the problem that arise and the non-routine manner in which they are dealt with makes it quite difficult to appraise the quality of this planning process.

Systems Analysis addresses, what the proposed system must do. Systems analysis, addresses the problem of developing a classification scheme that allow management to have planning, direction and control perspective of what the systems must do. Anthony (1965) develops a systems analysis taxonomy for managerial activity consisting of three categories and argues that these categories represent activities sufficiently different in kind to require the development of different systems. The first of Anthony's categories of managerial activity is strategic planning: "Strategic planning is the process of deciding on objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use and disposition of these resources." Strategic planning focusses on the choice of objectives an organisation sets and the activities and means required to achieve these objectives. The second category defined by Anthony is that of management control: "Management control is the process by which managers assure that resources are being used effectively and efficiently in the accomplishment of the organization's objectives." Anthony's third category is operational control, by which he means "the process of assuring specific tasks are carried out effectively and efficiently." The difference between management control and operational control are that operational controls are specifically concerned with tasks to be performed to achieve the objectives while management controls are concerned with people, policies and procedures employed to execute the tasks. Feasibility assessment addresses issues pertaining to the probability and achievability of the desired objectives that organisations choose to pursue.

This study agrees with Anthony's categories of managerial activities concerned with strategic objectives formulation that cascades to information system acquisition, development and implementation to solve the business problem or attain the strategic objective. The ADIF adopts these categories for the acquisition phase that are elicited by business objectives determined in the strategic planning phase

### **2.3.3 Systems Design**

Information System design refers to the process of transforming the business idea into a logical and conceptual model. The model is used by system developers to build (Code) the system. The business idea is turned into a conceptual and logical model. The system design defines what is going to be done or built. The systems design phase implies the use of scientific principles (use case diagrams, UML), technical information and imagination in the definition of an information system to perform pre-specified functions (business objective) Fielden (2013).

### **2.3.4 Build**

As domain-specific software becomes more available, businesses face a dilemma: whether to acquire commercial off-the-shelf (COTS) enterprise management systems or to build them in-house. Companies choosing to create a product internally are often rewarded with flexibility and control over their development process and its results while customization of COTS is the option available for companies that choose to buy commercial off-the-shelf enterprise systems. This phase refers to the coding (programming) of the information system defined in the design stage.

There are several software build strategies. This study reviewed the following:

#### **2.3.4.1 Agile Approach**

Agile software development is not a set of tools or a single methodology, but a philosophy put to paper in 2001 with an initial 17 signatories (Cockburn, 2003). Agile was a significant departure from the heavyweight document driven software development methodologies such as waterfall in general use at the time. While the publication of the “Manifesto for Agile Software Development” didn’t start the move to agile methods, which had been going on for some time, it did signal industry acceptance of agile philosophy (Gibson, 2011). Greg Smith and Ahmed Sidky, 2009, state that "many people may think that agile is just another software development process. Although that is true to a degree, there is a lot more to agile than just a process or just a set of practices. Agile (or agility) is more of a mind-set way of thinking about software development."

The Agile software development philosophy values;

- i Individuals and interactions over processes and tools
- ii Working software over comprehensive documentation
- iii Customer collaboration over contract negotiation
- iv Responding to change over following a plan

Williams and Cockburn (2003) state that agile software development “is about feedback and change”, and they emphasize that software development is an empirical or nonlinear process, where short feedback-loops are necessary to achieve a desirable, predictable outcome. Erickson et al. (2005) further underlines the importance of lightweight processes in agile development, defining agility as to “strip away as much of the heaviness, commonly associated with the traditional software-development methodologies, as possible to promote quick response to changing environments, changes in user requirements, accelerated project deadlines and the like.” (p. 89). Agile software development has had



a major influence on how software development is conducted. It helps software developers plan and coordinate their work, how they communicate with customers and external stakeholders, and how software development is organized in small, medium-sized and large companies. Agile software development methods are seen as a reaction to plan-based or traditional software methods, which emphasize “a rationalized, engineering-based approach” (Dyba, 2000) incorporating extensive planning, codified processes, and rigorous reuse (Boehm, 2002). By contrast, agile methods address the challenge of an unpredicted-table world by recognizing the value competent people and their relationships bring to software development (Nerur and Balijepally 2007).

The 12 Agile principles are:

- i The highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- ii Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- iii Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- iv Business people and developers must work together daily throughout the project.
- v Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
- vi The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- vii Working software is the primary measure of progress.
- viii Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- ix Continuous attention to technical excellence and good design enhances agility.
- x Simplicity--the art of maximizing the amount of work not done--is essential.
- xi The best architectures, requirements, and designs emerge from self-organizing teams.
- xii At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly.

This study appreciates the contribution of the Agile philosophy to the body of knowledge of information systems development. Specific lessons learnt were the Agile philosophy that encourages documentation, customer relationship, individual interactions and responding to change all of which are factors that the ADIF advocates for. The notable omission with this model that the researcher believes is required is the need for flexibility.

#### 2.3.4.2 Rapid Application Development Model

Traditional lifecycles devised in the 1970s, and still widely used today, are based upon a structured step-by-step approach to developing systems. This rigid sequence of steps forces a user to “sign-off” after the completion of each specification before development can proceed to the next step (Smith, 2009). The requirements and design are then frozen and the system is coded, tested, and implemented. With such conventional methods, there is a long delay before the customer gets to see any results and the development process can take so long that the customer’s business could fundamentally change before the system is even ready for use (Anonymous, 2018).

In response to these rigid, cascading, one-way steps of stage wise or Waterfall Models of development, Barry Boehm, Chief SW Engineer at TRW, introduced his Spiral Model (Boehm, 2002). The work of Boehm and Gilb paved the way for the formulation of the methodology called Rapid Iterative Production Prototyping (RIPP) at DuPont in the mid-to-late 1980s (Smith, 2009). James Martin then extended the work done at DuPont and elsewhere into a larger, more formalized process, which has become known as Rapid Application Development (RAD). RAD compresses the step-by-step development of conventional methods into an iterative process. The RAD approach thus includes developing and refining the data models, process models, and prototype in parallel using an iterative process (Boehm, 2002).

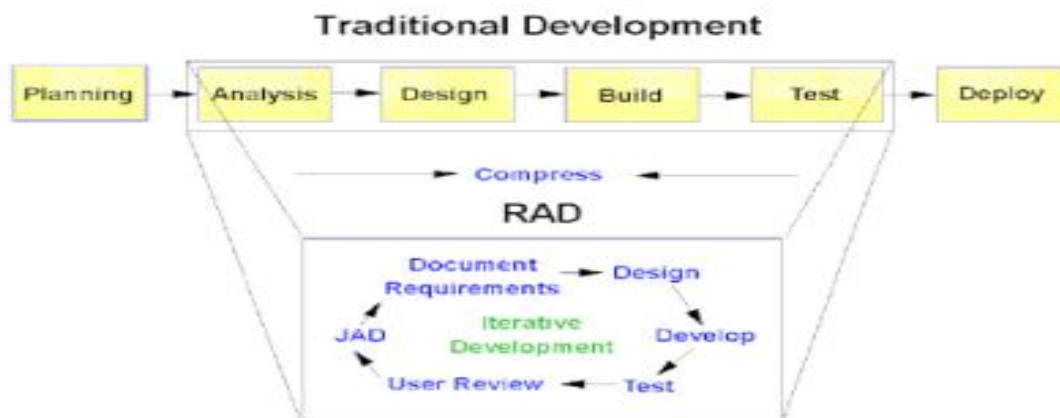


Figure 3. A comparison of the Traditional system development and Rapid Application Development (Boehm, 2002).

Professor Clifford Kettemborough of Whitehead College, University of Redlands, defines Rapid Application Development as “an approach to building computer systems which combines Computer-Assisted Software Engineering (CASE) tools and techniques, user-driven prototyping, and stringent project delivery time limits into a potent, tested, reliable formula for top-notch quality and productivity (BlueInk, 2005). RAD drastically raises the quality of finished systems while reducing the time it takes to build them.” Online Knowledge defines Rapid Application Development as “a methodology that enables organizations to develop strategically important systems faster while reducing development costs and maintaining quality. This is achieved by using a series of proven application development techniques, within a well-defined methodology.” (BlueInk, 2005)

RAD takes advantage of automated tools and techniques to restructure the process of building information systems. RAD replaces hand-design and coding processes, which are dependent upon the skills of isolated individuals, with automated design and coding, which is an inherently more stable process. Rapid Application Development is more stable and provides a capable process, as it is much faster and less error prone than hand coding.

In Zambia most organisations are struggling with legacy systems and are faced with a backlog of new systems to be developed. The system development is partly inhibited by the rigidity of programming languages and database system used to develop these systems with little or no documentation of these systems in most instances. This leads to organisations spending over most of their IT budgets on existing IT systems maintenance and support. RAD increases the likelihood that the system will be satisfactory to the users, whose demands are met much quicker than ever before. The RAD process also directly integrates the end-users in the development of the application

RAD Limitations include;

- The methodology works best for projects where the scope is small or work can be broken down into manageable chunks. Along these lines project teams must also be small, preferably two to six people, and the team must have experience with all technologies that are to be used.
- Business objectives will need to be well defined before the project can begin, so projects that use RAD should not have a broad or poorly defined scope.
- Furthermore, in order to keep the project within a short time frame, decisions must be able to be made quickly, so it is imperative that there be very few client decision makers, preferably only one, and they must be clearly identified up front.
- Client decision makers need to understand and agree to a RAD approach and ideally should be willing to accept a product that is less full featured and/or be willing to accept higher

development cost (due to the emphasis on purchasing reusable components over building them) in exchange for increases in speed.

#### **2.3.4.3 Computer Aided Software Engineering (CASE) Tools and Techniques**

Computer Aided Software Engineering (CASE) are the software tools that provide automated support for some portion of the systems development process.” Hoffer (1999). CASE tools are computerized software development tools that support the developer when performing one or more phases of the software life cycle and/or support software maintenance (Boehm, 2002).

#### **2.3.5 Testing**

Information system testing is one of the four levels of quality assurance. It is an expensive but critical process that can take up to 50% of the budget for program development (Mwazembe, 2005). Testing is a process of executing a program with the explicit intention of finding system errors. The philosophy behind testing is to find errors. Test cases are therefore developed with this purpose behind. The data is created to determine whether the logic of the system will process it correctly. There are basically two categories of testing namely;

##### **2.3.5.1 Code testing / white box testing**

The code testing strategy examines the logic of the program (information systems). The conditions or logic of the program are examined with live data simulation and review that the system processes the data with the intended business logic.

##### **2.3.5.2 Specification testing / black box testing**

Specification testing strategy compares the functionality of the information system against the user specifications documents. Approved user requirements defined the requirements specification document act as the checklist for this tests. End users must be involved in these test to confirm that the desired requirement is met and a user acceptance certificate issued, signed and accepted by the end users that indeed the desired business logic has been achieved. Specification testing is a more efficient strategy because it focuses on the way the system is expected to be used. This testing strategy is akin to ITIL system requirement of fit for purpose and fit for use requirement for systems transitioning to operations

#### **2.3.6 Information system implementations strategies**

Information system implementation includes all those activities that take place to convert from the old system to the new (Mwazembe, 2005). The new system may be totally new, replacing an existing manual or automated system or it may be a major modification to an existing system. Proper implementation is essential to provide a reliable system that meets the organisational requirements. Successful implementation may not guarantee improvement in the organisation if the departure point for system acquisition is not properly defined

by the organisation strategists or the system design did not adequately address the software requirements specification (SRS).

Mwazembe (2005) identifies 3 aspects of systems implementation namely;

#### **2.3.6.1 Training personnel**

Many systems depend on the I.T personnel who are responsible for keeping the equipment running as well as proving the necessary systems support service. Training also involves familiarization of run procedures which involve working through the sequence activities needed to use a new system on an on-going basis. The IT personnel training must ensure that they are able handle to all possible operations both routine and extraordinary.

#### **2.3.6.2 Conversion procedures**

Conversion is the process of changing from the old system to the new one (Mwazembe, 2005). There are four methods of handling system conversions namely;

#### **2.3.6.3 Parallel systems**

Under this approach user continue operating the old system in the familiarised manner but they also begin using the new system (Mwazembe, 2005). Both systems are concurrently running and users pass or post entries in both systems.

This system guarantees that should there be a challenge such as computational errors in processing or failure to handle certain type of transactions arising from the use of the new system the organisation can still fall back onto the old system. The downside of this approach is that the running cost doubles and users tend to resist change by frustrating efforts of complete switchover to the new system.

#### **2.3.6.4 Direct cutover or big bang**

With this approach the organisation converts from the old system to the new system abruptly on a planned conversion day. There are no parallel activities. If not properly executed this approach can have detrimental effects on the organisation due to lack of fall back system however, its advantage is that it prompts users to accept change and make the new system work knowing that they do not have any other method to fall back on.

#### **2.3.6.5 Pilot approach**

The Pilot approach is preferred when the new systems involve new techniques or drastic changes in organizational performance. With this method a prototype (working version) of the system is implemented in a single or two departments and simulated and modified to meet user requirements. Upon satisfaction

of functionality the whole solution is rolled out to the other department at once (big bang approach) or gradual (phased-in Approach).

#### **2.3.6.6 Phase-in approach**

This approach is used when it is not possible to install the new system at once throughout an organization all at once. This implies staging the implementation over a period of time ranging from week to months. Some users will begin to take advantage of the system before the others.

#### **2.3.7 Post implementation review**

Once the system conversion and implementation is complete, a review is usually conducted by users and analysts alike. This is a practice undertaken to determine whether the system meets expectations such as user requirements, value realisation, operation ability, fit for use and fit for purpose to mention but a few. This is an important step to undertake as it measures the worthwhile of the undertaking. The post implementation review provides the first source of information for maintenance requirements.

### **2.4 Best practice information systems frameworks**

Like other disciplines of life, Information Systems undergo many stages from the conception of the idea until the retirement or withdrawal of the system. Best practice frameworks reviewed this this study included.

#### **2.4.1 Control objectives for information and related technologies (COBIT5)**

Control Objectives for Information and Related Technologies (COBIT5) is a holistic non prescriptive, IT and business governance, management, risk and value creation enterprise framework. The framework defines a set of generic processes for the management of IT, with each process defined together with process inputs and outputs, key process-activities, process objectives, performance measures and an elementary maturity model. COBIT5 also provides a set of recommended best practices for governance and control process of information systems and technology with the essence of aligning IT with business. COBIT 5 was developed by the Information Systems Audit and Control Association (ISACA).

ISACA first released COBIT in 1996, originally as a set of control objectives to help the financial auditors manage to conduct audits in IT-related environments R.E Stroud, (2012). In 19998 ISACA saw value in expanding the frameworks beyond the auditing realm and released a broader version, COBIT version 2 which was expanded further by adding management guidelines in 2000's and released COBIT version 3. The development of both the AS 8015: Australian Standard for Corporate Governance of Information and Communication Technology in January 2005 and the more international draft standard ISO/IEC DIS 29382 which soon after became ISO/IEC 38500 in January 2007 increased awareness of the need for more information and communication technology (ICT)

governance components da Cruz, (2006). ISO/IEC 38500 ISO/IEC 38500 is an international standard for corporate governance of information technology published jointly by the International Organization for Standardization (ISO) and the International Electro Technical Commission (IEC). ISACA inevitably added related components/frameworks with versions 4 and 4.1 in 2005 and 2007 respectively, "addressing the IT-related business processes and responsibilities in value creation Val IT and risk management (Risk IT). Val IT is a governance framework that can be used to create business value from IT investments developed by the IT Governance Institute (ITGI). COBIT 5 released in 2012 consolidates COBIT 4.1, Val IT and Risk IT into a single framework acting as an enterprise framework aligned and interoperable with other frameworks and standards. The two main drivers for the development of the COBIT 5 framework are:

- i Provide guidance in: end to end business and IT responsibilities, Controls for user-initiated and user-controlled IT solutions.
- ii A need for the enterprise to: Enterprise architecture, Asset and service management, leverage on emerging sourcing and organization models, enhance Innovation and emerging technologies, achieve increased value creation from technological solutions to business problems, obtain business user satisfaction, achieve compliance with relevant laws, regulations and policies, Improve the relation between business and IT, and Increase the return of governance over enterprise IT. Figure 4 below illustrates the evolution of the COBIT5 framework;

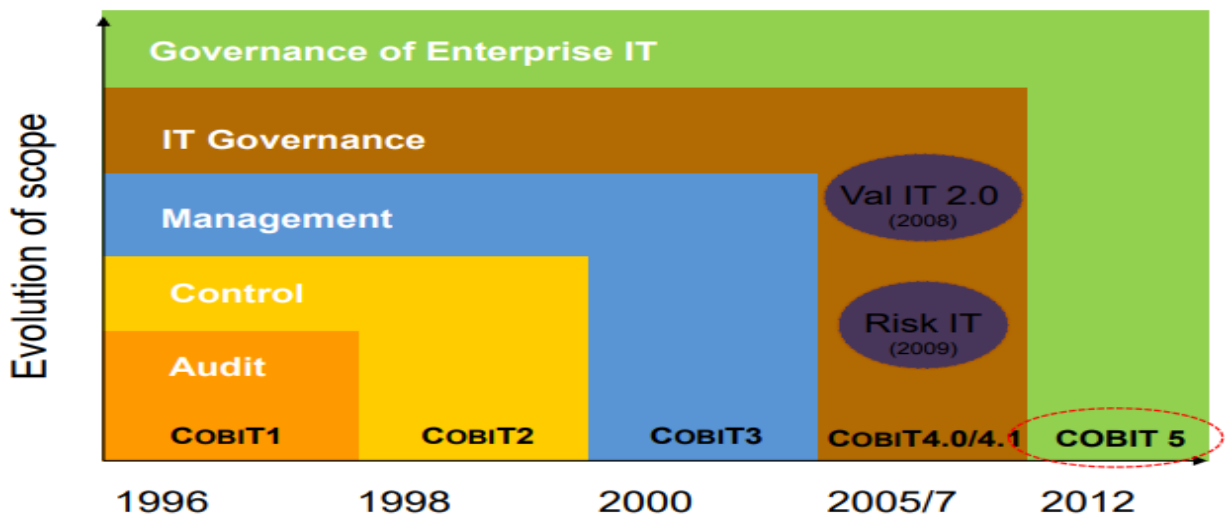


Figure 4. COBIT5 Framework Evolution (ISACA, 2018).

COBIT 5 provides the industry accepted framework under which IT governance goals and objectives are derived from stakeholder drivers with the intent of enterprise IT generating business value from IT-enabled investments (Information system Acquisition, Development and implementation). The majority

of business benefits are obtained through changes enabled by technology. Benefits do not just happen when new technology is delivered; they occur throughout the business cycle.

### COBIT 5 Principles



Figure 5. The COBIT5 Principles (ISACA, 2018)

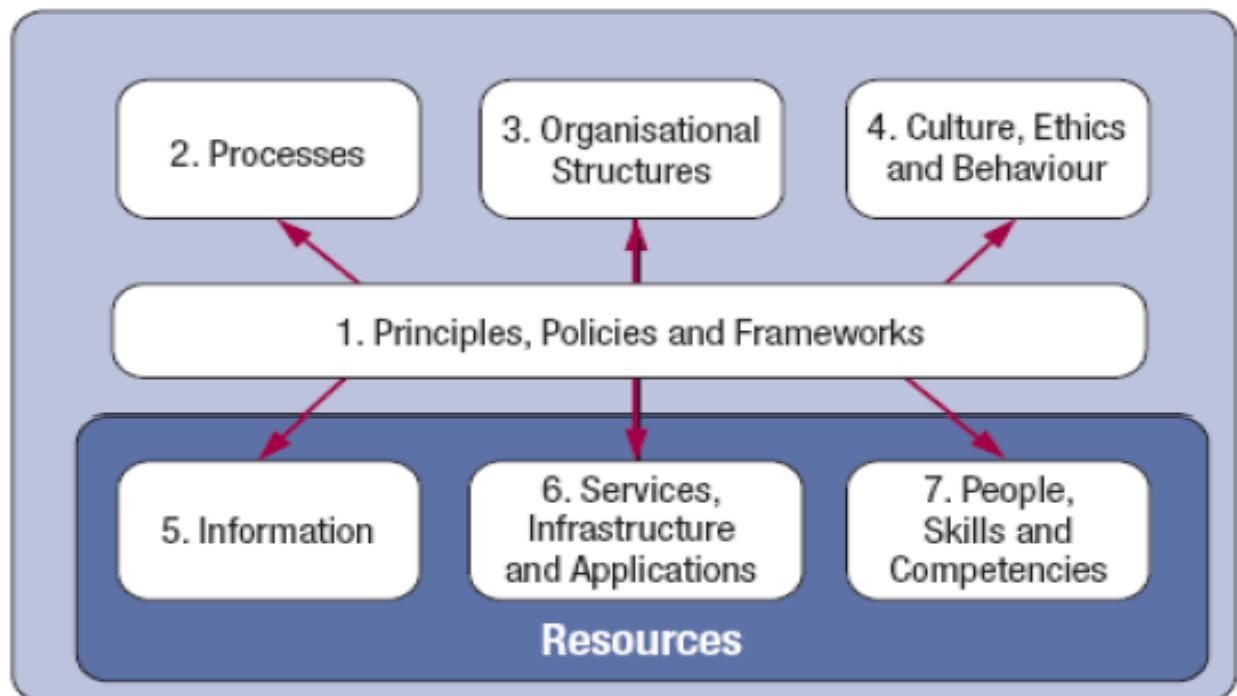


Figure 6. The COBIT5 Enablers (Robert E. Stroud, 2016)



#### 2.4.2 Information Technology Information Library (ITIL)

ITIL was developed in the 1980s and 1990s by CCTA (Central Computer and Telecommunications Agency, now the Office of the Governance Commerce, OGC) under contract to the UK Government (**ITIL Pocket Guide, 2011 Edition**). Since then, ITIL has provided not only a best practice based framework, but also an approach and philosophy shared by the people who work with IT in practice. ITIL is widely used in Information system Acquisition, Development and implementation is the Information Technology Infrastructure Library (ITIL) framework (**ITIL Pocket Guide, 2011 Edition**). It offers a systematic approach to the delivery of quality IT services. ITIL has now been updated three times, the first time in 2000 – 2002 (V2), the second time in 2007 (V3) and now in 2011. From 2011 onward, new editions will be named by the year of their release (“ITIL 2011”). ITIL Pocket Guide, 2011 Edition.

The ITIL framework is used predominantly by people working to provide services that are delivered using IT or infrastructure. IT service management is the implementation and management of quality IT services that meet the needs of the business delivered by IT Service Providers through an appropriate mix of people, process and information technology (ITIL® 2011, Service Strategy 2.1.3). The maintenance of the best practice documentation of ITIL is done by several organisations namely:

- i Office of Governance (OGC) – Owner of ITIL and promoter of best practice in numerous areas including IT service management
- ii IT service Management forum (itSMF) – an independent global internationally recognised not-for profit organisation dedicated to support the development of IT service management
- iii APM Group (APMG) – Since 2006 OGC contracted the management of ITIL rights, certification of ITIL exams and accreditation of training organisations to the APMG. It defines the certification and accreditation schemes for the ITIL exams and publishes the associated certification system.
- iv Examinations Institutes – Accredited by APMG these institutions support world-wide delivery of the ITIL exams.

Figure 7 below shows the ITIL Domains depicting the service lifecycle. ITIL view IT as a service enabling the realisation business objectives.

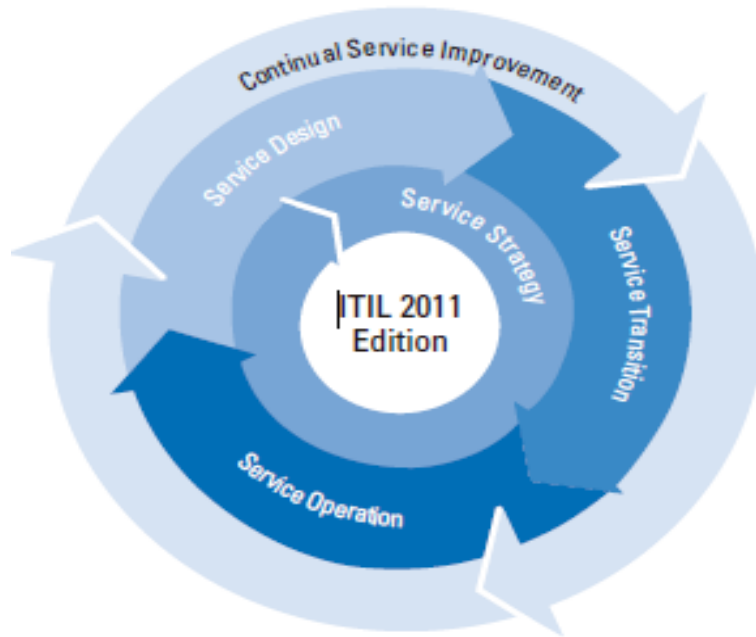


Figure 7. ITIL service lifecycle stages (ITIL Pocket Guide, 2011 Edition).

#### 2.4.3 Certified Information Systems Auditor (CISA) Domain 3; Information System Acquisition, Development and Implementation

Certified Information Systems Auditor (CISA) is a certification issued by ISACA for the people in charge of ensuring that an organization's IT and business systems are monitored, managed and protected M Rouse (2016). CISA has 5 domains illustrated in figure 8 below:

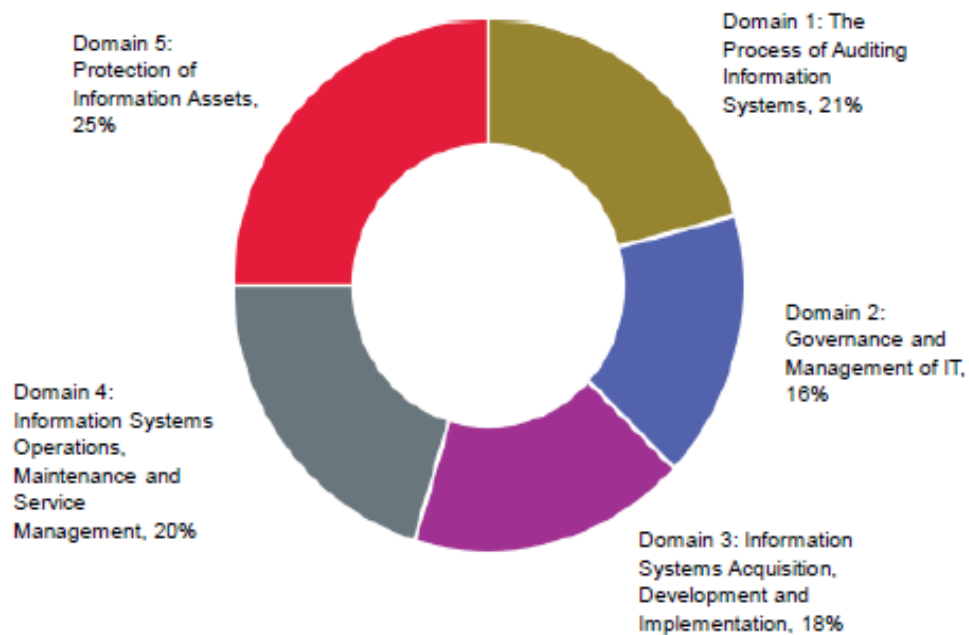


Figure 8. The 5 CISA Domains (CISA® Review Manual 26th Edition, 2016).

This research paper draws some lessons from the CISA domain number 3: Information Systems Acquisition, Development and Implementation. According to ISACA, CISA handbook 26<sup>th</sup> Edition; Information system acquisition, development and implementation refers to the use of technology to solve business problems. Business problems and risks are a whole purpose that organisations exist for in the first place. To create solutions to these problems or mitigate risks associated with these challenges, customers pay for these solutions in return for value realisation. CISA provides a framework to assess and assure enterprises of Information systems reliability, operability, security, control and risk mitigation measures that ensure value realisation from IT investments and resources.

#### **2.4.4 ISO /IEC 27001**

ISO/IEC 27001 is derived from BS 7799 Part 2, first published as such by the British Standards Institute in 1999. BS 7799 Part 2 was revised in 2002, explicitly incorporating the Deming-style Plan-Do-Check-Act cycle. BS 7799 part 2 was adopted as ISO/IEC 27001 in 2005 with various changes to reflect its new custodians. ISO/IEC 27001:2005 was extensively revised in 2013, bringing it into line with the other ISO management systems standards (ISO27K, 2018).

All the ISO management systems standards specify good governance and management arrangement practice concerned with their respective topic areas. Management information and metrics are vital, along with explicit business-driven objectives or goals against which to measure and assess actual performance, and the governance structures (such as policies and compliance activities) to enact or implement the changes necessary to mature the organization. In Deming's world, 'knowledge' and 'data' are the essential tools of management. Since 2012, all the ISO management system standards are being gradually aligned around the same core structure and concepts, often using more or less identical boilerplate text and terms (ISO27K, 2018).

### **2.5 Related Works**

Similar studies were reviewed and table 1 below provides the findings and identified gaps from the respective studies. Factors affecting the successful implementation of ICT projects in government, Gichoya (2005) provides insights on the many challenges affecting African countries with information systems implementations. Challenges to the successful implementation of e-government initiatives in sub-Saharan Africa Nkohkwo et al. (2013), An analysis of the factors influencing implementation of computer based information systems in public universities in Kenya; case study of Egerton University, Sirma and Ngacho (2014), An analysis of the critical success factors of the integrated financial management system in selected Kenyan counties, Micheni (2017) and the integrated financial management information system; guideline for effective implementation by public sector in South Africa, Hendriks (2012) are some of the related research works from which valuable insights have been drawn from during the course of the research execution

Table 1. Related works

	Title	Year	Authors	Findings	Gaps
1	Factors Affecting the Successful Implementation of ICT Projects in Government ( <b>Gichoya, David, 2005</b> )	2005	David Gichoya,	<ul style="list-style-type: none"> <li>▪ Unstable ICT resources yet the budgets for ICT are inadequate but rising.</li> <li>▪ lack of ICT policies and master plans to guide investment. To the extent that, with a number donors funding ICT, there have been multiple investments for the same product due to lack of coordination.</li> <li>▪ Operational/running costs are met by the government. Funding (capital and human resource requirements) ends with the project phase.</li> <li>▪ Some investments are made without prior consultation or carrying out a needs analysis by the recipient organization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Insufficient resources to fund IT projects</li> <li>▪ Risk management had not been addressed, business systems had not been justified to the full and lack of involvement from management</li> <li>▪ Though developing countries commit a sizable amount of economic resources to ICT, for them to reap maximum benefits, ICT needs careful planning and coordination prior to implementation and use otherwise trial and error methods of implementation that characterise most government ICT applications only succeed in the wastage of the scarce resources</li> </ul>
2	Challenges to the Successful Implementation of e-Government Initiatives in Sub-Saharan Africa: A Literature Review	2013	Quinta Nven-akeng Nkohkwo, M. Sirajul Islam	<ul style="list-style-type: none"> <li>▪ Lack ICT infrastructure along with other issues such as human resources, legal framework, Internet access and connectivity, digital divide, language and illiteracy</li> <li>▪ Infrastructural, financial, political, organizational, socio-economic, and human (IF-POSH).</li> <li>▪ The political situation and leadership of the countries in SSA pose a challenge. Leadership is not only an important</li> </ul>	<ul style="list-style-type: none"> <li>▪ Apart from the lack of ICT infrastructure. Financial constraints in the Africa the researcher failed to identify the other key challenges. This research however, agrees with the findings of this research.</li> </ul>

				driving force in the implementation of an innovative initiative, there also needs to be a political will which is missing in the case of SSA.	
3	An Analysis of Factors Influencing Implementation of Computer Based Information Systems in Public Universities in Kenya: A Case Study of Egerton University ( <b>Jerotich Sirma, 2014</b> )	2014	Jerotich Sirma, Felix Obegi and Dr. Christopher Ngacho	<ul style="list-style-type: none"> <li>▪ Whatever is designed and agreed upon as project activities becomes difficult to implement due to persistence change in university administrations (scope creep).</li> <li>▪ Lack of ICT policy has also been mentioned to be another contributor to either failure or success of any IS implementation in public universities.</li> <li>▪ The acquisition of ICT resources and their implementation are never on strategic action, in that, procurement is never planned</li> </ul>	<ul style="list-style-type: none"> <li>▪ Poor project and strategic management</li> <li>▪ No governance procedures thus no prioritization and business justification for ICT projects</li> <li>▪ though the adoption and utilization of ICT in Kenya's public universities is at infancy, its execution must be done cautiously in a manner that allow successful implementation</li> </ul>
4	Analysis of the Critical Success Factors of Integrated Financial Management Information Systems in Selected Kenyan Counties ( <b>Micheni, 2017</b> )	2017	Elyjoy Muthoni Micheni	<ul style="list-style-type: none"> <li>▪ The study revealed that adequate communication from management as shown by high percentage of over 60 indicating general agreement.</li> <li>▪ IFMIS implementation implemented just another government directive, without considering the importance of the change management required contrary to the who found that having the users informed on how IFMIS will affect their current work is important in ensuring the success in the implementation as this will reduce resistance by the users and enhance acceptance of the new system.</li> </ul>	<ul style="list-style-type: none"> <li>▪ There was lack of effective communication and end user involvement in the implementation process.</li> <li>▪ There was no evaluation and feedback process in place to access the benefits or objective realisation.</li> <li>▪ Capacity building and training need to be focused out during the needs assessment process.</li> <li>▪ Training programs need to address various audiences, from top management to low level management</li> </ul>

				<ul style="list-style-type: none"> <li>change management techniques such as how the project is planned and implemented and end-user involvement in design and the findings of this study indicate that there are no regular consultative forums held for all stakeholders involved in the IFMIS implementation process.</li> <li>Since the county governments started using the IFMIS, no effort has been made so far to collect feedback on the benefits and challenges of using the system, or advance the skills of those using the system.</li> <li>Human capital development issues have not been dealt with adequately, it was reported that most counties did not provide adequate training on IFMIS to their staff; there are no regularly planned skills upgrading courses for IFMIS; and low motivation to retain IFMIS trained staff in the counties.</li> </ul>	
5	Integrated Financial Management Information Systems: Guidelines for effective implementation by the public sector of South Africa ( <b>Hendriks, 2012</b> )	2012	Christoffel J. Hendriks	<ul style="list-style-type: none"> <li>The IFMIS programme proved to be more complex than what was originally envisaged.</li> <li>There was an initial lack of sufficient capacity in the State Information Technology Agency (SITA) as the Prime Systems Integrator (PSI) from the commencement of the project.</li> <li>The movement of some Phase 3 deliverables (acquisition and implementation of COTS products) to</li> </ul>	<ul style="list-style-type: none"> <li>The research did not give the details of the modules that were being implemented</li> <li>The research did not provide details on what sort of legal framework was required to support the implementation</li> <li>The business processes that required re-engineering was not mentioned in the research so as to</li> </ul>

				<p>Phase 2 placed an additional burden on the IFMIS project.</p> <ul style="list-style-type: none"> <li>▪ Misalignment between the HRM product procurement and the Payroll product development resulted in challenges relating to the duplicate capturing of data on IFMIS and PERSAL in the HRM lead sites.</li> <li>▪ There was insufficient capacity at user departments to take on IFMIS modules, for example, inadequate ICT infrastructure, budgets and staff with sufficient functional capabilities. Weak commitment to change</li> </ul>	determine the degree of user involvement required
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## **2.6 Summary**

The chapter has presented the Information systems acquisition processes by evaluating and analysing the business requirements that triggers decision to acquire an information system to solve a business problem. Further the chapter evaluated the information systems development process; several systems design and build (coding) approaches have been reviewed. COBIT5, ITIL, ISO/IEC 2700, Agile, RAD, CASE and SDLC models are some of the best practice frameworks that the research reviewed and drawn lessons.

Information systems testing and implementation techniques were also reviewed and lessons drawn on appropriate user engagement, value or benefit realisation of Information systems acquisition, development and implementation. Neumann, (2011) says that the most important thing is a customer and a product, because if a customer is well taken care of he will come back and if a product is properly developed it will not come back. The lesson drawn from this adage is that good Information systems development will ensure that the cost of maintenance (product maintenance) is minimised and augment customer satisfaction with information systems solutions.



## **CHAPTER THREE**

### **THE RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 Introduction**

This Chapter explains the procedures and methods used in the study. It gives the research design, study population, the sample size and sampling procedure, the outline of techniques used in data analysis and collection. The Chapter also sets out the methodology used to model and design the Acquisition development and implementation model. Ethical considerations taken into account during the study are also presented in this chapter.

#### **3.2 The Research Design Matrix**

MacMillan and Schumacher (2001) define a research design as a plan for selecting subjects, research sites, and data collection procedures to answer the research question(s). Further they indicate that the goal of a sound research design is to provide results that are judged to be credible. For Durrheim (2004), research design is a strategic framework for action that serves as a bridge between research questions and the execution, or implementation of the research strategy. Janesick (1994), stated that “qualitative research design begins with a question” and presented research design as a sequence of decisions that the researcher will need to make at each stage of the research. The architect Frank Lloyd Wright emphasized, the design of something must fit not only its use, but also its environment You will need to continually assess how your design is actually working during the research and how it influences and is influenced by the context in which you’re operating, and to make adjustments and changes so that your study can accomplish what you want.

The research design matrix below in table 2 provides a linear order of the research components developed and shows the connections between specific parts of each component, such as how each research question is related to the specific goal (s), data collection theory and data analysis methods. However, I am advocating for an interactive rather than a sequential model of research design primarily because I see design as pertaining to the actual relationships of the components of a research study and its environment that is constantly changing and for a design to remain relevant there is need for its ability to change or iterate to suit the research environment.

Table 2. The research design Matrix

Research Question	Research Objective	Population and Sampling	Data collection technique	Data Analysis technique
1 What are the causes of Information systems acquisition, development and implementation failure?	To identify the common cause of Information systems acquisition, development and implementation failure at The Road Transport and Safety Agency (RTSA), Zambia Telecommunication Company Limited (ZAMTEL), National Pension Scheme Authority (NAPSA), Zambia National Commercial Bank (ZANACO) and Zambia Revenue Authority (ZRA).	Purposive sampling	Survey questionnaires	Qualitative content analysis
2 How can an information systems acquisition, development and implementation framework (ADIF) enhance successful information systems acquisition, development and implementations in Zambia?	To develop an information systems acquisition, development and implementation framework (ADIF) that enhances successful information system acquisition, development and implementation in Zambia.	PAR	Interviews	Content analysis

### **3.3 Research Approach**

The research approach is a general term for inductive and deductive research approach, Saunders et al. (2007). Therefore, we can say that there are two types of approaches for research. We will elaborate them one by one.

#### **3.3.1 Inductive research approach**

In inductive approach the theory is developed or built through as a result of data analysis (Saunders et al. 2007). Ghauri and Gronhaug (2005) also support this view of that in inductive approach conclusion is drawn from empirical observations. In a simplified way we can express as.

Observations\ Findings  Theory

This study adopted an inductive approach. Using the analysis of the collected data this research develops the Information systems acquisition, development and implementation framework (ADIF) for Zambia. The inductive approach also deals with qualitative research, which we performed during the questionnaire administration at the named firms.

### **3.4 Target population**

Five organisations were enumerated namely ZRA, ZANACO, RTSA, ZAMTEL and NAPSA. The primary departments where questionnaires were administered are the Information technology department, Project Management Offices (PMO) and end user departments (operatives). The rationale for the site selection was to acquire various user perspectives of information systems acquisition, development and implementation.

### **3.5 Sample size and sampling procedure**

The study was done in five organisations targeting project management office (PMO), IT systems administration, IT management and end-users (system operators). The researcher believed that the selected organisations' operations depended on information systems and consequently, have at least experienced an information system acquisition, development and implementation. The organisations and participants were purposively sampled because the researcher was focusing on particular characteristics of respondents. A total of 80 questionnaires were distributed to the five (5) purposively sampled institutions for enumeration. Fifty-eight (58) questionnaires were responded to representing a 72.5% response rate.

### 3.6 Data collection

In this research questionnaires and interviews are seen as having differing and possibly complementary strengths and weaknesses. While questionnaires are usually viewed as a more objective research tool that can produce generalizable results because of large sample sizes, results can be threatened by many factors including: faulty questionnaire design; sampling and non-response errors; biased questionnaire design and wording; respondent unreliability, ignorance, misunderstanding, reticence, or bias; errors in coding, processing, and statistical analysis; and faulty interpretation of results (Oppenheim, 1992). Additionally, questionnaire research can be seen as over-reliant on instruments and, thus, disconnected from everyday life, with measurement processes creating a spurious or artificial sense of accuracy (Bryman, 2008). Neither are interviews neutral tools; here data are based on personal interactions which lead to negotiated and contextually based results (Fontana & Frey 2000; Silverman, 2000, 2006). While interviews provide contexts where participants can ask for clarification, elaborate on ideas, and explain perspectives in their own words, the interviewer can use questioning to lead or manipulate interviewee responses. Due to the interpersonal nature of the interview context, participants may be more likely to respond in ways they deem socially desirable (Richman, Keisler, Weisband, & Drasgow, 1999; Yin, 2009).

The rationale of using semi-structured interviews and structured questionnaires is in agreement to Harris (2010) observation that, “structured questionnaires and semi-structured interviews are often used in mixed method studies to generate confirmatory results despite differences in methods of data collection, analysis, and interpretation”. Brookhart & Durkin, 2003; Lai & Waltman, 2008 also observed that questionnaires and interviews are often used together in mixed method studies investigating educational assessment. While questionnaires can provide evidence of patterns amongst large populations, qualitative interview data often gather more in-depth insights on participant attitudes, thoughts, and actions (Kendall, 2008).

This study adopt the use of semi-structured interviews and structured questionnaires as illustrated in Figure 9. Below, The data collection Methodology.

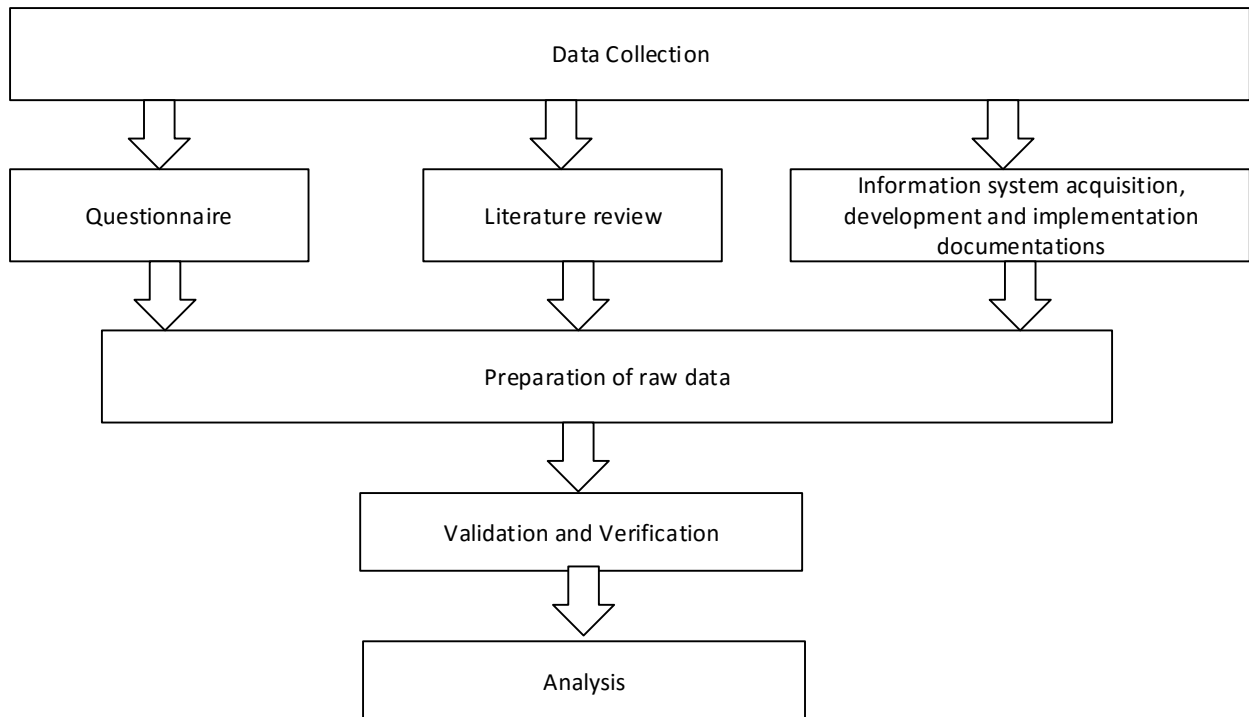


Figure 9. The data collection Methodology

### 3.7 Data Analysis

According to Creswell (2009) data analysis is an ongoing process that involves continual reflection about the data, asking questions and taking notes throughout the study. Qualitative data analysis could be conducted concurrently with gathering data, making interpretations and writing reports. In this research, we have collected primary data through questionnaires and semi-structure interviews and for secondary data we have reviewed the information systems acquisition, development and implementation documents of the respective organisations and literature review on the subject matter. This research adopted the four general procedures for analysis of qualitative data as outlined by Saunders et al. (2007). These are:

- i. Categorization
- ii. Unitizing data
- iii. Recognizing relationships and developing the categories.
- iv. Developing and testing theories to reach conclusions.

The statistical analysis tool used for the research study is Microsoft Excel 2016.

### **3.8 Ethical consideration**

During the research I adhered to the five principles of research ethics by ensuring that we; obtained informed consent from the potential research participants, minimise the risk of harm to participants, protect their anonymity and confidentiality, avoided using deceptive practices and give participants the right to withdraw from the research (Dlaerd, 2019). All the respondents that participated in the study were not required to provide their personal information that revealed their identities. Consequently, the respondents were assured of total confidentiality, non-persecution arising from their responses as clearance was sought from the organisation's human resource department before the administration of the questionnaires

### **3.9 ADIF modelling and design**

Information system acquisitions adopts in-house or outsourcing option depending on the urgency of the business need. Information Systems acquisition process conjures management's decision making; to buy or make decisions. According to Moschuris (2007) as cited by I. Sillanpaa (2015), the most important make or buy triggers are cost and quality problems. This study considers several other triggers that include capacity, competition, risk exposure, regulatory, flexibility and the nature of business as factors for Information systems acquisition, make or buy decision. Figure 10 below illustrates this taxonomy.

In this study, the researcher did not formulate any theory from the beginning, but instead had some questions in mind and then used the data collected to form the theory (ADIF). In this case, mainly the inductive research approach is applied. This research proposes the IS acquisition, development and implementation framework (ADIF), illustrated in Figure 10 below. The framework has 4 domains split into 8 stage processes flowing from the conception of the idea till the withdrawal of the Information system and promotes the inclusion of all relevant stakeholders in the entire lifecycle of an information system. It is believed that the earlier the stakeholders are involved in the process, the higher the acceptance chance of the change that comes with the solution

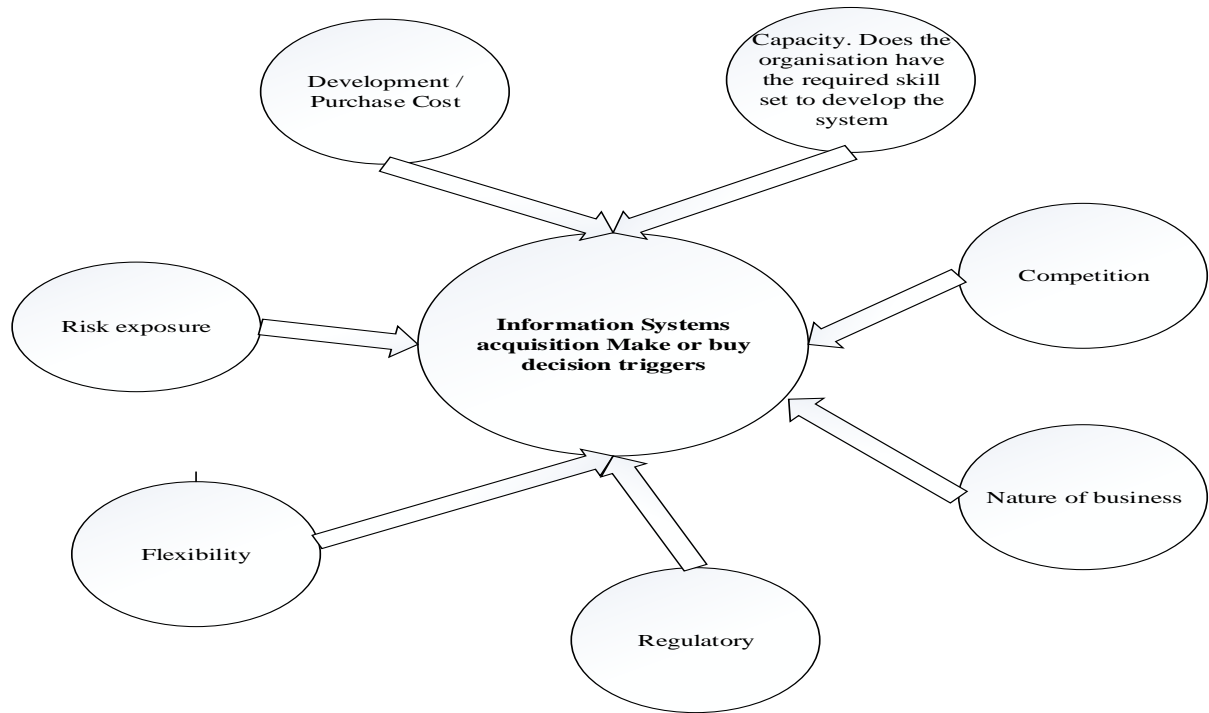


Figure 10. Information systems acquisition, make or buy decision triggers

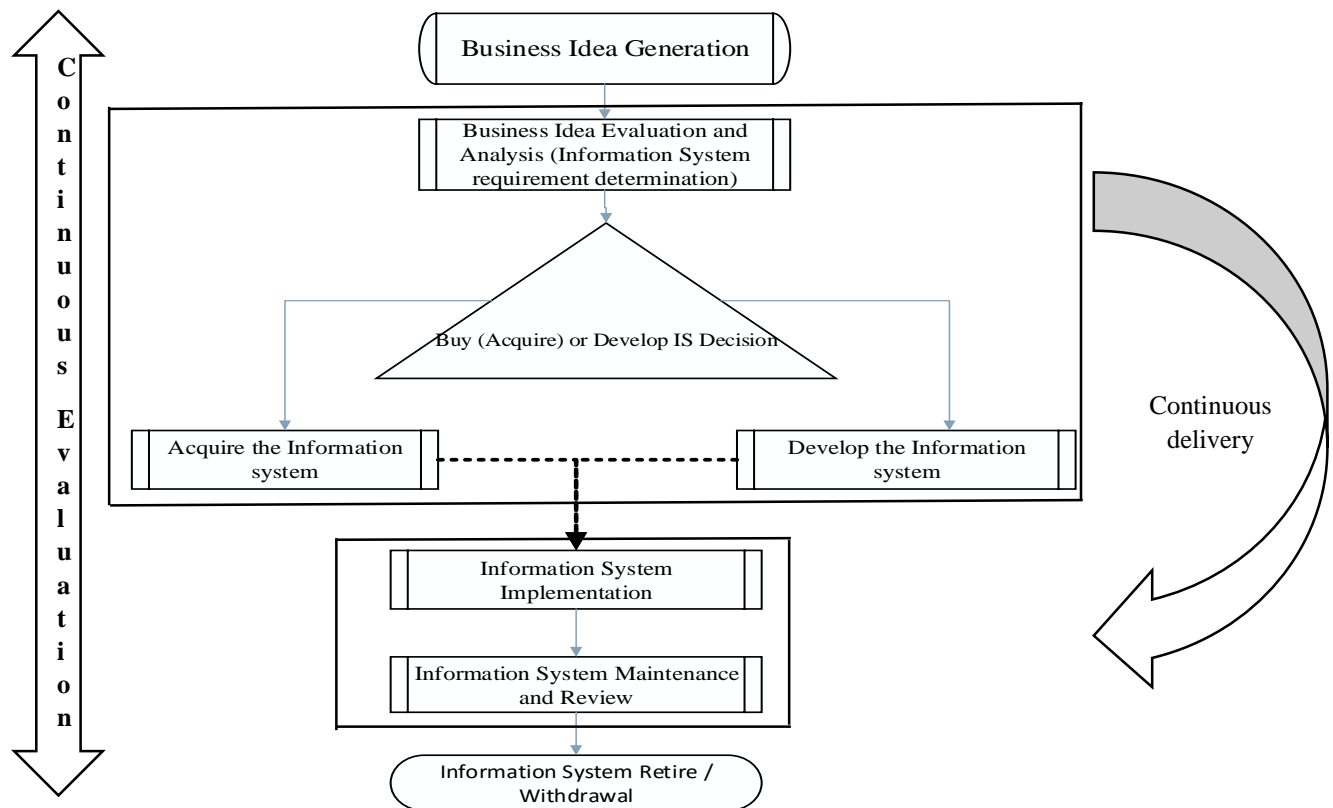


Figure 11. The Information Systems Acquisition, Development and Implementation framework (ADIF)

**Acquisition;** This is the stage of the model where decision to acquire/develop and information system is determined by management. This model proposes that relevant stakeholders must be involved.

**Development;** This stage is the translation of the business idea into a functional system for implementation

**Implementation;** The system is deployed from production and in use.

**Continuous business justification evaluation;** from the conception of the idea to implementation the business objectives must be evaluated to ensure that it remains relevant and feasible otherwise the project at whatever stage must be terminated if the business objective for the engagement no longer remains feasible or justifiable

### **3.10 Limitations of The Study**

- Time: The research was conducted within limited time; juggling work, home and school (research responsibilities) at the same time adversely affected the extent on research man hours
- Finances: The research was not externally funded. The researcher applied personal finances to meet the costs of the study.
- Lack of experience in statistical software: The researcher lacked essential experience in academic research software's such as SPSS, Stata etc.

### **3.11 Summary**

This chapter of the research dealt with the description of the methods applied in carrying out the research study. It is organized under the following sections: Introduction, research phases, the research design matrix, the research approach, the data collection and analysis tools used and the research sites and population. An inductive research approach was selected because the aim of the research is to develop a framework (theory) from the analysis of the respondents' data. Due care was applied in selecting the appropriate design that would assist the researcher achieve the research objectives and minimise the risks associated with poorly selected design approaches.



## CHAPTER 4

### PRESENTATION OF FINDINGS AND DISCUSSION

#### 4.1 Introduction

This chapter presents the summary of the findings of the research with particular reference to the research problem, objectives and results. It provides a summary of the main findings of the study, challenges encountered during the study, discussion and recommendations of the findings. The chapter further provides an evaluation of the extent to how the research objectives were accomplished.

#### 4.2 Questionnaire distribution

Table 3. Questionnaire distribution table

Name of Institution	Number of Questionnaires
NAPSA	16
RTSA	16
ZAMTEL	16
ZANACO	16
ZRA	16
<b>TOTAL</b>	<b>80</b>

#### 4.3 Response rate

During the data collection questionnaires were addressed to the Zambia National Commercial Bank, Zambia Revenue Authority, National Pension Scheme Authority, Zambia Telecommunications Limited, and Road Transport and Safety Agency.

A total of 80 questionnaires were distributed to the five (5) purposively sampled institutions for enumeration. Fifty-eight (58) questionnaires were responded to representing a 72.5% response rate.

Table 4. Response rate

Total questionnaires distributed	Questionnaires responded to	Unanswered questionnaires
80	58	22
100%	73%	27%

### 4.3.1 Response by Institutions

#### 4.3.1.1 The National Pension Scheme Authority (NAPSA)

Table 5. The NAPSA response

Sample Size	Organization	Gender	Respondent Classification				
			Information Technology Management	Systems Administration & Support	End User	Education Level	Professional qualification
16							
1	NAPSA	Male	1	0	0	Masters	PMP
2	NAPSA	Male	1	0	0	Masters	Other
3	NAPSA	Male	0	1	0	Degree	Change Mgt
4	NAPSA	Female	0	1	0	Diploma	ITIL
5	NAPSA	Male	0	0	1	Diploma	Other
6	NAPSA	Male	0	1	0	Degree	Other
7	NAPSA	Male	0	1	0	Degree	Other
8	NAPSA	Female	0	1	0	Degree	Other
9	NAPSA	Male	0	1	0	Degree	Other
10	NAPSA	Male	0	1	0	Degree	ITIL
11	NAPSA	Female	1	0	0	Degree	ISO 27001

#### 4.3.1.2 The Road Transport and Safety Agency (RTSA)

Table 6. The RTSA response

Sample Size	Organization	Gender	Respondent Classification				
			Information Technology Management	Systems Administration & Support	End User	Education Level	Professional qualification
16							
1	RTSA	Male	1	0	0	Degree	ISO 27001
2	RTSA	Male	1	0	0	Degree	Other
3	RTSA	Male	0	0	1	Masters	Change Mgt
4	RTSA	Female	0	0	1	Masters	Other
5	RTSA	Male	0	1	0	Diploma	ITIL
6	RTSA	Male	1	0	0	Degree	ITIL
7	RTSA	Male	0	1	0	Diploma	MCP
8	RTSA	Female	0	1	1	Diploma	ITIL
9	RTSA	Male	0	1	1	Diploma	ITIL
10	RTSA	Male	0	1	0	Degree	Other
11	RTSA	Male	0	1	0	Degree	PMP

#### 4.3.1.3 The Zambia Telecommunications Limited (ZAMTEL)

Table 7. The ZAMTEL response

Sample Size	Organization	Gender	Respondent Classification				
			Information Technology Management	Systems Administration & Support	End User	Education Level	Professional qualification
1	ZAMTEL	Female	0	0	1	Diploma	PMP
2	ZAMTEL	Male	0	1	0	Degree	PMP
3	ZAMTEL	Female	0	0	1	Diploma	PMP
4	ZAMTEL	Female	0	1	1	Diploma	ITIL
5	ZAMTEL	Male	0	1	1	Diploma	ITIL
6	ZAMTEL	Female	0	1	0	Degree	Other
7	ZAMTEL	Female	0	1	1	Diploma	ITIL
8	ZAMTEL	Male	0	1	1	Diploma	ITIL
9	ZAMTEL	Male	0	1	0	Degree	Cobit5
10	ZAMTEL	Female	0	1	0	Degree	Cobit5
11	ZAMTEL	Male	1	1	0	Degree	Cobit5
12	ZAMTEL	Female	0	1	0	Degree	Change Mgt

#### 4.3.1.4 The Zambia National Commercial Bank (ZANACO)

Table 8. The ZANACO response

Sample Size	Organization	Gender	Respondent Classification				
			Information Technology Management	Systems Administration & Support	End User	Education Level	Professional qualification
1	ZANACO	Male	0	1	0	Diploma	Cobit5
2	ZANACO	Female	0	0	1	Degree	PRINCE2
3	ZANACO	Male	0	1	0	Diploma	ITIL
4	ZANACO	Male	0	0	1	Diploma	ITIL
5	ZANACO	Female	0	0	1	Diploma	ITIL
6	ZANACO	Male	1	0	0	Degree	Cobit5
7	ZANACO	Male	0	0	1	Degree	Cobit5
8	ZANACO	Male	1	1	0	Degree	Cobit5
9	ZANACO	Male	1	0	0	Degree	Cobit5
10	ZANACO	Male	1	0	0	Degree	Cobit5
11	ZANACO	Male	1	0	0	Masters	Cobit5
12	ZANACO	Male	1	0	0	Masters	Change Mgt
13	ZANACO	Female	0	1	0	Degree	Change Mgt

14	ZANACO	Male	1	0	0	Degree	ISO 27001
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#### 4.3.1.5 The Zambia Revenue Authority (ZRA)

Table 9. The ZRA response

Sample Size	Organization	Gender	Respondent Classification				
			Information Technology Management	Systems Administration & Support	End User	Education Level	Professional qualification
1	ZRA	Male	0	1	0	Diploma	ITIL
2	ZRA	Male	0	0	1	Diploma	ITIL
3	ZRA	Male	0	0	1	Diploma	ITIL
4	ZRA	Male	1	0	0	Degree	Cobit5
5	ZRA	Male	0	0	1	Degree	Cobit5
6	ZRA	Male	0	1	0	Degree	ITIL
7	ZRA	Male	1	0	0	Degree	Cobit5
8	ZRA	Male	1	0	0	Degree	Cobit5
9	ZRA	Female	1	0	0	Masters	Cobit5
10	ZRA	Male	1	0	0	Masters	Change Mgt

## 4.4 Demographic information

### 4.4.1 Gender

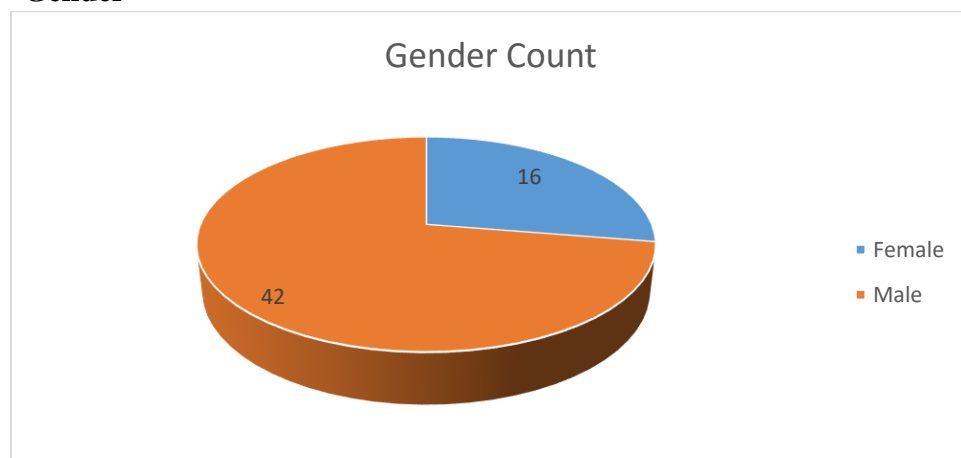


Figure 12. The Gender Count

#### 4.4.2 Age Group Classification

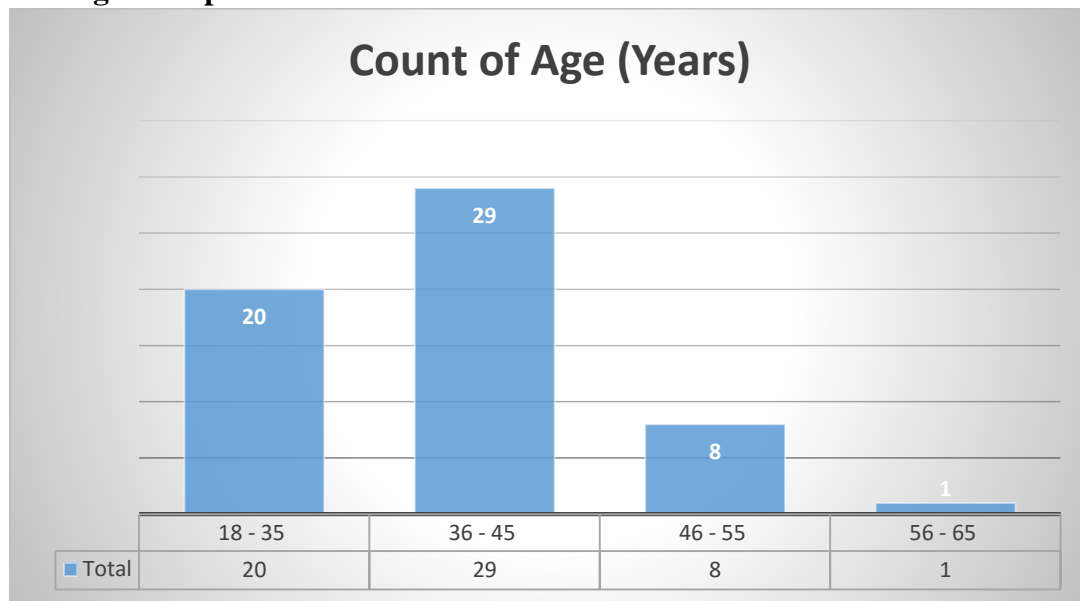


Figure 13. Age group classification.

The research respondents were between 18 years and 65 years old. Majority of the respondents are in the 36 – 45 years old bracket. The researcher is of the view that this a fairly representative population for the study and that it provides an accurate representation of the study under review. Further the researcher is of the view that the objectives of the study would be met with this representation.

#### 4.4.3 Educational level

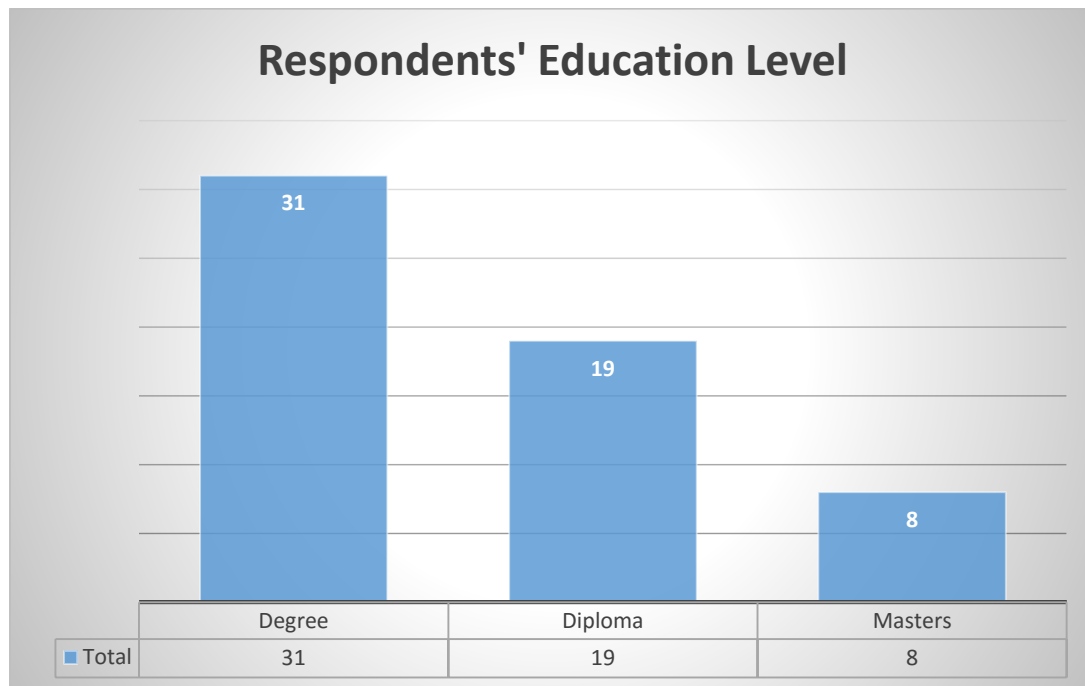


Figure 14. Educational level

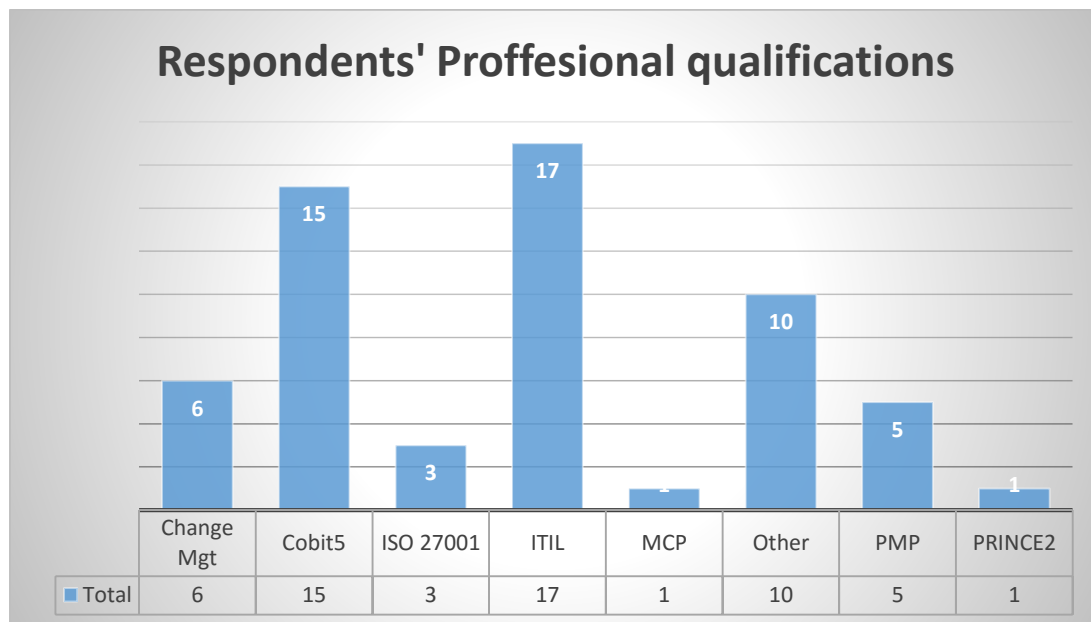


Figure 15. Respondents professional qualifications

Respondents' education level and professional qualification review was examined to assess and gain research assurance of the respondents' comprehension of the study. As evidenced in the findings illustrated in Figure 16 and 17 the respondents had sufficient knowledge

and understanding of the study under review. Valuable suggestions and experiences were brought forward that enriched the data collected from the survey.

#### 4.4.4 Work category

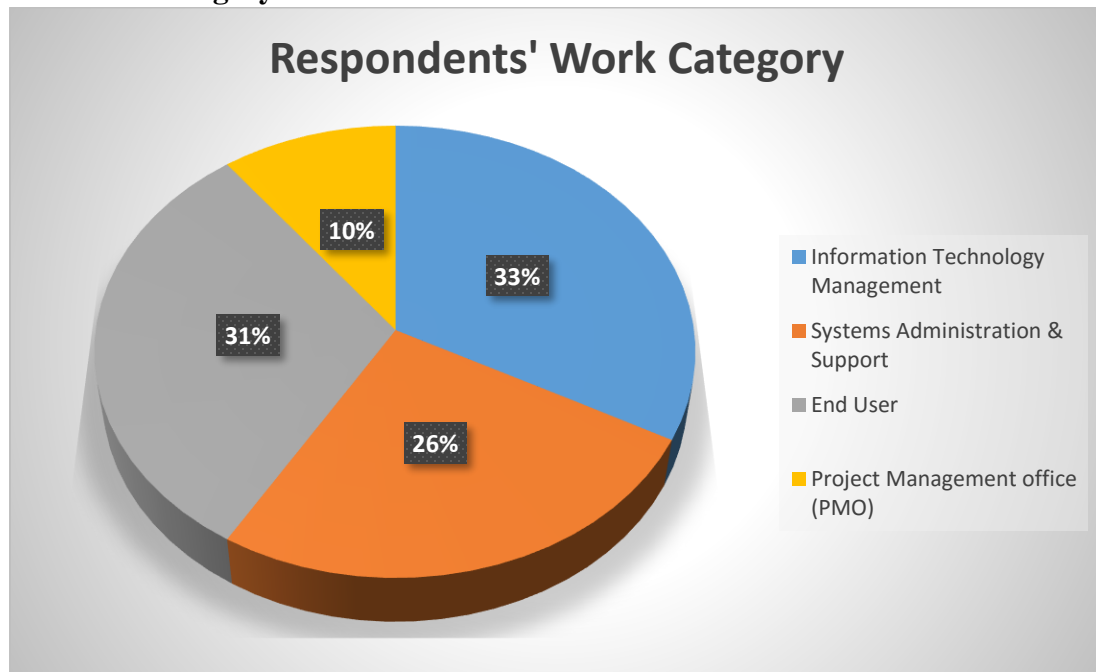


Figure 16. Work Category.

The study extrapolated data from the four work categories; I.T management, System Administration and Support, Project Management Office and End user perspectives. The rationale was to get a cross sectional view of information systems acquisition, development and implementation. As evidenced in Figure 16 the sampled population is a reasonable

#### 4.5 Causes of Information Systems Acquisition

Table 10. Causes of Information System acquisition

Sample size	Causes of Information Systems Acquisition										
58	Competition	Regulatory	Growth	Survival	Cost Control	Risk Mitigation	Nature Business	Capacity	IS project Initiator	IS Project Implementation Mgt	User Involvement in IS Project execution rating
1	Yes	Yes					Yes	Yes	Snr Management	Snr Management	10
2		Yes				Yes	Yes	Yes	Snr Management	Operatives	5
3		Yes			Yes	Yes	Yes	Yes	Management Board	Operatives	2
4		Yes					Yes		End user	Snr Management	4
5		Yes	yes		yes	yes	yes	yes	Management Board	Operatives	4
6		Yes	yes		Yes	Yes	Yes	Yes	customers	Operatives	5
7			yes	yes	Yes	Yes	Yes	Yes	Management Board	Operatives	10
8			yes			Yes		Yes	Snr Management	Snr Management	4
9	Yes	Yes	yes	yes	Yes	Yes	Yes	yes	Snr Management	Snr Management	9
10	Yes	Yes	yes		Yes	Yes	Yes	Yes	Snr Management	Snr Management	8
11			yes			Yes	Yes	Yes	Snr Management	Snr Management	1
12	Yes	Yes	yes	yes	Yes	Yes	Yes	Yes	customers	Snr Management	9



13	Yes	Yes					Yes	Yes	Snr Management	Snr Management	10
14		Yes				Yes	Yes	Yes	Snr Management	Operatives	5
15		Yes			Yes	Yes	Yes	Yes	Management Board	Operatives	2
16		Yes					Yes		End user	Snr Management	4
17		Yes	yes		yes	yes	yes	yes	Management Board	Operatives	4
18		Yes	yes		Yes	Yes	Yes	Yes	customers	Operatives	5
19			yes	yes	Yes	Yes	Yes	Yes	Management Board	Operatives	10
20			yes			Yes		Yes	Snr Management	Snr Management	4
21	Yes	Yes	yes	yes	Yes	Yes	Yes	yes	Snr Management	Snr Management	9
22	Yes	Yes	yes		Yes	Yes	Yes	Yes	Snr Management	Snr Management	8
23			yes			Yes	Yes	Yes	Snr Management	Snr Management	1
24	Yes	Yes	yes	yes	Yes	Yes	Yes	Yes	customers	Snr Management	9
25	Yes	Yes					Yes	Yes	Snr Management	Snr Management	10
26		Yes				Yes	Yes	Yes	Snr Management	Operatives	5
27		Yes			Yes	Yes	Yes	Yes	Management Board	Operatives	2
28		Yes					Yes		End user	Snr Management	4
29		Yes	yes		yes	yes	yes	yes	Management Board	Operatives	4

30		Yes	yes		Yes	Yes	Yes	Yes	customers	Operatives	5
31			yes	yes	Yes	Yes	Yes	Yes	Management Board	Operatives	10
32			yes			Yes		Yes	Snr Management	Snr Management	4
33	Yes	Yes	yes	yes	Yes	Yes	Yes	yes	Snr Management	Snr Management	9
34	Yes	Yes	yes		Yes	Yes	Yes	Yes	Snr Management	Snr Management	8
35			yes			Yes	Yes	Yes	Snr Management	Snr Management	1
36	Yes	Yes	yes	yes	Yes	Yes	Yes	Yes	customers	Snr Management	9
37	Yes	Yes					Yes	Yes	Snr Management	Snr Management	10
38		Yes				Yes	Yes	Yes	Snr Management	Operatives	5
39		Yes			Yes	Yes	Yes	Yes	Management Board	Operatives	2
40		Yes					Yes		End user	Snr Management	4
41		Yes	yes		yes	yes	yes	yes	Management Board	Operatives	4
42		Yes	yes		Yes	Yes	Yes	Yes	customers	Operatives	5
43			yes	yes	Yes	Yes	Yes	Yes	Management Board	Operatives	10
44			yes			Yes		Yes	Snr Management	Snr Management	4
45	Yes	Yes	yes	yes	Yes	Yes	Yes	yes	Snr Management	Snr Management	9
46	Yes	Yes	yes		Yes	Yes	Yes	Yes	Snr Management	Snr Management	8

47			yes			Yes	Yes	Yes	Snr Management	Snr Management	1
48	Yes	Yes	yes	yes	Yes	Yes	Yes	Yes	customers	Snr Management	9
49		Yes	yes		Yes	Yes	Yes	Yes	customers	Operatives	
50			yes	yes	Yes	Yes	Yes	Yes	Management Board	Operatives	
51			yes			Yes		Yes	Snr Management	Snr Management	
52	Yes	Yes	yes	yes	Yes	Yes	Yes	yes	Snr Management	Snr Management	
53	Yes	Yes	yes		Yes	Yes	Yes	Yes	Snr Management	Snr Management	
54			yes			Yes	Yes	Yes	Snr Management	Snr Management	
55	Yes	Yes	yes	yes	Yes	Yes	Yes	Yes	customers	Snr Management	
56	Yes	Yes	yes		Yes	Yes	Yes	Yes	Snr Management	Snr Management	
57			yes			Yes	Yes	Yes	Snr Management	Snr Management	
58	Yes	Yes	yes	yes	Yes	Yes	Yes	Yes	customers	Snr Management	

#### 4.5.1 Information Systems Acquisition Motives

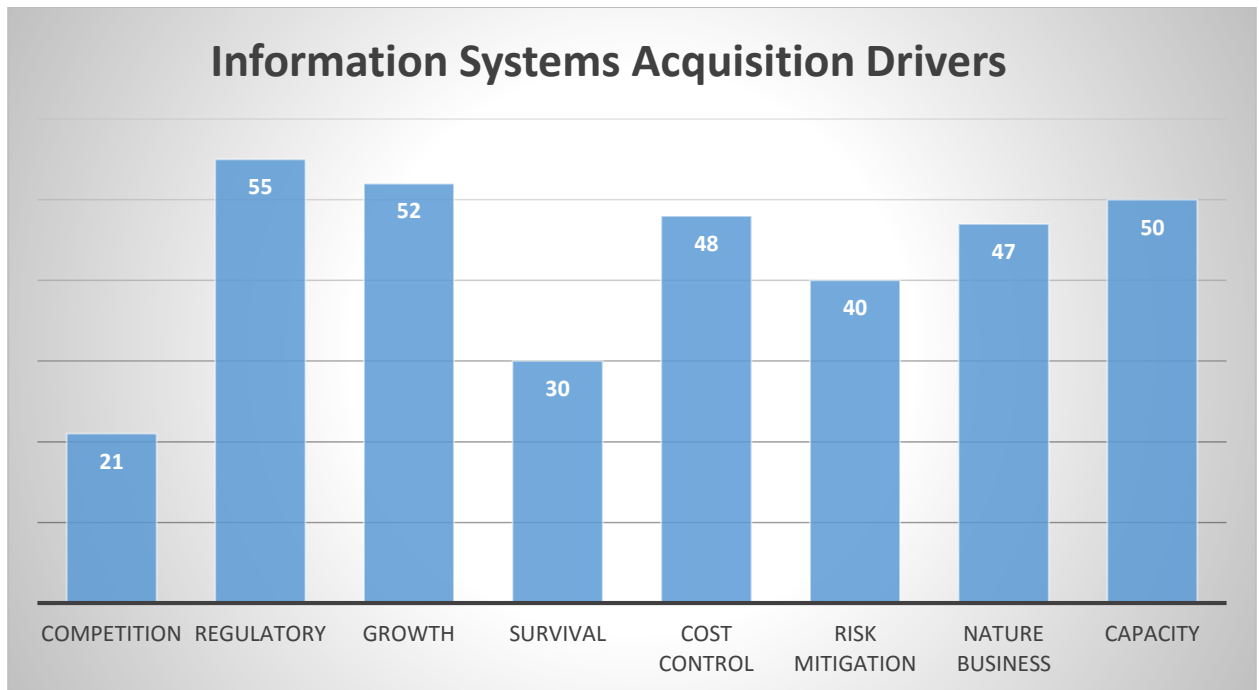


Figure 17. Information system acquisition motives

Organisations have myriad reasons to acquire or develop information systems in the quest to meet their business objectives. Business objectives vary from regulatory, competitiveness, cost control etc. The business objectives determine organisations existence and continual existence by remaining competitive and delivering the much sought after stakeholder value.

This study reviewed eight (8) information systems development motives; competition, regulatory, growth, survival, cost control, risk mitigation, nature of business and capacity. Regulatory requirements, growth and capacity are the highest drivers (motives) for the information systems acquisition.

#### 4.5.2 Information system retention period

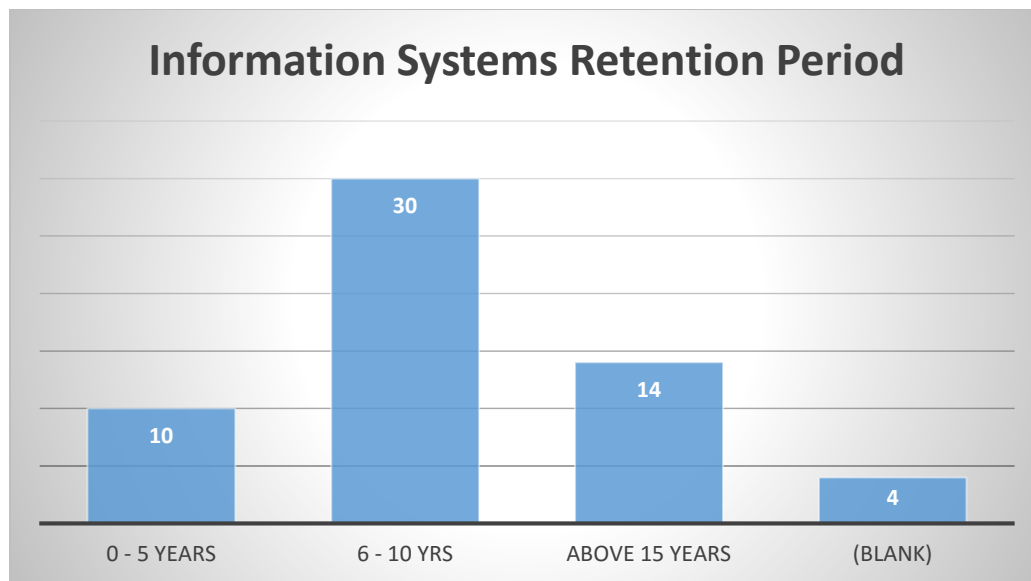


Figure 18. Information system retention period

The information systems retention period is the period that organisations acquire, use and dispose of the information systems. As evidenced in the data most information systems retention period is between 6 – 10 years.

This study is in agreement with this assertion because technology changes are rapidly occurring, for that reason, an organisation information strategy to remain relevant has to move with the technological trends. One of the factors leading to rapid technological changes is the global increase in internet access and reducing hardware prices due to advanced and increased ICT hardware production globally.

#### 4.5.3 End-user involvement information system acquisition, development and implementation

Forty-eight respondents from the survey out of the fifty-eight respondents gave their opinion regarding this aspect of effective project execution. They state that 80% of Information Systems Acquisition, Development and Implementation Projects do not involve actively end-users in the project lifecycle while another 20% of Information Systems Acquisition, Development and Implementation Projects actively involve end-users.

According to PRINCE2, PMP and CISA section 3 information systems project failure is usually attributed to the lack of end user involvement in the project life cycle. This is one

of the study's observation that most information systems projects in the sampled organisations have recorded failure as a result of low end-user involvement in the project lifecycle.

## 4.6 Information system development

### 4.6.1 Information system development modes

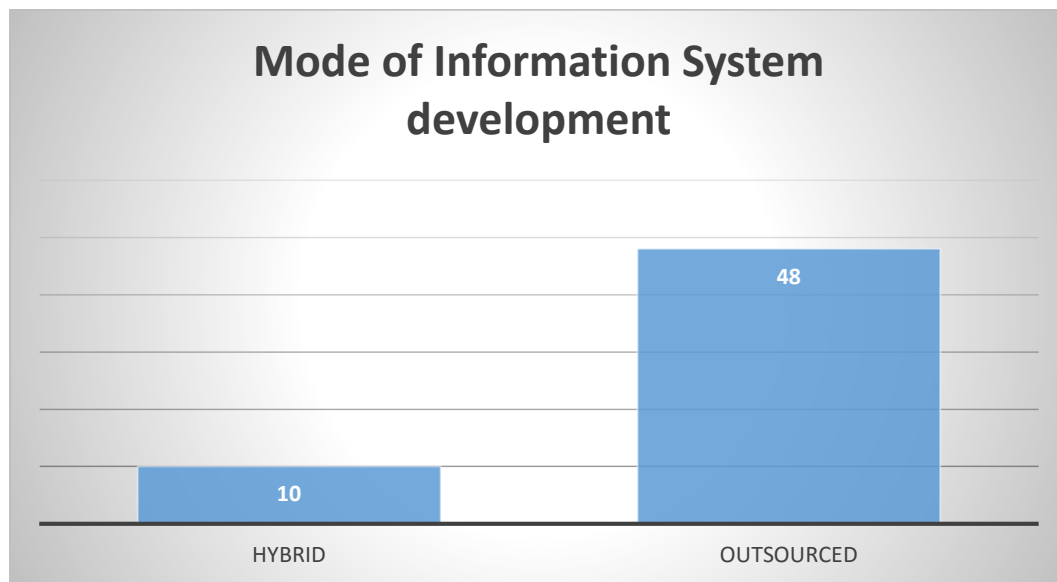


Figure 19. Information system development modes

The study evaluated the three (3) modes; In-house, Hybrid and Outsourced information system development approaches. As evidenced by the collected (58 respondents) and analysed data we can deduce that in Zambia 83% of information systems are outsourced with a paltry 17% of information systems being developed through the hybrid approach. This explains why the total cost of ownership of these systems continue to be on the upswing as indicated in figure 20 below. The problem statement continues to gain justification with such revelation as Zambian system developers are left out to be spectators of their development even in a domain that they are possibly capable of contributing. As seen in the 5 institutions enumerated there are no in-house application system development except for a few instances that are being complimented by outsourced methods. This need not to be the case if we are to create and leverage on ICTs as a country. Studies have revealed that countries such as India, Kenya, South Africa, Nigeria to mention but a few are examples of developing countries that have taken deliberate measures aimed at

promoting local ICT solutions, some of which are already off-shoring their capacities to Zambia, which is a bad situation as we should have been favourably competing for markets.

#### 4.6.2 Annual maintenance cost

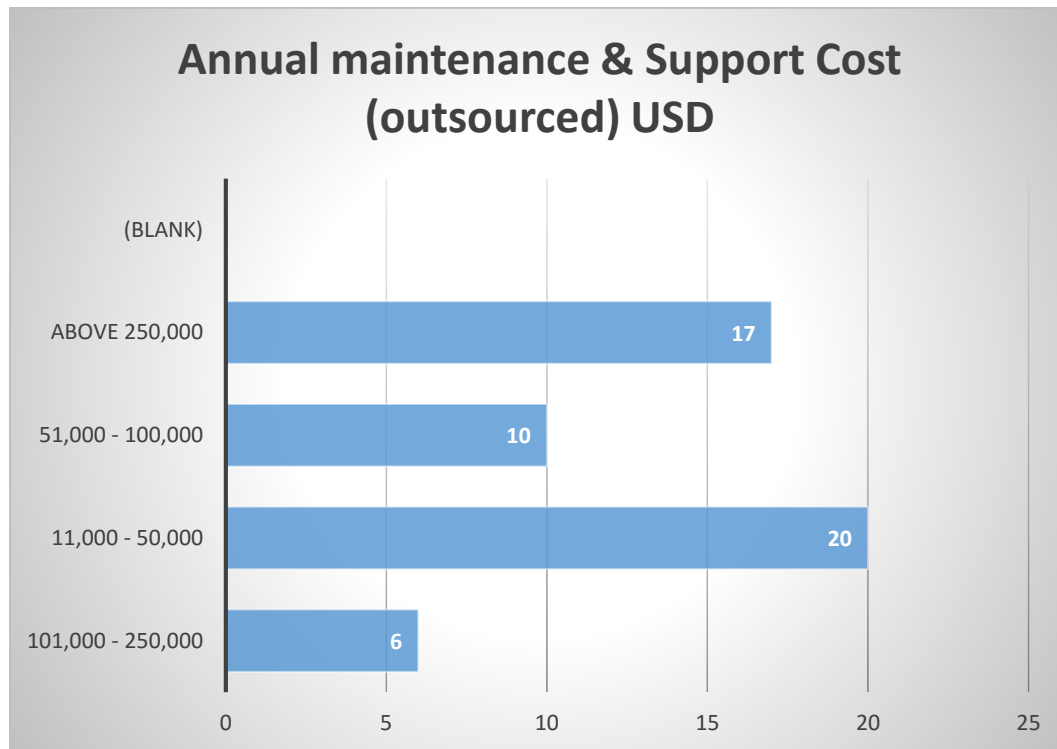


Figure 20. Annual Information Systems Maintenance Costs

This table provides a synopsis of the annual maintenance cost for a system's lifecycle. As seen there is no doubt that if organisations developed their own systems these costs could be reduced notwithstanding the huge outlay costs required to gain the desired competencies to develop and implement robust and scalable applications. With the reduction of ICT hardware prices, it is imperative upon organisation to invest in capacity building in ICTs so as to leverage on these opportunities.

#### 4.6.3 Reasons for information system failure

The study extrapolated the following factors and reasons for Information Systems development failures;

- Limited staff establishment and lack of skilled personnel
- inefficiency of local in-house systems and political influence

- Lack of dedicated resources to develop systems as they are occupied with other operational duties
- Outsourced systems are easy to maintain
- Lack of skills transfer from developers
- Lack of management support

#### **4.6.4 Why in-house information systems development is low?**

The reasons below are a summary of the respondent's perception of the cause of the low information systems acquisition, development and implementation;

- use of hybrid implementation
- High cost of software development tools
- Lack of specialization and dedication to specific needs for particular projects
- High cost of training
- Local development has not yet matured to the expected standard.
- Lack of support for local companies in preference to foreign companies
- Low skills support for systems development in organisations
- Poor project management skills
- End user exclusion in the information systems acquisition, development and implementation

#### **4.6.5 How in-house information systems development can be augmented**

In-house information systems development can be augmented by the need to stimulate;

- ICT investment that support in-house information systems development
- Local developer promotion by encouraging and keeping up with emerging trends in the technology
- The embracing locally developed solutions by organisations in their effort to satisfy the respective business objectives.
- Building capacities of local software development through continuous research and development programmes
- The need to encourage in-house IS development and investing in skills development
- The need to reduce costs by building capacities in-house or locally developed solutions.



- Talent identification and encouraging innovation with better rewards
- Local developers keeping up with emerging trends in the technology
- Easier in solution provision for indigenous challenges
- The increase in the number of IT staff in organisations.
- The use of best practice frameworks for project management and information system development.

#### 4.7 Information system implementation

Table 11. Information system implementation user experience

<b>Sample Size</b>	<b>IS Implementation</b>			<b>Implementation Experience</b>				
<b>58</b>	<b>Experience</b>	<b>was it in-house?</b>	<b>Used Approach</b>	<b>Any outage experienced</b>	<b>was the process expensive</b>	<b>Experienced difficulties</b>	<b>Knowledge adequacy</b>	<b>Implementation proposal / suggestions</b>
1	yes							
2	yes	No	parallel conversion	No	No	No	No	Improvement should be made in knowledge transfer from system developers. Management of support contracts
3	yes	No		No	yes	No	No	
4	No	No						
5	No							
6	yes	yes	Pilot Approach	yes	yes	yes	yes	
7	yes	No		yes	yes			
8	yes	No	parallel conversion	No	yes	No	No	
9	yes	No	User acceptance testing	yes	No	yes	yes	
10	yes	yes		yes	yes			

11	yes	No	phased approach	No	yes	No	No	it is important to engage engineers, middle management and lower management in the acquisition of systems as they are the main operators of the systems. End user must be involved.
12	yes	yes		No	yes	No	yes	clearly understanding of the requirements specification
13	yes	yes	Agile	yes	No	No	yes	Agile approach in terms of management of information system implementation
14	yes	yes	SDLC	yes	yes	yes	yes	Holistic approach
15	yes	yes	Agile	yes	yes	yes	yes	Requirements specification
16	yes	yes	Agile	yes	yes	No	yes	
17	yes	yes	phased approach	yes	No	yes	yes	Business needs specifications
18	No							
19	No							
20	No							
21	No							
22	yes	No	parallel conversion	No	No	No	No	Improvement should be made in knowledge transfer from system developers. Management of support contracts

23	yes	No		No	yes	No	No	
24	No	No						
25	No							
26	yes	yes	Pilot Approach	yes	yes	yes	yes	
27	yes	No		yes	yes			
28	yes	No	parallel conversion	No	yes	No	No	
29	yes	No	User acceptance testing	yes	No	yes	yes	
30	yes	yes		yes	yes			
31	yes	No	phased approach	No	yes	No	No	it is important to engage engineers, middle management and lower management in the acquisition of systems as they are the main operators of the systems. End user must be involved.
32	yes	yes		No	yes	No	yes	clearly understanding of the requirements specification
33	yes	yes	Agile	yes	No	No	yes	Agile approach in terms of management of information system implementation
34	yes	yes	SDLC	yes	yes	yes	yes	Holistic approach
35	yes	yes	Agile	yes	yes	yes	yes	Requirements specification
36	yes	yes	Agile	yes	yes	No	yes	

37	yes	yes	phased approach	yes	No	yes	yes	Business needs specifications
38	yes	No	User acceptance testing	yes	No	yes	yes	
39	yes	yes		yes	yes			
40	yes	No	phased approach	No	yes	No	No	
41	yes	yes		No	yes	No	yes	clearly understanding of the requirements specification
42	yes	yes	Agile	yes	No	No	yes	Agile approach in terms of management of information system implementation
43	yes	yes	SDLC	yes	yes	yes	yes	Holistic approach
44	yes	yes	Agile	yes	yes	yes	yes	Requirements specification
45	yes	yes	Agile	yes	yes	No	yes	
46	yes	No		No	yes	No	No	
47	No	No						
48	No							
49	yes	yes	Pilot Approach	yes	yes	yes	yes	clearly understanding of the requirements specification
50	yes	No		yes	yes			Agile approach in terms of management of information system implementation
51	yes	No	parallel conversion	No	yes	No	yes	Holistic approach

52	yes	No	User acceptance testing	yes	No	yes	yes	Requirements specification
53	yes							
54	yes	yes	SDLC	yes	yes	yes	yes	
55	yes							
56	No							
57	yes	yes	SDLC	yes	yes	yes	yes	Holistic approach involving all key stakeholders
58	No							

#### 4.7.1 Information system implementation experience

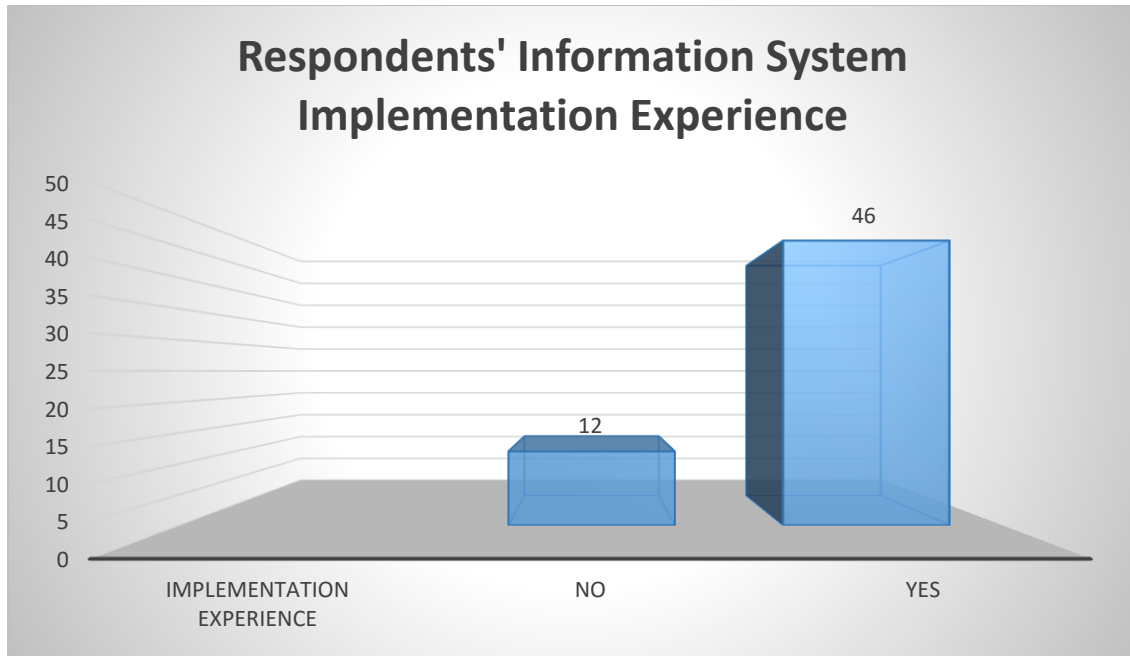


Figure 21. Respondents Information System Implementation Experience

79% of respondents have had an experience of Information systems implementation in their organisations while 21% have never experienced one. Most of the respondents experienced information system implementation as spectators consequently they were not in a position to have a premise regarding the subject matter. It is for this reason that most of the respondents could not complete the implementation section of the questionnaire. As evidenced by the respondents' suggestions and proposal on the subject matter, it is clear that most of the operatives are excluded from the implementation part consequently change management and product acceptance is hindered a factor that the study believes to be a contributing factor to the higher failure rate information systems acquisition, development and implementation.

#### 4.7.2 Information System implementation approaches

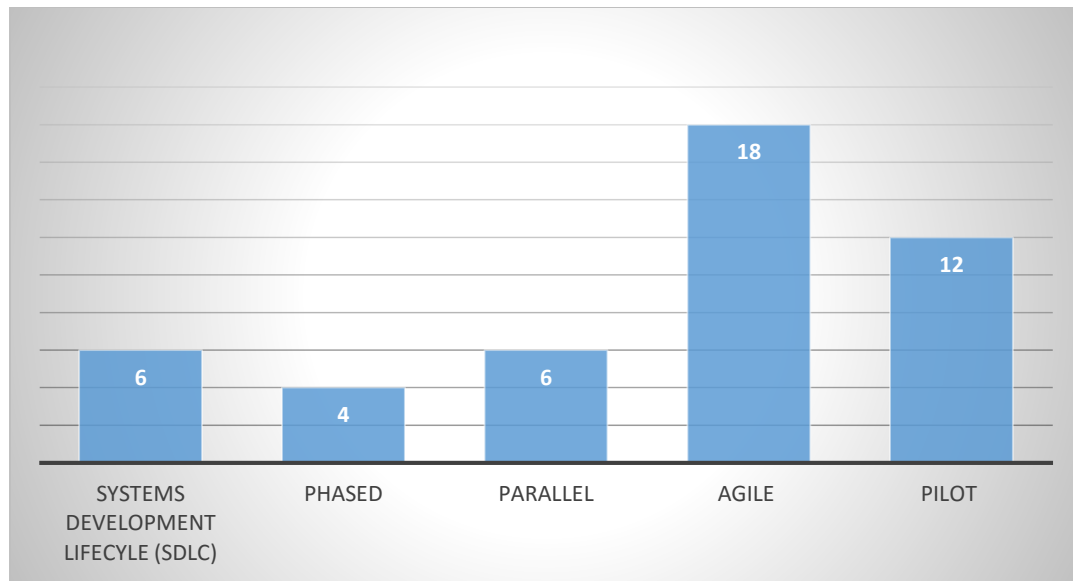


Figure 22. Information System Implementation Approaches

The implementation approaches that respondents are aware of are; Systems Development Lifecycle (SDLC), Phased approach, Parallel Approach, Agile and pilot project implementation approach. Although respondents separated a phased approach from the pilot approach, the two methods are in actual sense one and the same. The Agile approach stood out as a preferred approach as evidenced by the collected data.

#### 4.7.3 Knowledge adequacy in Information System Implementation

Most respondents had little or did not demonstrate that they had information implementation knowledge. This meant that implementation for those with an experience, they were merely on the learning curve while those without some experience have no implementation knowledge.

The researcher is of the view that is another information system acquisition, development and implementation failure point because the lack of the knowledge in this regard means that there is no formal implementation methodology followed. The lack of an implementation methodology leads to un-coordinated effort in the execution of the implementation process consequently, no lessons can be drawn for continuous improvement.



#### 4.7.4 Implementation (proposals) suggestion

The below table displays the respondents proposed information system implementation action plan that can ameliorate information systems implementation success in Zambia.

Table 12. Respondents information system implementation suggestions

	INFORMATION SYSTEMS IMPLEMENTATION PROPOSALS
	F9
1	Improvement should be made in knowledge transfer from system developers
2	Management of support contracts
3	It is important to engage engineers, middle management and lower management in the acquisition of systems as they are the main operators of the systems.
4	End users must be involved (Change management)
5	Agile approach in terms of management of information system implementation
6	Holistic approach (Change management)
7	Business requirements specifications

#### 4.8 Summary

This chapter described the findings of the research. The response rate was fairly good with a response rate of 72%. Most respondents were knowledgeable enough with the subject matter and gave valuable input to the study. Evidently that collected data affirmed the problem statement and respondents are alive to the fact that a problem exists and are eager to see a transformation that solves the problem and contribute to the socio economic problem resolution of the country related to the research problem. To mention but the few some of the socio economic problems associated with the high level of off-shoring information systems into the country are that unemployment levels continue to be on the upswing while local talent that can actively be involved in systems development continue to remain unproductive citizens.

## **CHAPTER 5**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

Most developing countries in Africa are at the emerging stage of information systems, acquisition, development and implementation despite having had national e-government strategies in place for a considerable period of time. Zambia like other African countries has recognised the importance of e-government as evidenced by the approval of the National ICT Policy by the Cabinet in 2005. The National ICT Policy of 2005 is aimed at creating socio-economic means to increase opportunities for wealth creation, employment and create active participation in poverty reduction through information systems acquisition, development and implementation.

This study identifies the cause of information system acquisition, development and implementation failure in Zambia despite the approval and implementation of the National ICT Policy of 2005 and develops a model; the acquisition development and implementation framework (ADIF). The ADIF provides valuable insights on how to ameliorate the success rate of information system acquisition, development and implementations in Zambia.

#### **5.2 Conclusion**

In this conclusion I briefly evaluate the obtained results by combining them to the initial research objectives and research questions. Do the results answer the stated questions? The reliability and validity of the results are also evaluated, and the limitations of the study. After that the suggestions for further research are presented, and finally, I will summarise the contributions of the study, and give a short summary of each chapter of this thesis.

##### **5.2.1 Evaluation of research results**

The demographic information from the research indicate that this industry is male dominated. The active age group in the sector is 18 to 45 years. The researcher agrees that this is a true representation of the participants in the sector and acknowledges the valuable insights from all the respondents. Further the researcher believes that the educational and

professional qualifications of most of the respondents was sufficient to comprehend the research subject matter.

Information system acquisition is predominately spearheaded by the senior management of organisations with the regulatory motive fulfilment. In as much as it is an ideal situation for organisations to comply to regulations the researcher is of the view that motive (drive) should not be main or highest driver for Information systems acquisition decision. The researcher is of the view that competition and the growth motives in compliance to regulatory requirements should be key motives for information system acquisition. In this case measurable and realistic benefits will be defined and pursued through information system implementations. Therefore, the development approach will be compelled to realise the organisational benefits sought after consequently, create the much needed value that will help change the negative perception of information system acquisition investments in Zambia. Once this perception is changed the bull-whip effect of it is that the country will elicit more investment in the sector and subsequently, help achieve the objectives of the National ICT policy of 2005 and organisations.

The research finding reviews that in Zambia most organisations prefer outsourced information systems solutions. The researcher is of the view that for the country to attain sustainable development deliberate measures should be put in place that will promote local information system development. Arguably the total cost of ownership will be reduced since huge software annual maintenance costs will be saved notwithstanding the huge outlay requirement to attain these capacities. The researcher argues that even though the outlay is high it can be done and eventually the costs associated with development will begin to drop over time, based on the economics theory of economies of scale as long as local enterprises are supported. India as a country is an example that took similar measures and now are enjoying the rewards as evidenced in Zambia 90% of commercial banks use Indian banking software namely Flexcube, Flex-branch and Flexcube Universal Banking Software (FCUBS).

Zambians have low Information system implementation experience as evidenced by the data collected. The main reason is that implementation is tightly coupled with the information systems acquisition method used; in-house or outsourced. In the case of an outsourced approach many are times that the developers are tasked with the

implementation of the developed system while the local experts in the computing field are relegated to support functions. This is detrimental to the growth of the sector in the country. It is for this reason that the research advocates for the promotion of local information system development approaches that will stimulate meaningful growth in the sector and help Government curb the high unemployment levels. The key to attaining this milestone lies in local firms supporting local information systems solutions, talent identification and build capacities, investment in the sector and use of best practice frameworks.

### **5.2.2 Further research**

The researcher proposes the below research studies and is of the view that the studies will increase the body of knowledge in the subject matter and help enhance information system adoption and integration in our societies as a way of living. ICTs are here to stay and studies have reviewed that those that quickly adopt technologies stand a better chance of survival than the laggard organisations as they risk going into oblivion.

- The India or Pakistan information systems development adoption strategy
- The Kenyan e-government implementation case study.
- The rejection of local ICT solutions in preference to outsourced solutions

### **5.2.3 Contributions and conclusion**

This study increases to the body of knowledge of a number disciplines such as business management, change management, project management, Information Technology and Information Systems management, Risk management, management boards to mention but a few. The Acquisition, Development and Implementation framework (ADIF) provides a reliable reference framework that when coupled with other best practice frameworks such as PRINCE2, ITIL, ISO27000 and Cobit5 that the researcher has extensively drawn lessons from, assists Zambian and world organisations at large to implement successful ICT projects.

## **5.3 Recommendations**

### **▪ Capacity building and training**

To fulfil the needs of acquisition development and implementation projects, those involved in the design, implementation and management of IT-related projects and systems in the

developing countries must improve their capacity to meet the organisational requirements. Improvement should be made in knowledge transfer from system developers.

- **Holistic implementation Approach in Information Systems projects**

Information Systems project should take a holistic approach that involves everyone in organisations especially end-users to help attain product acceptance since the participants develops the sense of ownership of the product developed. All key stakeholders must be involved throughout the acquisition, development and implementation processes it helps build the sense of ownership by all. It is important to engage engineers, middle management and lower management in the acquisition of systems as they are the main operators of the systems

- **Benefits realisation through continuous information systems evaluation**

organisation should map their own specific goals and determined by their stakeholder's drivers and needs in order to deliver organisational value from information systems project investments. A measurable criterion must be implemented to evaluate the extent of benefit realisation.

- **Management of development, support and maintenance contracts**

Ensure that information systems project development, support and maintenance contractual obligations are adhered to by both parties. Many are instances that contractual obligations are not adhered to resulting in poor product and service delivery that in turn inhibits organisational value creation.

- **Business requirements specifications**

Most information systems projects fail due to scope creep. Unclear business requirements specifications that affect project duration and value realisation that at times lead to project failure as a result of undelivered envisaged value due to unclear business requirement or objective.

- **Risk and resource optimisation**

Project risk and resource optimisation is a key determinant of project failure or success. It is incumbent upon management and the project team to minimise risks and optimise resource utilization in the information systems projects implementation.

#### **5.4 Summary**

The data collected provided answers to the research questions and therefore, met the research objectives. The data gave the researcher valuable insights that enabled the development of the Acquisition Development and Implementation Framework (ADIF) which the key deliverable for the research. To fulfil the needs of acquisition development and implementation projects, those involved in the design, implementation and management of IT-related projects and systems in the developing countries must improve their capacity to address the specific contextual characteristics of the organisation, sector, country or region within which their work is located (Gichoya, 2005).

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## APPENDICES

### Appendices 1. The questionnaire

# The University of Zambia

## Graduate School of Business

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### Developing an Information Systems (IS) Acquisition, development and Implementation Framework (ADIF) in Zambia

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By Alex Mulumbe Maka (GSB 151257)

MSC Operations, Projects and Supply Chain Management

For more information or any queries, kindly get in touch on 0977-723451

Dear respondent,

I am a student at the University of Zambia pursuing a Master of Operations, Projects and Supply Chain Management degree at the Graduate School of Business. As part of fulfilling requirements for my program of study, I am now carrying out a survey with the purpose of learning about experiences of individual experts in this field in relation to this subject. I am therefore kindly requesting for your participation in this survey. This research is aimed at coming up with an ADIF that ameliorate Information systems acquisition, development and implementation.

Your reputable organization has been purposively sampled to assist with information on the research subject. Your responses will be treated with the highest level of confidentiality and will strictly be used for academic purposes.

Thank you in anticipation

For any information about this survey, you may wish to contact the following;

Research Supervisor: Dr. Jackson Phiri on [Jackson.phiri@cs.unza.zm](mailto:Jackson.phiri@cs.unza.zm)

Graduate School of Business Director: Dr. Lubinda Haabazoka on [gsb@unza.zm](mailto:gsb@unza.zm)

## **SECTION A: BIO DATA**

### 1. Gender:

Female	Male

Age:

18-35	36-45	46-55	56-65	Above 65
5	4	3	2	1

### 2. Job Classification (check one):

IT Management 4	IT Systems Administration 3	Project Management officer 2	End-Users 1

### 3. Education Level:

Certificate 4	Diploma 3	Bachelor's Degree 2	Master's Degree 1

### 4. Professional qualification:

Qualification	PRINCE2	COBIT5	ITIL	ISO27001	PMP	Change Management	Other
Code	1	2	3	4	5	6	7

## SECTION B: INFORMATION SYSTEMS ACQUISITION

1. Is your business operations dependant on Information systems?

Yes ☐ No ☐

2. What is the Information system retention period for your organisation?

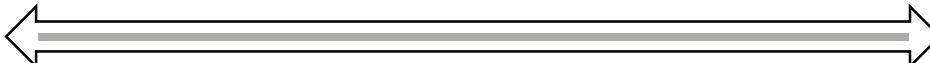
0 – 5 years	
6 – 10 years	
11 – 15 years	
Above 15 years	

3. What is your organization's motive for information systems acquisition?

	Tick all applicable	
1	Competition	
2	Regulatory	
3	Growth	
4	Survival	
5	Cost control	
6	Risk mitigation	
7	Nature of business	
8	Capacity	

4. To what extent do you think the motive was realised by your recent information systems acquisition, development and implementation project?

1	2	3	4	5	6	7	8	9	10

Low  High

5. In your organisation, who initiates Information systems project?

	Tick all applicable	
1	Senior Management	
2	Operatives	
3	End users (staff)	
4	Customers	
5	Management Board	

6. In your organisation, who is accountable the Information systems project implementation?

	Tick all applicable	
1	Senior Management	


2	Operatives	
3	End users (staff)	
4	Customers	
5	Management Board	

7. In your organisation, who manages the Information systems project implementation?

	Tick all applicable	
1	Senior Management	
2	Operatives	
3	End users (staff)	
4	Customers	
5	Management Board	

8. What is the user involvement in the IS project execution?

1	2	3	4	5	6	7	8	9	10

Low  High

## **SECTION C. INFORMATION SYSTEMS DEVELOPMENT.**

1. Does your organisation develop its information system in-house or outsource them?

In-house ☐

Outsourced ☐

2. If outsourced:

What is your Information systems annual maintenance and support cost?

	Tick applicable	
1	0 – \$10,000	
2	\$11,000 - \$50,000	
3	\$51,000 - \$100,000	
4	\$101,000 - \$250,000	
5	Above \$ 250,000	

3. Would you consider in-house and local information systems development to be a downward cost driver for Information systems total cost of ownership?

Yes ☐

No ☐

4. (a) If your answer in 3 is Yes:

Why hasn't your organisation leveraged on in-house information systems development?

(b) If your answer in 3 is No:  
Why is that the case?

5. How can in-house and local application development be augmented in Zambia?

#### SECTION D. INFORMATION SYSTEMS IMPLEMENTATION.

1. Have you ever done an information system implementation before?  
Yes ☐ No ☐

2. If yes, was it done in-house?  
Yes ☐ No ☐

3. What information system implementation approach did you use?

4. Did you have any system operation outage during the process?  
Yes ☐ No ☐

5. Was the process Expensive and Time consuming?  
Yes ☐ No ☐

6. Did you have difficulties in identifying the correct information system implementation approach?  
Yes ☐ No ☐

7. Did you have inadequate knowledge in using the precise information system implementation approach?

Yes ☐

No ☐

8. Do you have any proposals or suggestions as to how the current framework of interaction (i.e. Information systems acquisition, development and implementation) that you are familiar with could be improved?

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END!

THANK YOU