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SCHOOL OF COMPUTING AND INFORMATICS

FRAMEWORK FOR OFFSHORE SYSTEMS DEVELOPMENT AND DEPLOYMENT IN KENYAN ORGANIZATIONS

BY

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DECLARATION

This research project is my original work and has not been submitted for the award of a degree in any other university.

Signed: ……..…….. Date: ……

CHEBOI STEPHEN

P56/8117/2006

This research project has been submitted for examination with my approval as university supervisor.

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DEDICATION

I dedicate this work to my wife and my children for their support during its preparation. Your patience and encouragement as I stayed away for long, either in class or in the library throughout the weekends was really touching.

ACKNOWLEDGEMENT

A major research project like this is never the work of anyone alone. The contributions of many different people, in their different ways, have made this possible. First, I would like to thank God for the wisdom and perseverance that has bestowed upon me during this research project, and indeed throughout my life.

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Lastly, I wish to thank the respondents who participated in this study.

ABSTRACT

Offshoring refers to the movement of service-sector jobs from developed economies to offshore locations that are cheaper. Most companies opt to offshore systems development and deployment with the aim of reaping benefits such as reduced costs, but fail to consider the risks and challenges associated with such arrangements.

The main objective of this research was to develop a framework for offshore systems development and deployment in Kenyan organizations**.** A survey study of companies in Kenya was taken. The study was conducted through a descriptive survey design. The target populations were all the decision makers and implementers of offshore systems development and deployment in companies trading at the Nairobi stock exchange totaling 60 in number. Samples of 52 firms were used in the research. The research used primary data that was collected through a self-administered questionnaire. The research yielded quantitative data from the questionnaires, which were analyzed using descriptive statistics and factor analysis. Correlation Analysis was also used to establish the relationship between various factors and organization performance/value. The data was analyzed and presented using tables, pie chart and graphs.

Results and conclusions indicated that there are several benefits and risks and challenges of offshore systems development and deployment. These benefits include cost savings, quality, human capital (Solution to the IT skills shortage), and simplicity and remain focused on core competencies. The risks and challenges include operational problems, loss of competencies, threat of opportunism, detailed specifications required and unexpected costs/hidden costs. The factors influencing offshoring include cost, legal, cultural, IS security, human resource and infrastructural, specialization, and cost reduction and quality factors.

The research recommended that companies entering into offshore systems development and deployment should consider the benefits and the risks/challenges associated with such arrangements.

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LIST OF ABBREVIATIONS

ASEAN	-Association of Southeast Asian Nations
CCITT	-ComitéConsultatif International Téléphonique et Télégraphique (Communications standards organization)
CFO	- Chief Finance Officer
CMM	- Capability Maturity Model
CMM	-Capability Maturity Model
EBRD	- European Bank for Reconstruction and Development
EU	-European Union
EU15	- 15 member countries of the European Union as at May 2004 i.e. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.
GDP	- Gross Domestic percapita
HR	- Human resource
ICT-	Information Communication and Technology
IEEE	-Institute of Electrical and Electronics Engineers
IMF	- International Monetary Fund
IP	- Intellectual Property
IS	- Information Systems
ISO	- International Standard Organization
IT	-Information Technology

LAN	- Local Area Network
OAS	- Organization of American states
OECD	- Organization for Economic Co-operation and Development
R & D	- Research and Development
TOR	- Terms of reference
SMEs	- Small Medium Enterprises
SPSS	-Statistical Package for Social Sciences
UK	-United Kingdom
US	-United States
WTO	-World Trade Organization

CHAPTER ONE: INTRODUCTION

1.1: Background of the study

According to Barthelemy (2001), IT function is one of the most costly areas to maintain in today's corporate world with systems development and deployment taking a significant portion. Based on this, corporations contract such functions to other companies to reduce costs. Outsourcing this function can tap strengths of the vendor derived from large operations not possible for the single corporation and potentially lower costs.

Chandrasekaran and Ensing (2004) in their study found out that organizations have opted to international outsourcing commonly referred to as "offshoring". Joshi and Mudigonda (2008) defined offshore outsourcing as the "movement of service-sector jobs from developed economies to offshore locations that are cheaper". Offshore outsourcing is outsourcing IT functions to another country's vendor. Mostly, those vendors have been located in Asia (India or China), but offshore outsourcing can be to any country other than the organization's home country.

Farrell et al.(2005) found out that offshoring sector growth in India is the world's largest and fast growing with projection that in 2007 and 2008, employment growth was estimated to be between 1.45 to 1.55 million, accounting to 7% of India's GDP. Statistics Brain (2012) indicate that a total of 2,273,392 U.S. jobs were outsourced in 2011. 35 % of CFO's surveyed said their firms were currently outsourcing and 24 % of those CFO's favored India for outsourcing and 18% favored China. The same statistics also indicate that 53% of manufacturing companies outsource, 43% of IT Services outsource, 38% of R&D firms outsource, 26% of distribution companies outsource and 12% call or help centers outsource.

Lacity and Rottman (2008) argued that although there are contradicting views of the benefits of offshoring, it is generally understood that offshoring requires strong research, followed by backup of sound social capital and knowledge transfer.

Hirschheim and Lacity (2000) and Scheir (1997) concluded that for some reasons, offshoring arrangement does not always result in anticipated cost savings. The reasons for this include transition costs, time and effort managing the vendor, legal and liability issues and cultural differences. Statistics Brain (2012) noted that 44% of

companies outsource to reduce or control costs and 34% outsource to gain access to IT resources unavailable internally. 31% of companies outsource to free up internal resources. 28% of companies outsource to improve business or customer focus. 22% of companies outsource to accelerate company reorganization / transformation. 15% outsource to accelerate project while a similar percentage outsource to gain access to management expertise unavailable internally. 9% outsource to reduce time to market.

Varying views emerged over the primary motivations for offshore systems development for example Gottschalk and Solli-Saether (2005) implied that core competency management and strategic management were the most important factors for offshore systems development, whereas Fisher *et al.* (2008) indicated cost reduction to be the primary driver for outsourcing. King (2007) puts forth that offshore systems development is the norm for any IT activity that can be outsourced. He suggests that IT is not viewed as a core competency by organizations and suggests that outsourcing can be cost effective as well. This concept is also shared by Davis *et al.* (2006).

1.2: Research problem

Despite the availability of extensive existing literature on offshore systems development and deployment, there is no information on the framework for offshore systems development and deployment in Kenyan organizations. This research was important in helping Kenyan organizations make informed decisions about whether to offshore systems development and deployment. The research focused on developing the framework for offshore systems developments and deployment, basing it on Kenyan organizations.

1.3: Objectives of the Research

The main objective was to develop a framework for offshore systems development and deployment in local organizations with the following specific objectives;

i. To identify the needs, constraints and challenges of offshore systems development and deployment.

ii. To identify the benefits for offshore systems development and deployment.

iii. To investigate the factors associated with offshore systems development and deployment.

1.4: Research Questions

i) What is the most appropriate framework for offshore systems development and deployment in Kenya?

ii) What are the unique needs, constraints and challenges driving offshore systems development and deployment in Kenya ?

iii) What benefits arise from offshore systems development and deployment in Kenya ?

iv) What are the factors associated with offshore systems development and deployment in Kenyan organizations?

1.5: Significance of the study

The framework will be useful for organizations which have offshored systems development and deployment or those planning to deploy offshore systems.

1.6: Scope of the study

The scope of this research encompassed issues, benefits, challenges associated with offshore systems development and deployment within Kenyan organizations. The issues were those instrumental in informing the framework.

1.7: Limitation of the study

The limitation to the success of this research was the availability of information from those organizations which have offshored systems development and deployment or those planning to offshore. Some organizations may not have fully disclosed requested data. This was a limiting factor in this research.

CHAPTER TWO: LITERATURE REVIEW

2.0: Introduction

This chapter reviews the relevant literature on offshoring. The specific areas covered here are; the concept of offshoring of systems development, review of existing frameworks/models, benefits of offshore systems development and the risks/challenges of offshore systems development. The chapter begins by defining off shoring, outsourcing and offshore outsourcing.

2.1: What is offshoring, outsourcing and offshore outsourcing

Offshoring of services emerged as early as the late 1980s and early 1990s with the contracting out of tasks related to customer services, but has since moved on to a broader range of activities including engineering, software development and other tasks requiring high-skilled human capital. It is estimated the occupations potentially affected by off shoring in 2003 to be around 19.2% of total employment in the EU15, 18.1% in the United States, and 18.6% in Canada. In Korea, the share was slightly lower at 13%. It should be noted that these numbers may represent an "upper limit" as not all jobs in these occupations would necessarily be offshored (OECD, 2004). As a result, the subject has become increasingly politically charged. Outsourcing refers to the relocation of jobs and processes to external providers regardless of the provider's location, offshoring refers to the relocation of jobs and processes to any foreign country without distinguishing whether the provider is external or affiliated with the firm. Outsourcing may therefore include job relocations both within and between countries, whereas off shoring refers only to international relocations.

Loh and Venkatraman (1992) defines IT outsourcing as "the significant contribution of external suppliers in the physical and/or human resources associated with the entire or specific component of the IT infrastructure in the user organisation" (p 9).

Rajkumar and Mani (2001) defines offshore outsourcing as, "An activity where the supplier of software development is from another country than the firm that decides to outsource Information Systems" (p 64).

For the purposes of this research, offshore outsourcing was used to imply offshore systems development and maintenance as derived from the definition by Rajkumar and Mani (2001).

The key driving factors that enable developing countries to compete for systems development include the prices of hardware falling worldwide, availability of software to facilitate systems development, greater ease of telecommunications, existence of well trained, low paid analysts and programmers.

2.2: Concept of offshore Systems development

From available literature review, most companies opt to contract systems development and maintenance inorder to reduce costs. However, little empirical evidence exists to indicate that this arrangement delivers the anticipated cost reductions. Companies entering such arrangements fail to consider the transition costs, time and effort managing the vendor, legal and liability issues, lock-in, and personnel costs.

If handled correctly, off shoring systems development activities may prove beneficial to an organization. Some of the benefits achieved through such approach include lowering the overall cost of the function, enhancing opportunities for internal staff and bringing additional knowledge into the organization. The benefits obtained from such arrangements need to be balanced with the risks that may be encountered. If the arrangement is incorrectly handled, the anticipated benefits may be outdone by the additional unanticipated costs.

The overall cost and its benefit to the organization will be a product of the organization's ability to mitigate potential unanticipated cost factors and the additional risk inherent in this arrangement. Offshore systems development has undergone many phases. Takac (1994) developed a model on cost-cutting and efficiency, Cross (1995) and Willocks and Lacity (1998) came up with the development of strategic partnerships with vendors in the 1990s.

Most of the research on offshore systems development is customer-facing for example Lacity and Hirschheim (1993) in their case studies featured different outsourcing scenarios intended to capture the benefits and risks. Kumar and Willcocks (1996) in their study found out that interest in offshore systems development has grown

especially in light of the Internet and e-commerce, which has facilitated communication across borders. Apte, Sobal, Hanaoka, Shimada, Saarinen, Salmela and Versalainen (1997) found that firms entering into offshore outsourcing aim primarily to gain access to highly skilled professionals and reduced software development times and significant cost savings.

But there are also risks associated with offshore systems development.Subhankar and Bindu,(2006) in a case study found risks in knowledge, people, contract management, performance measurement, formulating scope, deciding the budget and schedule estimates, knowledge/expertise, quality standards, scope, cost and time estimates, measurement of performance, multi-vendor arrangements, and cross-culture issues. Tafti (2005) proposes the following outsourcing risk categories – contract, privacy and security, decision process, scope, diminished tech returns, hidden costs, loss of IT expertise.

2.3: Review on offshore frameworks and models

Kim, Westin and Dholakia (1989) propose a framework for organizing existing knowledge about the globalization of the software industry. The framework adopts a resource oriented perspective. It classifies resources as technological, human, individual cultural traits, and corporate culture. It argues that different areas of the world poses these resources in varying degrees, and that projects require such resources based on the phase of development. The framework enhances our understanding of the link between resource availability at sites and a project's requirements for these resources. Its primary limitations are that it ignores the impact of financial and IP resources on the decision, it does not explain the impact of other project characteristics (not just the phase of development) on the decision to outsourcing or the choice of sites, and it ignores the role played by external agencies in affecting resource availability at sites.

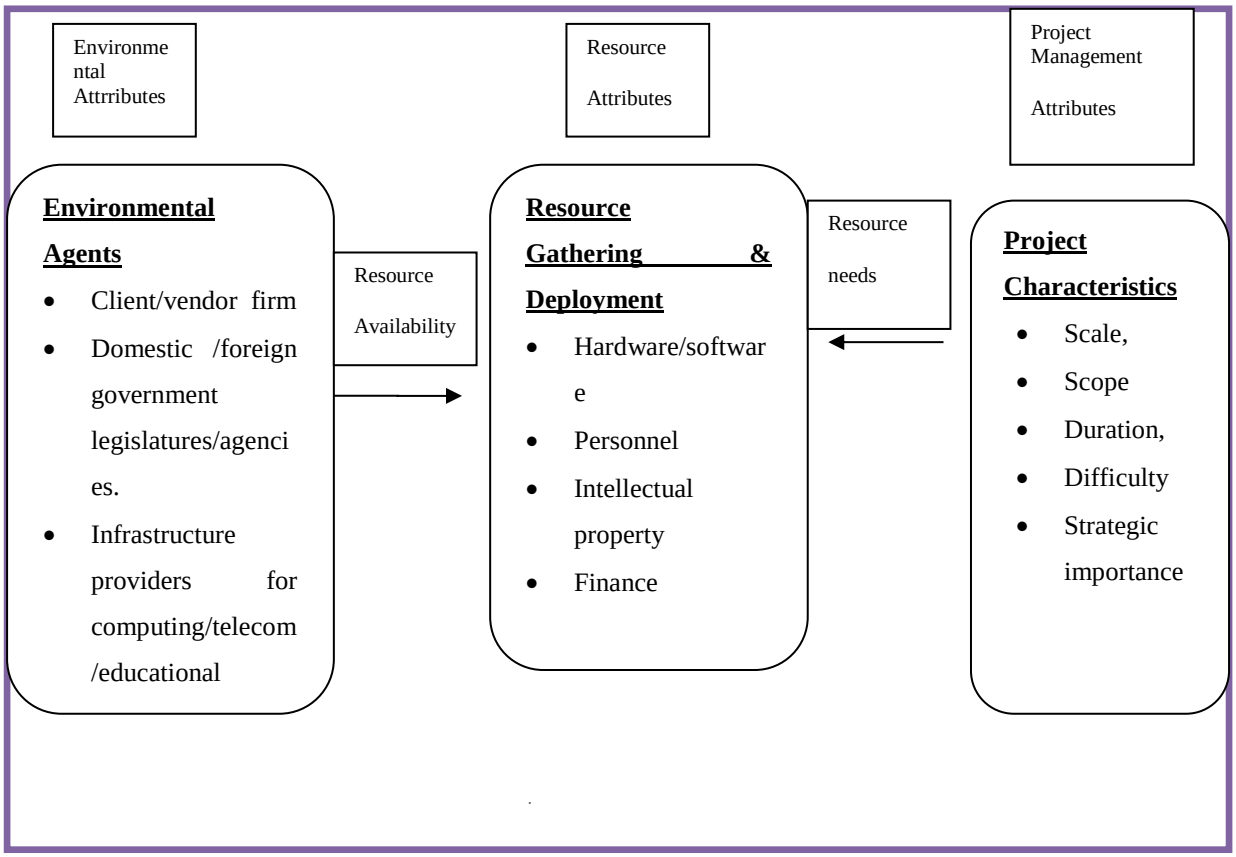
Ravichandran and Ahmed (1993) propose a framework to aid in the selection of projects and sites suitable for offshore software development. It recognizes that the usefulness of offshore option may vary with the phase of development, and that this usefulness depends on the characteristics of necessary interaction between developers and users. It also recognizes that several characteristics of site, not just cost, must be considered during site selection. The framework is useful because it summarizes a list

of issues that must be considered in selecting sites. However, it does not address the role of external agencies, the impact of other project characteristics (not just phase of development) on the decision to outsource and site selection, or the importance of IP and financial resources in the process.

2.3.1: Offshore outsourcing of software development and maintenance: A framework of issues

Most frameworks reviewed suggest ways to approach some of the environmental and organization issues with offshore outsourcing of software development, but none addresses all the issues involved. This framework is based on three attributes, resource, environmental and project management and the pair wise combination of these attributes. The resource attribute describes the money, people, and systems required for software development and maintenance. Hardware is both the computing and transmission equipment. The software includes the application software, data, documentation, software utilities and development software. IP aspect includes trade secrets, copyrights and patents between the client and the vendor. IP is important because projects require that information, perhaps trade secrets, be shared between the client and the vendor.The environmental attribute includes agents that affect the availability of resources needed for software development in an international environment. The project management attribute includes characteristics of an international software project that affect the resource requirement of the project.

Figure 2.1: Three related attributes of the framework



Source: Extracted from (Michael, A.S,Sabyasachi,M., Sridhar, N.,1996)

Combining the attributes

Each of the attributes provides a useful framework for considering some of the issues associated with offshore outsourcing of software development. A pair wise combination of the attributes reveals a richer set of issues that must also be addressed.

The environmental and resource attributes

Combining the environmental and resource attributes reveals issues related to their availability. A list of issues are generated by asking questions in the form "How does (agent) affect the availability of or deployment of (resource)?".These issues are tabulated and presented in table 2.1 below;

Table 2.1:Combining the resource and environmental attributes

Combining the resource and environmental attributes				
Resource /Env agent	**Hardware/software**	**Personnel**	**Intellectual property**	**Finance**
Firm	Installing compatible hardware and software	Recruitment,hiring, and employment practices Language use in firm	Role of IP in firm's strategy Firm –level IPProtection methods	Financial characteristics of the firm
Government	Import/export restrictions Promotion of standards through use	Immigration/emigration regulations Labor laws, educational incentives Promotion of skills through hiring	IP protection, regulation, and enforcement Transborder data flow restrictions Encryption standards and laws	Interest rates, Import/Export bank services Financial incentives Foreign exchange restrictions
Infrastracture providers	Telecomm capabilities Standardization of equipment	Information and technology literacy through education	Security of transmission	
Business environment	De facto standards	Competion for personnel Attractiveness of profession	Competitive strategy	Financing methods
International organizations	Standardization aid to develop infrastructure	International labor regulations.Aid to promote education	IP international conventions	Aid to promote development in general.

Source: Michael, A. S, Sabyasachi ,M., Sridhar, N.,1996

The authors argue that each environmental agent influence the resources for example, at the firm level, both firms influence needs and availability through their existing systems and practices. As for the business environment, agents include financial institutions, competitors, customers of both the client and vendor firms, and consumers of similar IT products and services. All these firms may adopt standards that affect the availability of the hardware, software and personnel, a case in point is the adoption of Unix as an industry standard in India in early eighties which resulted in the availability of Unix hardware, software and Unix-trained personnel in that country, allowing it to successfully compete in the market for Unix based products. Financial issues include the development of suitable schemes by financial institutions for software development in general and offshore software development in particular. International organizations include technical groups e.g. CCITT, ISO and IEEE, trade organizations e.g. WTO, OAS, ASEAN and the EU, and financial organizations e.g. World Bank, the IMF, Asian Bank, and EBRD.

The resources and project management attributes

Combination of the project management and resource attributes reveals issues related to the resource needs of projects. Here, issues are generated by asking questions in the form "How does (characteristic) affect the need for (resource)"?. These issues are tabulated in table 2.2 below;

Table 2.2: Combining the resource and project management attributes

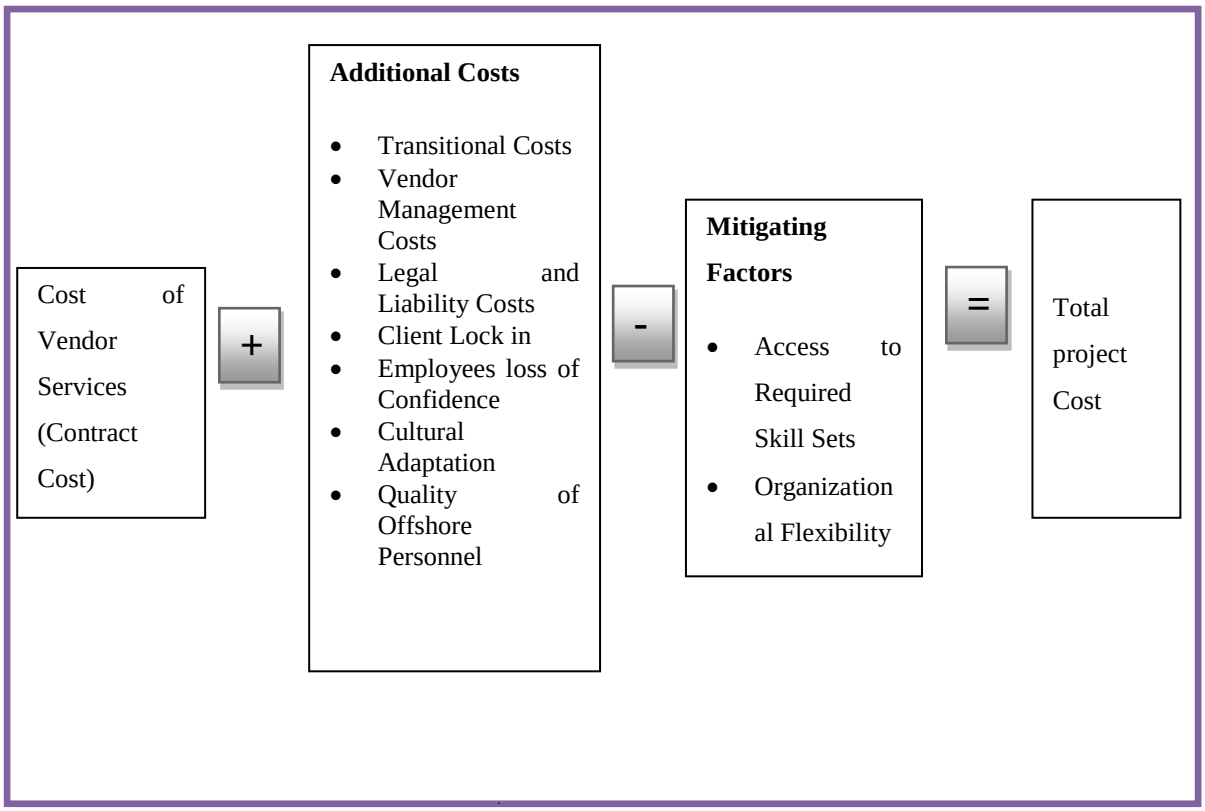
Combining the resource and project management attributes				
Resource /Characteristics	**Hardware/software**	**Personnel**	**Intellectual property**	**Finance**
Scale	Differing level/kind of resources requirements depending on project characteristics		Differing levels of IP protection needed/available depending on characteristics	Financial arrangements to coordinate interests of firm and vendor depending on characteristics.
Scope				Financial risk depending on characteristics.
Duration				
Difficulty				
Strategic value	Suitability tests based on characteristics ;contract provision based on characteristics			

Source: Michael, A. S, Sabyasachi ,M., Sridhar, N.,1996

2.3.2: Cost of Offshore Systems Technology (COST) Model

Although the key driving factor when offshoring systems development and maintenance is low cost, this model suggests the indirect costs may negate the financial benefit expected especially when by contracting with a low-cost vendor. The additional costs that exist and are not always considered before entering into offshore outsorcing arrangement include transitioning operations and knowledge of the vendor, management of the vendor, legal and liability costs, lock-in , loss of confidence by staff, adaptation of culture and the personnel quality. The authors also suggested the steps that mitigate the costs of managing offshore outsourcing irrespective of the vendor location. The steps/factors to mitigate include access to required skills and organizational flexibility. Figure 2.2 below illustrates this model.

Figure 2.2: Cost of Offshore Systems Technology (COST) Model



Source: Gerald DeHondt and Deborah Knapp,2008

Anticipated Cost Savings

One of the primary drivers of the offshoring of system development activities is cost savings (Ang and Cummings (1997), Ang and Straub (1998),Casale (2001),Gopal et al.(2002),Loh and Venkatraman (1992a,1992b),Slaughter and Ang(1996)

A survey of 252 IT Managers in the United States discovered that 44 percent identified cost savings as the primary reason most global companies offshore IT needs beyond their domestic borders King (2003b). King (2003a) concluded also that the main difference between domestic workers and those employed by offshore vendors is salary with every $100 spent on IT workers in the United States approximately $30 is spent on employees in Bangalore, India. Gopal et al.(2002) found out that offshore vendors benefit from their home infrastructure and favorable government policies like tax subsidies and access to skilled manpower. Banerjee and Duflo (2000) concluded that cost structure in India, past performance and reputation place them on competitive footing for offshore outsourcing ventures.

Hirschheim and Lacity (2000),Scheier (1997) indicated that cost benefits of offshoring have not always materialized. Aubert et al.(1998,1999) and Earl (1996) found that there are significant risks introduced by offshoring.Lacity and Willcocks (1998) study found that only 56 percent of offshore agreements realized the expected cost savings. Caldwell (2002a,2002b) in a Gartner Dataquest Report indicated that about one in every three offshoring contracts targeting cost reductions failed to meet expectations.

Transition and Management Costs

Scheier(1996) in his research indicates that many companies enter into an offshoring arrangement believing they understood all major costs. However, few businesses hardly consider the costs of transitioning to a new vendor, which are not negligible. In some instances the additional costs make the client's benefit vanish altogether. Examples of transition costs include; costs of maintaining internal staff while vendor learns the system, efforts by staff assisting vendor, business disruption while mentoring the vendor, inability by vendor to respond as internal staff. Barthelemy (2001) found that the more complex the activity being offshored, the more expensive will be the transition costs.

Legal and Liability Issues

When companies choose to offshore, there is need to be aware of the legal ramifications, their ability to control and monitor performance, and the impact on workplace attitudes. Arnett and Litecky(1994) indicated that in a permanent work arrangement, the employer is liable to third parties for employee's negligence and employees are responsible to their employers and have a duty to protect trade secrets and confidential information. Since offshore workers do not have employment agreements, companies need to take extra precautions to ensure that company's proprietary information is handled appropriately. One of the ways to address this is by non-disclosure agreements.

Vendor contract

Levina and Ross (2003) in their study concluded that the actual benefits of outsourcing to a foreign vendor depends on the ability of the organization to

determine the consistency between its needs and the competencies available in the market place, the selection of appropriate vendor and successfully managing the relationship, and their complementariness to the client.

Bendor-Samuel(2002) mentioned that clients must fully negotiate the service level agreement, but also give the vendor control on how to fulfil the contract.

Client Lock-In

Aubert et al. (1998) indicates that the number of prior projects successfully completed by a vendor increases its bargaining power with a client and can lead to a lock-in effect, a situation where a client cannot get out of a relationship except by incurring a loss. Once locked in, the vendor may renege on service levels because the client cannot easily turn to another vendor. Bahli and Rivard (2003) mentioned that service degradation or cost escalation may also occur in cases of lock-in effect. In the case of service degradation, the client may incur direct costs if the client performs the vendor's tasks and in the second instance, the vendor may increase costs or decrease service level. Both instances cause the client to incur additional costs directly or indirectly. Porter (1985) suggests a way to counter this is by engaging multi-vendor strategy.

Institutional System Knowledge and Employee Loss of Confidence

Permanent employees represent one of the most vital organizational resources whose system knowledge may be difficult, if not impossible, to replace. During offshoring arrangement, permanent staff loose confidence with the employer. Domberger (1998) found that a major concern among companies is what to do with the displaced staff, or even losing team members with significant organizational knowledge especially during critical knowledge transfer periods. Their organizational and system knowledge may be difficult to replace. In any type of transition, allocation of appropriate time to allow organizational knowledge held by employees be transferred to the vendor is important and at the same time and allow the employee to be productive as possible. Knowledge acquired over many years of experience by employee difficult to effectively and fully transition over a small period to a new vendor. This represents one of the potential disadvantages of re-staffing IS activities.

Slaughter and Ang (1996) suggests that there may be loss of confidence by full time employees in an organization when there is presence of contract workers. This is due

to expanded job descriptions placed upon permanent workers by management and the sense of inequality they feel. These feelings may increase as the presence of contract workers creates higher intentions to displace full time employees. This may increase the turnover rate, resulting in exodus of knowledge from the organization and productivity lowered.

Cultural Adaptation

Krishna and Walsham (2004) research demonstrates that particular societies have distinct ways of working that can be problematic when attempting cross-border collaboration. Farell et al. (2005) in his research found that even though English is the official language of India, many professionals do not speak it well enough to interact with U.S. clients and personnel. In fact, even HR managers in software and IT Service firms rank language difficulties as one of the top three handicaps of job applicants. This becomes fruitful during critical projects phases such as requirements gathering where any items missed in the communication process early can have devastating effect in the project later. These cultural differences also affect the way individuals interact with supervisors, perceive group harmony, respond to gender issues, and handle quality-of-life concerns.

Offshore Personnel

Gopal et al. (2003),Krishna et al. (2000) and Guinan (1998) concluded that quality of programmers or project personnel has a positive effect on project performance. This highlights the fact that companies need to be cautious when offshoring critical projects impacting on core business functions. Sometimes projects that appear to be on schedule may infact be behind due to quality measures not being met. These may require additional reworks once delivery has been done and as such may prevent system deployment, negating expected benefits from offshoring.

While offshoring systems development activities may lead to additional unanticipated costs mentioned above, additional factors in the offshoring relationship may mitigate these costs.

Access to Required Skill Sets

Krishna,Sahay,and Walsham (2004) argue that companies offshore to obtain access to wider labor markets. Martin (1991),Yourdon(1992) argue that maintaining IS expertise in-house opens a company to the challenges of permanent work arrangement in IT such as skill deterioration and specific skill shortages. Slaughter and Ang (1996) found that relying on retaining permanent workforce may be cost prohibitive, due to the rapidly evolving IT field and by the time the company invests in training its IS staff, the technology and skill may be obsolete. Contracting these services to offshore vendors therefore provides the organizations with access to knowledge workers that already have mastered the functions and are also familiar with the organizations challenges.

Organizational Flexibility

Companies can use their level of organizational flexibility to decide whether to outsource systems development work or train existing employees to perform these tasks.

Barrett et al (2005) defined organizational flexibility as the degree in which a business unit is adaptable in administrative relations and authority vested in situational expertise. If in-house IS staff are unable to handle a systems need, the company can use external vendor to perform this function, thereby expanding the development resources of the organization. Seeking offshore workers fill a missing potential of the organization allows them wider breadth and access to a larger pool of potential talent, which in turn increases the flexibility of the organization allowing them to better adapt to a changing environment.

2.4: Benefits of Offshore Systems Development and Maintenance

2.4.1: Cost savings

One of the driving factors in offshore systems development is cost savings. Amoribieta et al (2001) argue that although local outsourcing to software firms in the US or UK may be possible, firms can gain a strategic advantage from the lower wages and benefits prevailing in countries such as India, where hourly, fully loaded programming rates can be 40 to 60 per-cents below those in the United States.According to Nasscom (2002), software development costs in India are estimated to be 30-40 per cent lower than those in developed markets.

2.4.2: Flexibility, speed

Time saving is another reason for outsourcing some of the in-house IS work to offshore outsourcers. Khan et al (2003) noted that different time zones enable a nearly 24 or 18 hour programming a day for example the US and UK respectively. This reduces the development life cycle by half. Due to this time zone difference, if an error occurs in the system it can be fixed overnight and the system can be fully available on the next day. However, this time saving is only possible if the supplier and customer have a good telecommunications and infrastructure.

2.4.3: Quality

When engaging in offshore outsourcing, companies not only pursue cost savings, but they also want a quality service. According Nasscom (2002) most Indian firms are quality accredited with capability maturity Model (CMM) level 5 and CMM level 4 thus making it the most preferred destination for offshore systems development.

CMM involves a 5-level process maturity continuum - where the uppermost (5th) level is a notional ideal state where processes would be systematically managed by a combination of process optimization and continuous process improvement. The CMM level 1 is *Initial* (chaotic, ad hoc, individual heroics) - the starting point for use of a new or undocumented repeat process. Level 2 is *Repeatable* - the process is at least documented sufficiently such that repeating the same steps may be attempted. Level 3 is *Defined* - the process is defined/confirmed as a standard business process, and decomposed to levels 0, 1 and 2 (the last being Work Instructions). Level 4 is *Managed* - the process is quantitatively managed in accordance with agreed-upon metrics and level 5 is *Optimizing* - process management includes deliberate process optimization/improvement (Barrett et al, 2005).

2.4.4 : Human capital(Solution to the IT skills shortage)

One main reason for offshore outsourcing is that very often there isn't enough talent in the own country. Robb (2000) in his study found out that some firms want to outsource in their own country, but the personnel available for specific tasks do not have the sufficient qualifications whereas, the programmers from countries like India do have the right qualifications, e.g. JAVA and other Internet related skills.

2.4.5: Simplicity and remain focused on core competencies

Lacity and Willcocks (1997) argued that outsourcing can benefit firms to focus on their core competences and activities while contracting out the less noncore work which the market can do more cost effectively.

2.5: Risks/Challenges of Offshore Systems Development and Maintenance

Although offshore systems development often seems attractive, it can have pitfalls. Ishman, (1996) in a study of 85 outsourcing deals over the period 1992 – 2000 showed that, while in 60% of these deals the client benefited, nearly 36% of clients experienced problems. The following paragraphs examine some noteworthy problems that can occur on offshore systems development.

2.5.1: Operational problems

In an offshore systems development arrangement, an organization's processing is performed by different personnel, with different management, using different techniques and methods, in a changed operating environment. Threats to availability, integrity of systems and resources, confidentiality of information and regulatory compliance failure of the systems, a lack of data integrity, or unauthorized access to data can jeopardize an organization's ability to make sound business decisions using reliable system-generated information and to conduct its operations in compliance with regulations. These situations can lead to a loss of business and reputation, and financial losses, as well as lawsuits, fines and penalties.

2.5.2: Loss of competencies

In many offshore systems development arrangements, the IT assets and personnel are transferred to the service provider. This action results in the transfer of knowledgeable staff who previously contributed to the intellectual capital of the organization. Through offshore systems development, an organization therefore risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains. This loss could, in turn, compromise its ability to operate and manage effectively. Offshore systems development creates a need for new management skills which may not be available within the organization.

2.5.3: Threat of opportunism

As outsourcing take control of the IS functions, there are fears that supplier may take advantage of clients. In particular, firms that outsource may find themselves at a disadvantage when the outcome of the development is not satisfactory or disagreement with contractors. Thus it becomes difficult to disengage a contract and also the money and time that was spent is considered as ill spent.

2.5.4: Unexpected Costs/Hidden costs

These may arise because of a failure to analyze services offered by the supplier and the cost, thus making a poor estimate of the initial contract price. Usually offshore outsourcers bid low to attract clients, but subsequently, this low price work becomes very high investment when supplier fails to generate work and thus start at ground zero. This could also result when suppliers are not selected properly or poor selection process of an organization. Hidden costs such as consultancy fees transfer of software license fees, and mitigation of data may defeat the cost advantage of using an offshore outsourcing. Sometimes, managing the project becomes difficult in a long distance environment, which could lead the project to overrun its scheduled completion date and estimated costs.

2.5.5: Geopolitical risk

Instability of the political situation could act as a discouragement for the foreign investors to offshore outsourcing. Therefore, if the development process gets delayed due to impeding factors like strikes or power cuts, it becomes difficult to continue the process.

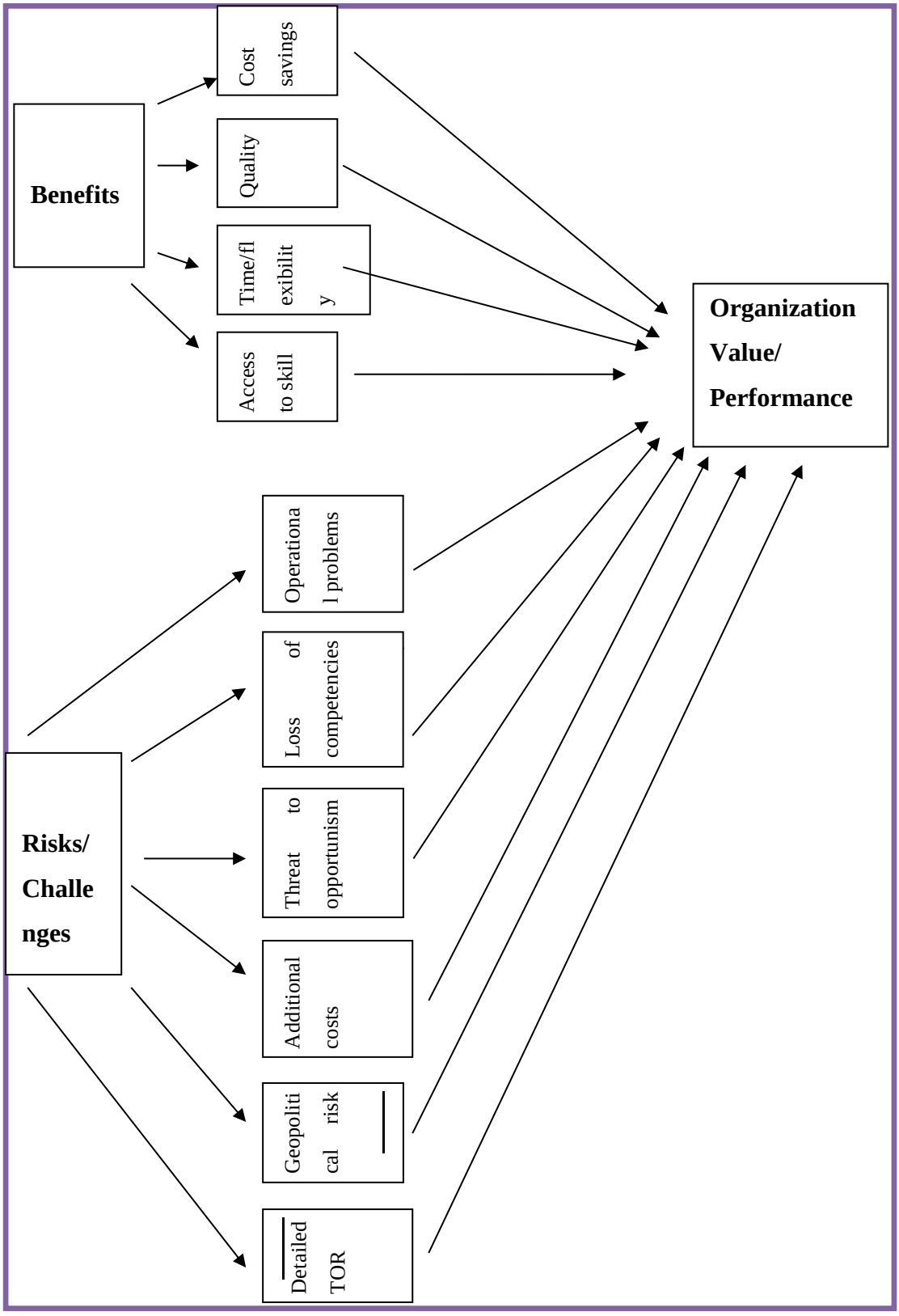
2.5.6: Detailed specification is required

Normally product specification is to be delivered in great detail and at times it takes a long time to do this. The entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can also impede this process.

2.6: Conceptual framework

This framework is informed from the information on the literature review i.e. the benefits and risks and challenges in offshore systems development and deployment

Figure 2.3: Conceptual framework for offshore systems development and deployment



Source: Research

CHAPTER THREE: METHODOLOGY

3.1: Introduction

This chapter presents the research design and methodology that was used to carry out the research. It presents the research design, population, sampling procedures, and research tools, procedures and data analysis techniques.

3.2: Research design

The research was conducted through survey research design. Survey is one of the most prevalent research methodologies used in IS research (Vogel and wetherbe,1894; Pinsonneault and kremer,1993). The benefit of using survey is that researcher can easily cover large population quickly at relatively low cost especially with availability of modern communication technologies.

3.3: Target population

The survey targeted decision makers and implementers of offshore systems development and deployment in companies trading at the Nairobi stock exchange. This was made up of 60 companies. The decision makers included Information and Communication Technology (ICT) Managers, System Analysts, Programmers, legal officers and Human Resource officers.

3.4: Sample size

For this study, the sample size was derived from sample sizes table developed by Robert and.Morgan (1970). In their study, using Chi-square table for 1 degree of freedom at confidence level and for known population, constructed a table using the formula below;

$$s = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$, where

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level of .05.

N = the population size.

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (0.05).

Using this formula, table in Appendix III can be used to determine the sample size for a given population.

The sample size of 52 firms was used in this study.

3.5: Sample design

This is a definite plan determined before any data are collected for obtaining a sample from a given population. The samples can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample. These are those based on simple random sampling, systematic sampling, stratified, cluster/area sampling.

With non-probability sampling, items for the sample are selected deliberately by the researcher i.e. judgment of the researcher plays an important role. Sampling error cannot be estimated and element of bias small or big is always there. This type of design fits small and individual research where time and cost take advantage.

For this research, non-probability sampling, specifically convenience sampling was used to select companies from the Nairobi Stock exchange.

3.6: Data Collection method/procedure

In this research, pre-tested questionnaires were employed as a method of data collection. The questionnaires were sent to respondents with request to answer and return the questionnaires. This method was chosen because it is free from bias of interviewer, low cost and large samples can be made use of thus reducing bias and improving reliability of data collected and analyzed.

The questionnaires had open and closed ended questions. The questionnaires were pre-tested by conducting a ‘pilot research’ of small respondents of those organizations

that offshore systems development. The results were used to detect ambiguities or weaknesses if any on the questionnaires.

3.6.1: Reliability tests

The reliability tests were done for statements measuring the benefits of offshore systems development and deployment and for the challenges and risks associated with offshore systems development and deployment. The Cronbach's Alpha of more than 0.7 indicates that the data collection instrument (questionnaire) is reliable.

3.6.2: Reliability tests for benefits

Results in table 3.1 below indicate that the reliability statistics for offshore systems development and deployment benefits is reliable. This is supported by Cronbach's Alpha of 0.753.

Table 3. 1: Reliability statistics

Cronbach's Alpha	N of Items
.753	5

Source: Research

The results in table 3.2 indicate that all the statements are reliable and no significant improvement on reliability would be achieved if any of the items were deleted.

Table 3. 2: Item total statistics

	Cronbach's Alpha if Item Deleted
Offshore system development and deployment lead to cost savings because of low development costs in offshore countries.	.632
Time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment.	.762
Organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited.	.618
There isn't enough talent on systems development and deployment locally i.e. i.e. available personnel for specific tasks do not have the sufficient qualifications.	.737
ICT function is not the core activity of ourbusiness,offshoring systems development and deployment will help our organization to remain focused.	.763

Source: Research

3.6.3: Reliability tests for risks/challenges

Results in table 3.3 below indicate that the reliability statistics for challenges associated with offshore systems development and deployment indicate that the items are reliable. This is supported by Cronbach's Alpha of 0.910.

Table 3. 3: Reliability statistics

Cronbach's Alpha	N of Items
.910	14

Source: Research

The results in table 3.4 below indicate that all the statements are reliable and no significant improvement on reliability would be achieved if any of the items were deleted.

Table 3. 4: Item Total Statistics

	Cronbach's Alpha if Item Deleted
In an offshore systems development transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer (additional bandwidths or reinforce security measure) etc.	.903
In offshoring systems developments engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose c	.910
During offshore systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks that thus causing threats to availability and integrity of systems and r	.905
Offshoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations	.906
Offshore systemdevelopments in organizations lead to loss of jobs.	.900
Through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains	.896
Offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss.It becomes difficult for client to get out o	.906
Sometimes to minimize costs,offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed.	.896
Offshore systems developments require new management skills that are sometimes not readily available within your organization.	.897
Sometimes cultural differences, language barrier between offshore vendors and your the performance of project.organization affect	.908
Oversees legal requirements of offshore system development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts	.904
Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process	.908

	Cronbach's Alpha if Item Deleted
Sometimes communication infrastructure breakdowns e.g. unavailability of internet is a great challenge to offshore system development arrangement	.903
Locally there are no policies/guidelines formulated that govern offshore systems development arrangements.	.909

Source: Research

3.7: Hypothesis

The hypotheses below were used to test and fit the framework for offshore systems development and deployment.

Hypothesis 1: Offshore systems development and deployment result in cost savings because of low development costs.
Cost savings is one of the drivers of the offshoring of system development and deployment in Kenyan organizations

Hypothesis 2: Systems are developed and deployed through offshore arrangements due to time saving ability.
Kenyan organizations engage in offshore system developments and deployments in order to achieve the time saving advantage.
Hypothesis 3: Systems are developed and deployed through offshore for quality service which is offered by offshore vendors, who are quality accredited.

Hypothesis 4: Systems development and deployment through offshore happen due to availability of required skill.

Hypothesis 5: Systems are developed and deployed through offshore because ICT function is not the core activity of our business.

H***ypothesis 6***: Hidden costs such as cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer is a significance challenge in offshore development and deployment.

Hypothesis 7: organizational privacy is a significant challenge in offshore development and deployment since connections with networks in multiple legal and political juristications increase risk of illicit access to information and pose considerable risks to the security and privacy of organizations.

Hypothesis 8: Hacking and threats to availability and integrity of systems and resources is a significant challenge in offshore development and deployment.

Hypothesis 9: Organizations risk of industrial espionage is a significant challenge in offshore development and deployment.

Hypothesis 10: Loss of jobs is a significant challenge in offshore systems development and deployment.

Hypothesis 11: Organization risks of losing its competencies is a significant challenge in offshore development and deployment.

Hypothesis 12:Increased costs due to client-lock-in effect is a significant challenge in offshore development and deployment.

Hypothesis 13: Poor quality of work from vendors who employ young inexperienced programmers is a significant challenge in offshore development and deployment.

Hypothesis 14: Lack of management skills is a significant challenge in offshore development and deployment.

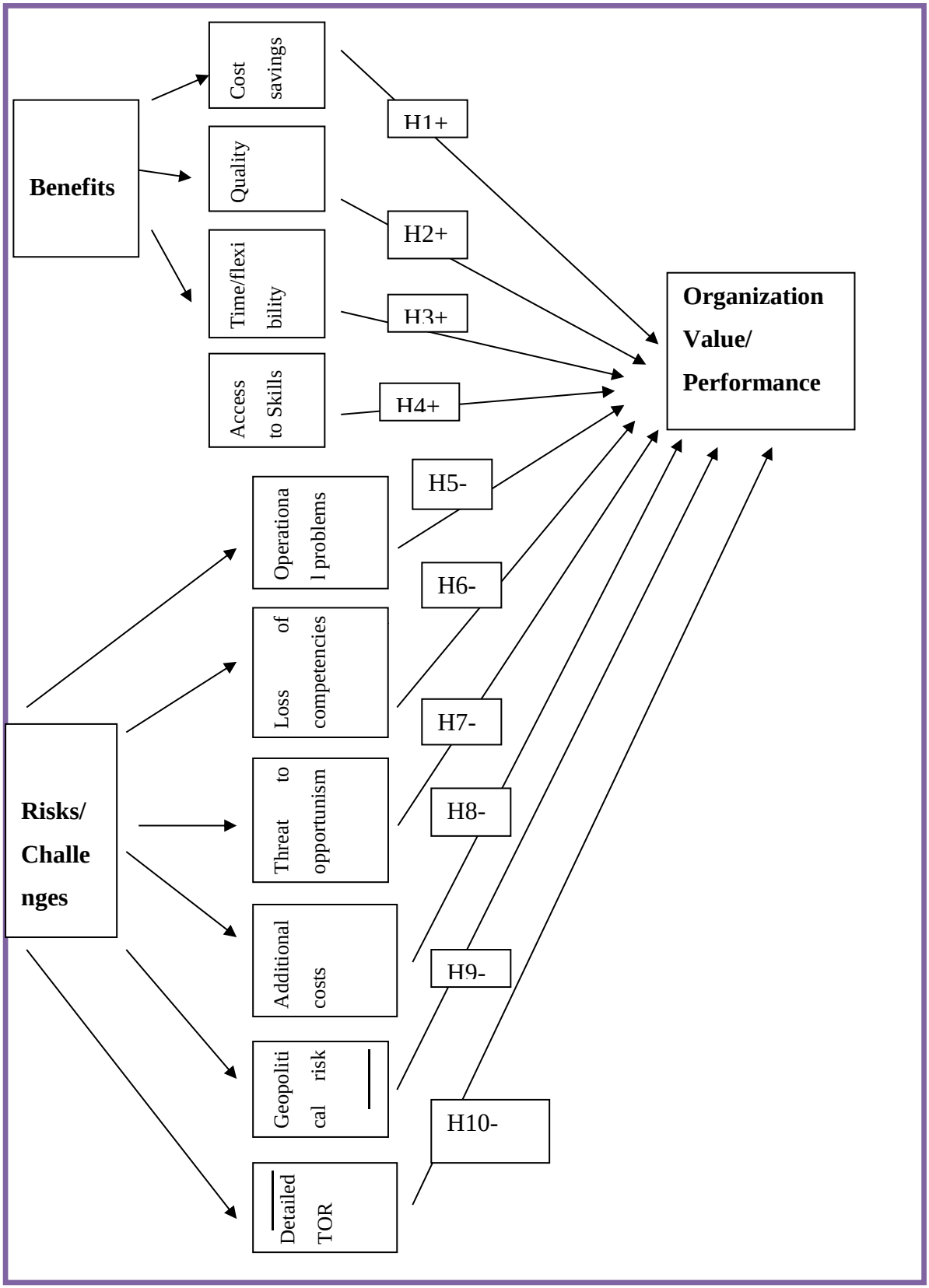
Hypothesis15: Cultural differences and language barrier are significant challenges in offshore development and deployment.

Hypothesis 16: Unclear overseas legal requirement is a significant challenge in offshore systems deployment and deployment.

Hypothesis 17: Detailed specifications during Systems development, local culture and customs is a significant challenge in offshore deployment

Hypothesis 18: Lack of policies/guidelines formulated that govern offshore systems development is a significant challenge in offshore deployment

Figure 3.1: Causal relationships for offshore systems development and deployment.



Source: Research

3.8: Data Analysis

Prior to analyzing the collected data, the questionnaire responses were checked to ensure that they are fully completed and accurate by editing. Here, the raw data collected were examined to detect errors and omissions. The questionnaire responses were also coded.

Likert scales was also used, scales can conveniently show the response from strongly agree to strongly disagree with mid-point being neutral response. Davis (1989) suggested use of 5 point likert-type scale ranging from 1 (strongly disagree) to 5 (Strongly agree)

SPSS version 17software was used to analyze the quantitative data collected. Factor analysis methodology using principal component analysis (PCA) was used to reduce the questionnaire statements into few factors. The eigen maximum criterion (an option under PCA) was employed to extract these factors. Varimax method was used to rotate the factor loadings. The choice of PCA is because it has the capability to produce orthogonal factors. Pearson Correlation and regression analysis was also applied during analysis to test the hypotheses.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.0: Introduction

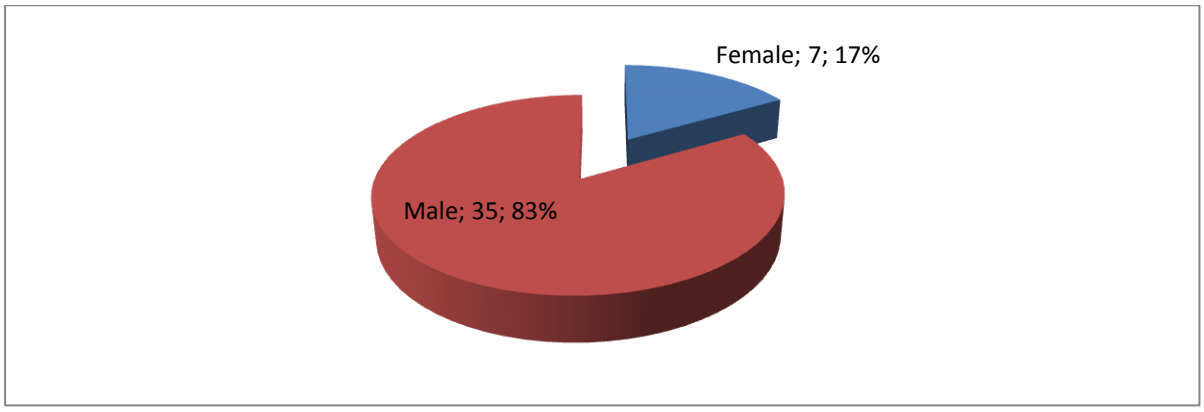
The 60 firms at the Nairobi Stock exchange formed the population. A sample of 52 was identified. A response rate of 42 out of 52 organizations was achieved, representing a response rate of 80.8 % of the sample.

4.1: Demographics

4.1.1: Gender of the Respondents

The respondents were asked to indicate their gender. Figure 4.1 indicates that majority 83% of the respondents are male and 17% are female. These findings imply that the organizations gender is predominantly male. This may also indicate that the IT profession is not preferred by women because of its demanding nature.

Figure 4.1: Gender of the respondents

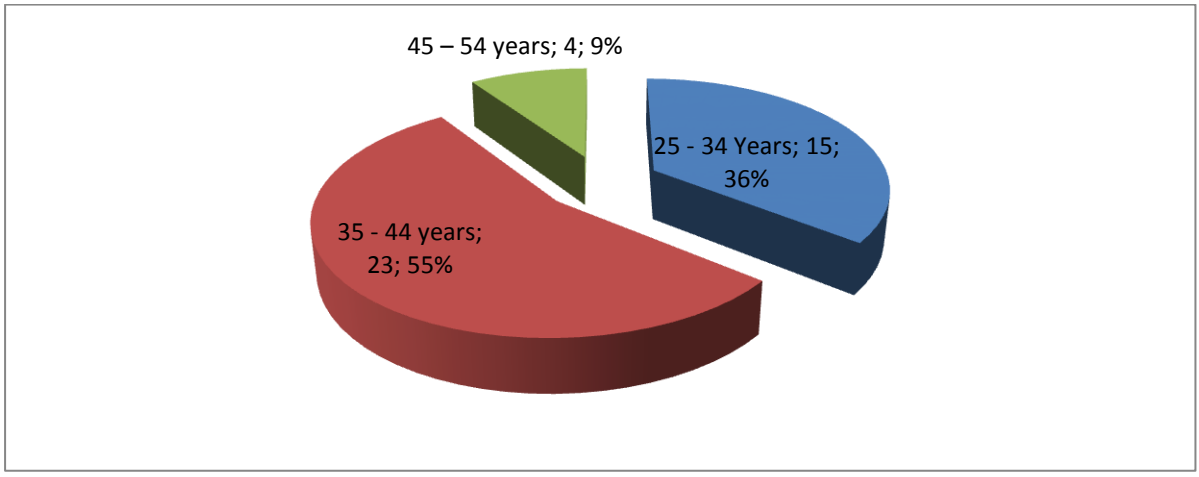


Source: Research

4.1.2: Age Bracket

The research sought to establish the age brackets of the respondents. The findings are presented in figure 4.2. As illustrated in figure 4.2, the findings reveals that a majority 55% of respondents are aged between 35-44 years, followed by 36% respondents who are aged between 25 to 34 years, and 9% of the respondents were between 45- 54 years. The findings imply that the respondents of the research were mature and probably at the peak of their careers.

Figure 4.2:Age bracket

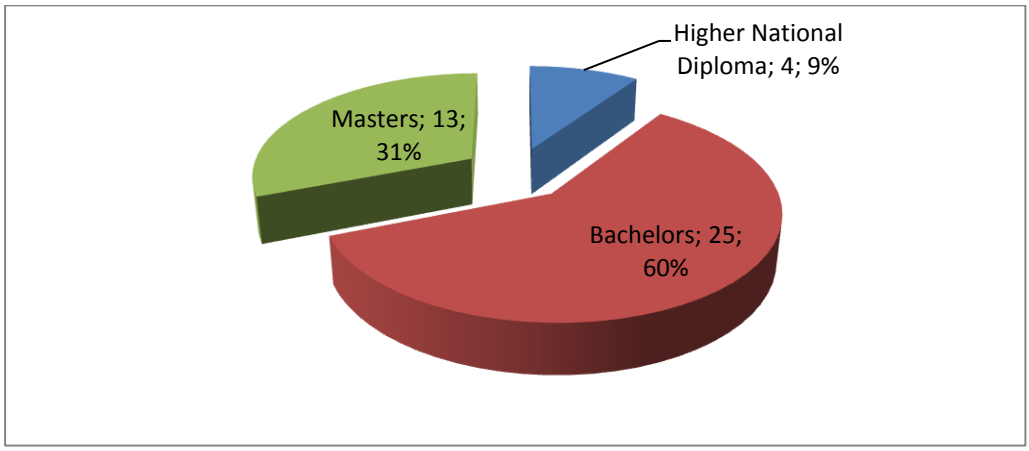


Source: Research

4.1.3: Level of education

The research sought to establish the level of education for the respondents. The findings are presented in figure 4.3 below. As illustrated in figure 4.3, the findings revealed that a majority 60% of the respondents are undergraduates, while another 31% of the respondents had attained masters and 9% of the respondents had attained higher national diploma. These results imply that the respondents had high academic qualifications.

Figure 4.3: Level of education

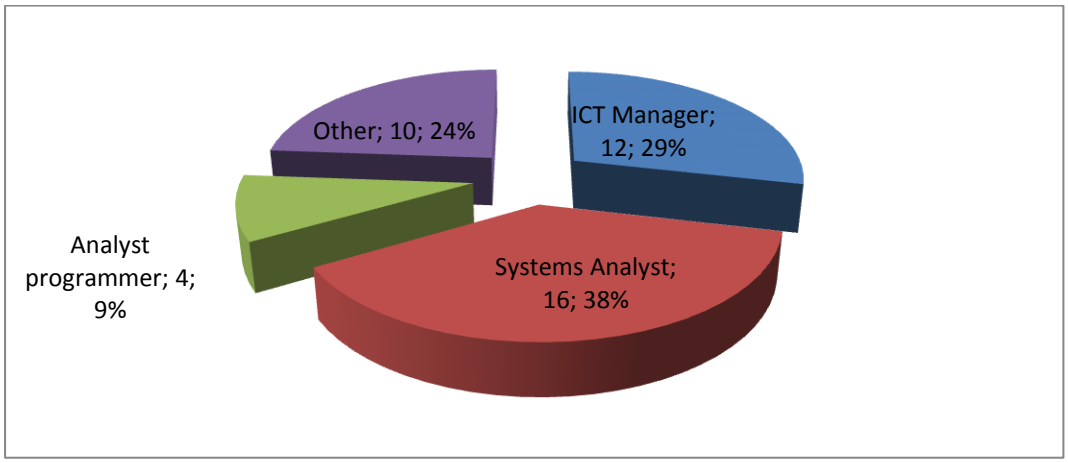


Source: Research

4.1.4: Position in organization

The research sought to establish the position held by the respondents. Figure 4.4 revealed that majority 38% of respondents were systems analysts, while, 29 % were ICT managers and 9% were analyst programmers, 24% were in general IT positions. The finding implies that the results were drawn from respondents who were well distributed across the organization.

Figure 4.4: Position in organization

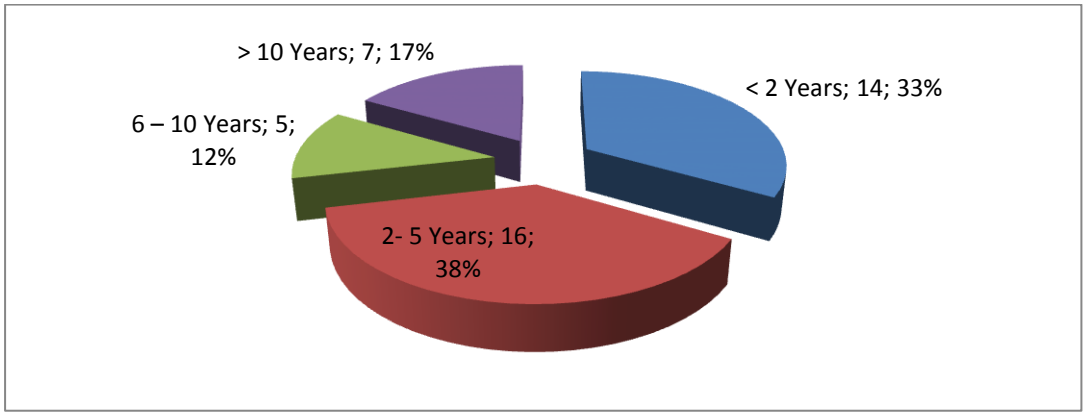


Source: Research

4.1.5: Period in the Company

The research sought to establish the length of period the respondents have been in the organization. The results are presented in figure 4.5 below. This indicates that majority 38% of the respondents had been in the organization for a period of 2-5 years, while 33% of the respondents had been in the organization for less than 2 years and 17% of the respondents had been in the organization for more than 10 years., 12% of the respondents had been in the organization for 6-10 years. The findings imply that all the respondents had been in the organization long enough hence had knowledge of what was going on in the organization.

Figure 4.5: Period in the company

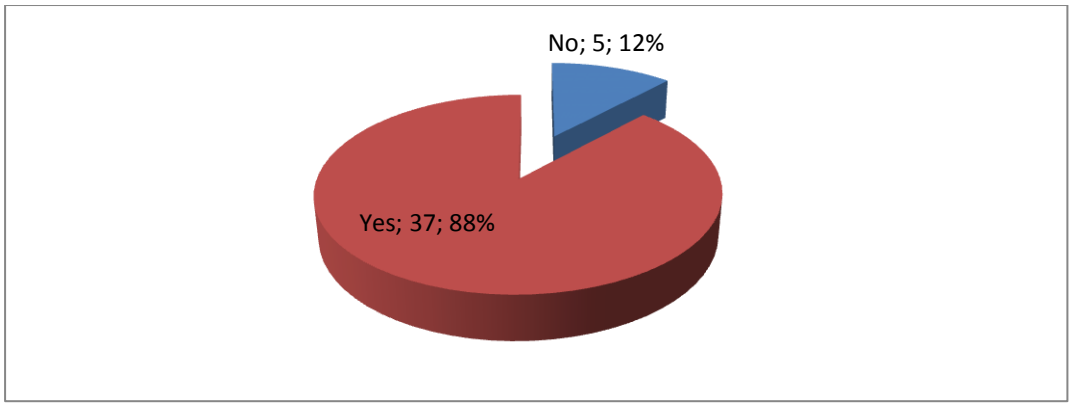


Source: Research

4.1.6: Engagement in offshore

The research sought to establish whether organization has ever engaged in offshore of systems development and deployment. Results in figure 4.6 indicated that majority 88% of the respondents indicated their organizations were engaged in offshore development and 12% of the organizations have not been in offshore systems development and deployment.

Figure 4.6: Engagement in offshore

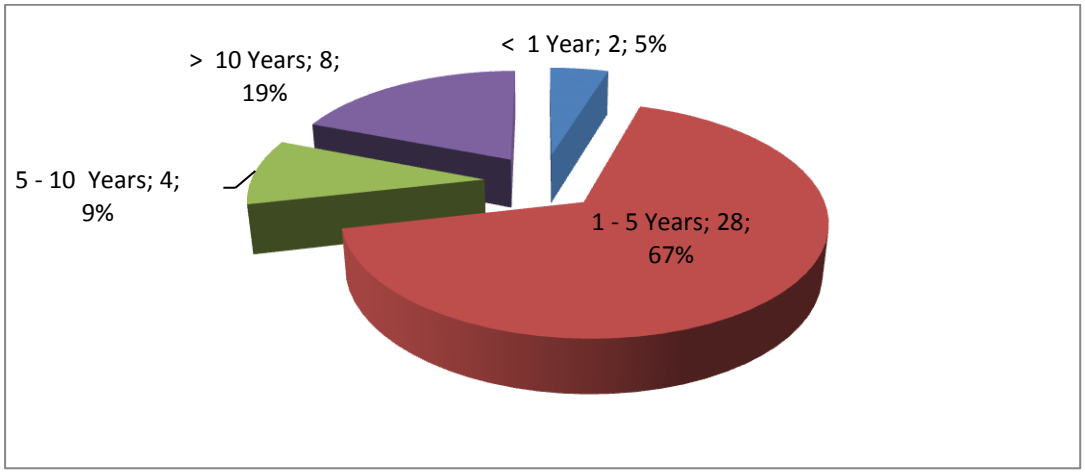


Source: Research

4.1.7: Engagement duration

The respondents were asked to indicate for how long their organizations had been engaged in offshore of systems development and deployment. Results in figure 4.7 revealed that majority 67% of the respondents indicated that their organizations had been engaged for a period of 1-5 years, while 9% of the respondents indicated their organizations had been engaged for 5-10 years and 19% of the respondents indicated more than 10 years. Only 5% have been engaged for less than 1 year.

Figure 4.7:Engagement duration



Source: Research

4.1.8: Country

The respondents were asked to specify which country(s) their organizations have been getting offshore services from. 71.4% of the respondents indicated from India, while 11.9% of the respondents indicated France, another 11.9% of the respondents also indicated from Spain and 2.4% respondents indicated Mauritius and another 2.4% of the respondent indicated South Africa.

4.1.9: Systems

The respondents were asked to specify which service(s) their organizations have been offshoring for systems development and deployment. The respondents indicated; SAP ERP system configuration, Systems Development, Firewall management, Systems integration, Fuel card system development and support, Systems developments,core banking, back office application suite, planning & budgeting system, SAP system

enhancement and support,Database management, as some of the systems for outsourcing.

4.2: Benefits of offshore systems development and deployment.

The research sought to establish the benefits of offshore system development and deployment in Kenyan organizations. Results in table 4.1 revealed that majority 35.7% of the respondents agreed while another 9.5% strongly agreed, bringing to a total of 45.2% of those who agreed with the statement that offshore systems development and deployment lead to cost savings because of low development costs in offshore countries.33.3% disagreed, while 9.5% of the respondents strongly disagreed and another 11.9% neither agreed nor disagreed with the statement.

Table 4. 1: Cost savings.

Likert scale	Frequency	Percent
strongly disagree	4	9.5
disagree	14	33.3
undecided	5	11.9
agree	15	35.7
strongly agree	4	9.5
Total	42	100.0

Source: Research

In addition, a majority 40.5% disagreed and another 33.3% strongly disagreed bringing to a total of 73.8% of those who disagreed with the statement that time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment. 16.7% of the respondents were undecided and another 7.1% strongly agreed while 2.4% of the respondents agreed with the statement. The results are tabulated in table 4.2 below;

Table 4. 2: Time savings.

Likert scale	Frequency	Percent
strongly disagree	14	33.3
disagree	17	40.5
undecided	7	16.7
agree	3	7.1
strongly agree	1	2.4
Total	42	100

Source: Research

Furthermore, as indicated in table 4.3, a majority 33.3% of the respondents strongly agreed, and another 31.0% of the respondents agreed with the statement that organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited. 9.5% of the respondents disagreed, while another 9.5% of the respondents strongly disagreed and 16.7% neither agreed nor disagreed with the statement.

Table 4. 3: Quality service.

Likert scale	Frequency	Percent
strongly disagree	4	9.5
disagree	4	9.5
undecided	7	16.7
agree	13	31.0
strongly agree	14	33.3
Total	42	100

Source: Research

Similarly, 28.6% of the respondents strongly agreed and another 19% agreed bringing to a total of 47.6% of those who agreed with the statement that there isn't enough talent on systems development and deployment locally i.e. available personnel for specific tasks do not have the sufficient qualifications. A similar percentage of 19% of respondents strongly disagreed with the statement and 28.6% of the respondents disagreed with the statement whereas 4.8 % neither agreed nor disagreed with the statement as indicated in table 4.4 below.

Table 4. 4: Lack of talent locally.

Likert scale	Frequency	Percent
strongly disagree	8	19
disagree	12	28.6
undecided	2	4.8
agree	8	19
strongly agree	12	28.6
Total	42	100

Source: Research

Finally, majority 38.1% of the respondents agreed and another 19.0% strongly agreed bringing to a total of 57.1% of those who agreed with the statement that ICT function is not the core activity of our business, off shoring systems development and deployment will help our organization to remain focused.23.8%of the respondents disagreed and another 9.5% strongly disagreed with the statement and 9.5% neither agreed nor disagreed with the statement as tabulated in table 4.5 below.

Table 4. 5: ICT function is not the core activity.

Likert scale	Frequency	Percent
strongly disagree	4	9.5
disagree	10	23.8
undecided	4	9.5
agree	16	38.1
strongly agree	8	19
Total	42	100

Source: Research

4.2.1: Additional benefits

The respondents were asked to indicate any additional benefits that their organizations have achieved as a result of offshore system development arrangements. The respondents indicated that; they have been able to acquire quality products through offshore system development arrangements, that resources were freed to focus on other pressing matters, that customized systems was an additional benefit, that knowledge exchange was a benefit since offshore teams have a wealth of knowledge to share with local teams, resource management i.e. key personnel are free to be assigned more important tasks that have direct impact on the organization, that quick

turnaround on systems since offshore vendors have experts, compliance to relevant industry standards and quality check was a benefit derived from outsourcing.

4.3: Challenges associated with offshore systems development and deployment.

The research sought to establish the risks/challenges associated with offshore systems development and deployment in Kenyan organizations. Results in table 4.6 revealed that majority 38.1% of the respondents agreed and another 28.6% strongly agreed bringing to a total of 66.7% of those who agreed with the statement that in an offshore systems development, transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer.

Table 4. 6: Existence of transition/additional/hidden costs.

Likert scale	Frequency	Percent
strongly disagree	4	9.5
disagree	6	14.3
undecided	4	9.5
agree	16	38.1
strongly agree	12	28.6
Total	42	100

Source: Research

Table 4.7 revealed that, a majority 45.2% of the respondents agreed and another 28.6% strongly agreed with the statement that in off shoring systems development engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose considerable risks to the security and privacy of organizations.

Table 4. 7: Compromising of privacy of organization's sensitive information/data

Likert scale	Frequency	Percent
strongly disagree	6	14.3
Disagree	2	4.8
Undecided	3	7.1
Agree	19	45.2
strongly agree	12	28.6
Total	42	100

Source: Research

As indicated in table 4.8 below, a majority 42.9% of the respondents agreed and another 19.0% strongly agreed that during offshoring of systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks that thus causing threat to availability and integrity of systems and resources.

Table 4.8: Opening of external access to organization's internal systems.

Likert scale	Frequency	Percent
strongly disagree	5	11.9
disagree	4	9.5
undecided	7	16.7
agree	18	42.9
strongly agree	8	19.0
Total	42	100.0

Source: Research

Table 4.9, revealed that 50% of the respondents agreed and another 16.7% of the respondents strongly agreed bringing to a total of 66.7% of those who agreed with the statement that off shoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights is often a gray area in developing nations. 9.5% strongly disagreed with the statement and 2.4% disagreed and 21.4% were undecided.

Table 4. 9: Increase on organizations risk of industrial espionage by competitors.

Likert scale	Frequency	Percent
strongly disagree	4	9.5
disagree	1	2.4
undecided	9	21.4
agree	21	50
strongly agree	7	16.7
Total	42	100

Source: Research

In addition a majority of 16.7% of the respondents agreed and another 21.4% strongly agreed that offshore system developments in organizations lead to loss of jobs while

52.4% of the respondents disagreed and strongly disagreed with the statement whereas 9.5 % were undecided as indicated in table 4.10.

Table 4. 10: Loss of jobs.

Likert scale	Frequency	Percent
strongly disagree	6	14.3
disagree	16	38.1
undecided	4	9.5
agree	7	16.7
strongly agree	9	21.4
Total	42	100

Source: Research

54.8% of the respondents agreed that through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains.38.1% of the respondents strongly disagreed and disagreed to the statement and 7.1% were undecided as tabulated in table 4.11.

Table 4. 11: Loss of competences.

Likert scale	Frequency	Percent
strongly disagree	7	16.7
disagree	9	21.4
undecided	3	7.1
agree	12	28.6
strongly agree	11	26.2
Total	42	100

Source: Research

Furthermore, a majority 52.4% of the respondents agreed and another 16.7% strongly agreed that offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss. It becomes difficult for client to get out of contract or engage another vendor. 21.4% of the respondents strongly disagreed and disagreed to the statement while 9.5% were undecided as tabulated indicated in table 4.12.

Table 4. 12: Client-lock-in effect.

Likert scale	Frequency	Percent
strongly disagree	3	7.1
disagree	6	14.3
undecided	4	9.5
agree	22	52.4
strongly agree	7	16.7
Total	42	100

Source: Research

Table 4.13 revealed that 33.3% of the respondents agreed and another 19.0% strongly agreed that sometimes to minimize costs, offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed. 33.3% of the respondents strongly disagreed and disagreed, whereas 14.3% were undecided.

Table 4.13: Poor quality of work.

Likert scale	Frequency	Percent
strongly disagree	4	9.5
disagree	10	23.8
undecided	6	14.3
agree	14	33.3
strongly agree	8	19
Total	42	100

Source: Research

A majority 40.5% of the respondents agreed and another 16.7% strongly agreed that offshore systems developments require new management skills that are sometimes not readily available within your organization. 33.3% strongly disagreed and disagreed with the statement as indicated in table 4.14.

Table 4. 14: New management skills.

Likert scale	Frequency	Percent
strongly disagree	3	7.1
disagree	11	26.2
undecided	4	9.5
agree	17	40.5
strongly agree	7	16.7
Total	42	100

Source: Research

However, a majority 45.2% of the respondents agreed and another 28.6% strongly agreed with the statement that sometimes cultural differences, language barrier between offshore vendors affect the performance of organizations project. 21.4% disagreed and strongly disagreed whereas 4.8% were undecided as tabulated below.

Table 4. 15: Cultural differences

Likert scale	Frequency	Percent
strongly disagree	4	9.5
disagree	5	11.9
undecided	2	4.8
agree	19	45.2
strongly agree	12	28.6
Total	42	100

Source: Research

A majority 47.6% of the respondents agreed that oversees legal requirements of offshore system development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts as tabulated below.

Table 4. 16: Unclear oversees legal requirements.

Likert scale	Frequency	Percent
strongly disagree	2	4.8
disagree	9	21.4
undecided	11	26.2
agree	14	33.3
strongly agree	6	14.3
Total	42	100

Source: Research

Similarly, table 4.17 revealed that 73.8% of the respondents agreed that Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process. 78.6% of the respondents agreed that sometimes communication infrastructure breakdowns e.g. unavailability of internet is a great challenge to offshore system development arrangement.

Table 4. 17: Detailed specifications.

Likert scale	Frequency	Percent
strongly disagree	1	2.4
disagree	8	19
undecided	2	4.8
agree	24	57.1
strongly agree	7	16.7
Total	42	100

Source: Research

Finally table 4.18 revealed that 54.8% of the respondents agreed that locally there are no policies/guidelines formulated that govern offshore systems development arrangements.

Table 4. 18: Lack of policies/guidelines formulated.

Likert scale	Frequency	Percent
strongly disagree	2	4.8
disagree	12	28.6
undecided	5	11.9
agree	11	26.2
strongly agree	12	28.6
Total	42	100

Source: Research

4.3.1: Additional Risks

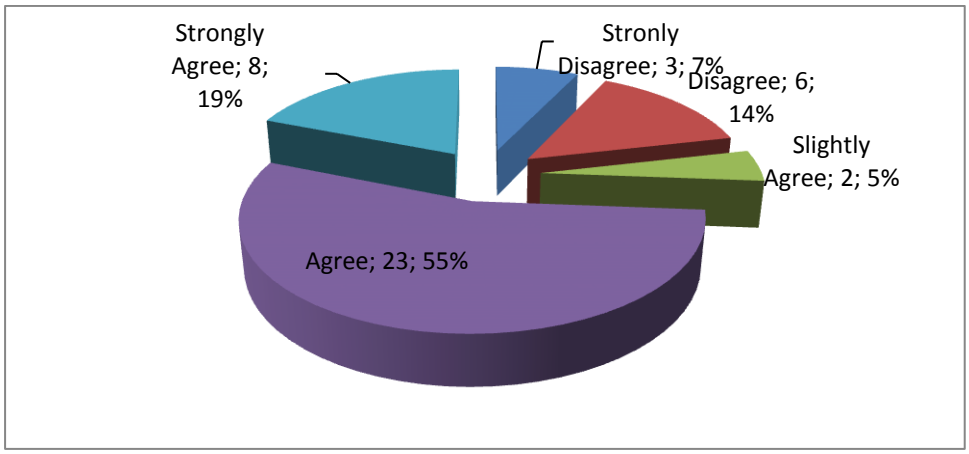
The respondents were asked to indicate any additional risks/challenges that their organizations face due to offshore system development arrangements. The respondents indicated that data integrity can be compromised; offshore vendors can be overwhelmed by work from various clients leading to delays. In addition, lack of proper knowledge transfer leading to poor first level support from internal staff, exposure of confidential data to competitors is possible. The respondents also cited poor deployment and training and lack of urgenc,system can go down for hours, days which may lead to loss of business. It was also indicated that there are high cost of maintenance fees, security risks not addressed during project and often process

owners are wrongly chosen which has direct correlation on the quality of work that is produced were additional risks with outsourcing.

4.5: Accomplishing Targets

The respondents were asked to indicate whether the offshore systems development and deployment has enhanced the ability to accomplish their targets as an organization. Results in figure 4.8 revealed that majority 55% of respondents agreed 19% strongly agreed, 5% slightly agreed with the statement that the organization accomplished targets while 21% disagreed with the statement that the organization accomplished its targets.

Figure 4.8: Accomplishing Targets



Source: Research

4.6: Factor Analysis for Benefits of offshore systems development and deployment

Factor analysis revealed that the statements on benefits of offshore systems development and deployment can be reduced to two factors. The reduction of the statements into two factors followed the Kaiser criterion which asserts that a factor should be selected on the basis of eigen Values. An eigen value of 1 or more indicates a factor. The two factors explained a cumulative variance of 74.608% of the total variance as indicated in table 4.19.

Table 4.19: Total Variance Explained

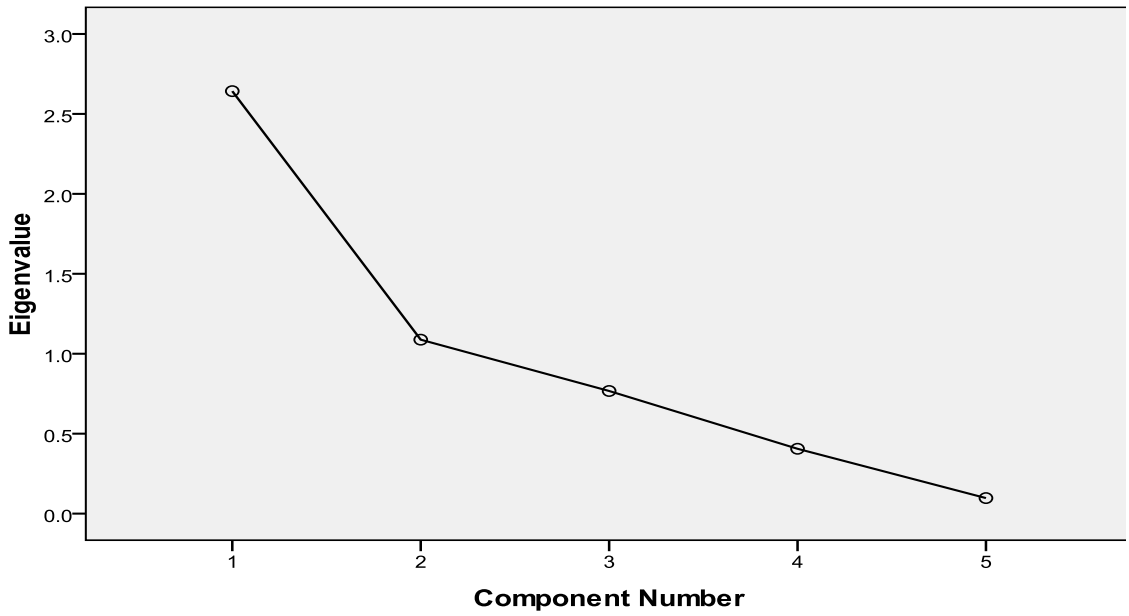
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.642	52.850	52.850	2.642	52.850	52.850	2.106	42.128	42.128
2	1.088	21.758	74.608	1.088	21.758	74.608	1.624	32.480	74.608
3	.767	15.338	89.947						
4	.405	8.110	98.057						
5	.097	1.943	100.000						

Extraction Method: Principal Component Analysis.

Source: Research

A Scree plot presented in figure 4.9 confirmed the results that the 5 statements on benefits can be reduced to two factors.

Figure 4.9 : Scree Plot



Source: Research

The rotated component matrix in table 4.20 presents the rotated factor loadings.

Table 4.20: Component Matrix

	Component	
	1	2
Offshore system development and deployment lead to cost savings because of low development costs in offshore countries.	.849	.373
Organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited.	.824	.423
Time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment.	.819	-.152
There isn't enough talent on systems development and deployment locally i.e. i.e. available personnel for specific tasks do not have the sufficient qualifications.	.178	.845
ICT function is not the core activity of ourbusiness,offshoring systems development and deployment will help our organization to remain focused.	.064	.755
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 3 iterations.		

Source: Research

Table 4.21 represents the names of the factors in line with factor loading results. The results indicate that three statements load heavily on "cost and quality benefits".The results also indicate that two statements load heavily on "specialization benefits".

Table 4.21: Factors

	Factor
1. Offshore system development and deployment lead to cost savings because of low development costs in offshore countries. 2. Organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited. 3. Time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment.	**cost and quality benefits**
1. There isn't enough talent on systems development and deployment locally i.e. i.e. available personnel for specific tasks do not have the sufficient qualifications. 2. ICT function is not the core activity of ourbusiness,offshoring systems development and deployment will help our organization to remain focused.	**specialization benefits**

Source: Research

4.7: Factor Analysis for Challenges Associated with Offshore Development

Factor analysis on challenges revealed that the statements on challenges associated with offshore development can be reduced to five factors. The reduction of the statements into five factors followed the Kaiser criterion which asserts that a factor should be selected on the basis of eigen Values. An eigen value of 1 or more indicates a factor. The five factors explained a cumulative variance of 94.310 % of the total variance as tabulated in table 4.22 below.

Table 4.22: Total Variance Explained

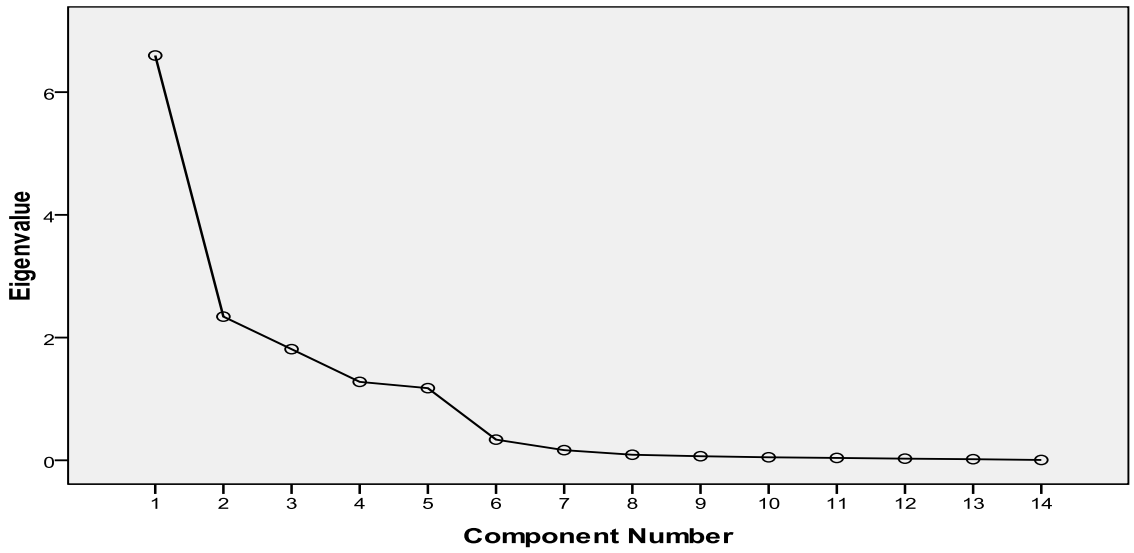
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.597	47.121	47.121	6.597	47.121	47.121	4.179	29.851	29.851
2	2.342	16.725	63.847	2.342	16.725	63.847	2.925	20.892	50.743
3	1.811	12.936	76.782	1.811	12.936	76.782	2.165	15.463	66.206
4	1.278	9.129	85.912	1.278	9.129	85.912	2.005	14.323	80.528
5	1.176	8.398	94.310	1.176	8.398	94.310	1.929	13.781	94.310
6	.337	2.407	96.716						
7	.165	1.182	97.898						
8	.090	.646	98.545						
9	.066	.474	99.019						
10	.049	.350	99.368						
11	.039	.275	99.643						
12	.027	.191	99.835						
13	.018	.127	99.962						
14	.005	.038	100.000						

Extraction Method: Principal Component Analysis.

Source: Research

A Scree plot presented in figure 4.10 confirmed the results that the 14 statements on challenges can be reduced to five factors.

Figure 4.10 : Scree Plot



Source: Research

The rotated component matrix in table 4.23 below presents the rotated factor loadings.

Table 4.23: Rotated Component Matrix

	Component				
	1	2	3	4	5
Sometimes to minimize costs,offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed.	.929	.195	.111	.150	.158
Through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains	.927	.196	.159	.121	.125
Offshore systems developments require new management skills that are sometimes not readily available within your organization.	.921	.221	.105	.087	.179
Offshore systemdevelopments in organizations lead to loss of jobs.	.915	.069	.052	.230	.086
Sometimes communication infrastructure breakdowns e.g. unavailability of internet is a great challenge to offshore system development arrangement	.651	-.062	.470	.309	.044
In offshoring systems developments engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose c	.135	.967	.046	-.052	.101
During offshore systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks that thus causing threats to availability and integrity of systems	.230	.946	.051	.131	.080
Offshoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations	.108	.928	.022	.270	.139
Sometimes cultural differences, language barrier between offshore vendors and your the performance of project.organization affect	.164	.089	.944	.065	.236
Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process	.156	.029	.941	.160	.113
Offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss.It becomes difficult for client to get out o	.186	.199	.090	.922	.134
In an offshore systems development transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer (additional bandwidths or reinforce security measure) etc.	.326	.091	.197	.884	.135
Locally there are no policies/guidelines formulated that govern offshore systems development arrangements.	.147	.116	.208	.045	.946
Oversees legal requirements of offshore system development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts	.227	.170	.142	.235	.901

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Source: Research

Table 4.24 represents the names of the factors in line with factor loading results. The results indicate that five statements load heavily on "Human resource and infrastructural factors", three statements load heavily on "IS security factors", two statements load heavily on "cultural factors", two statements load heavily on "cost factors" and that two statements load heavily on "legal factors".

Table 4.24: Factors

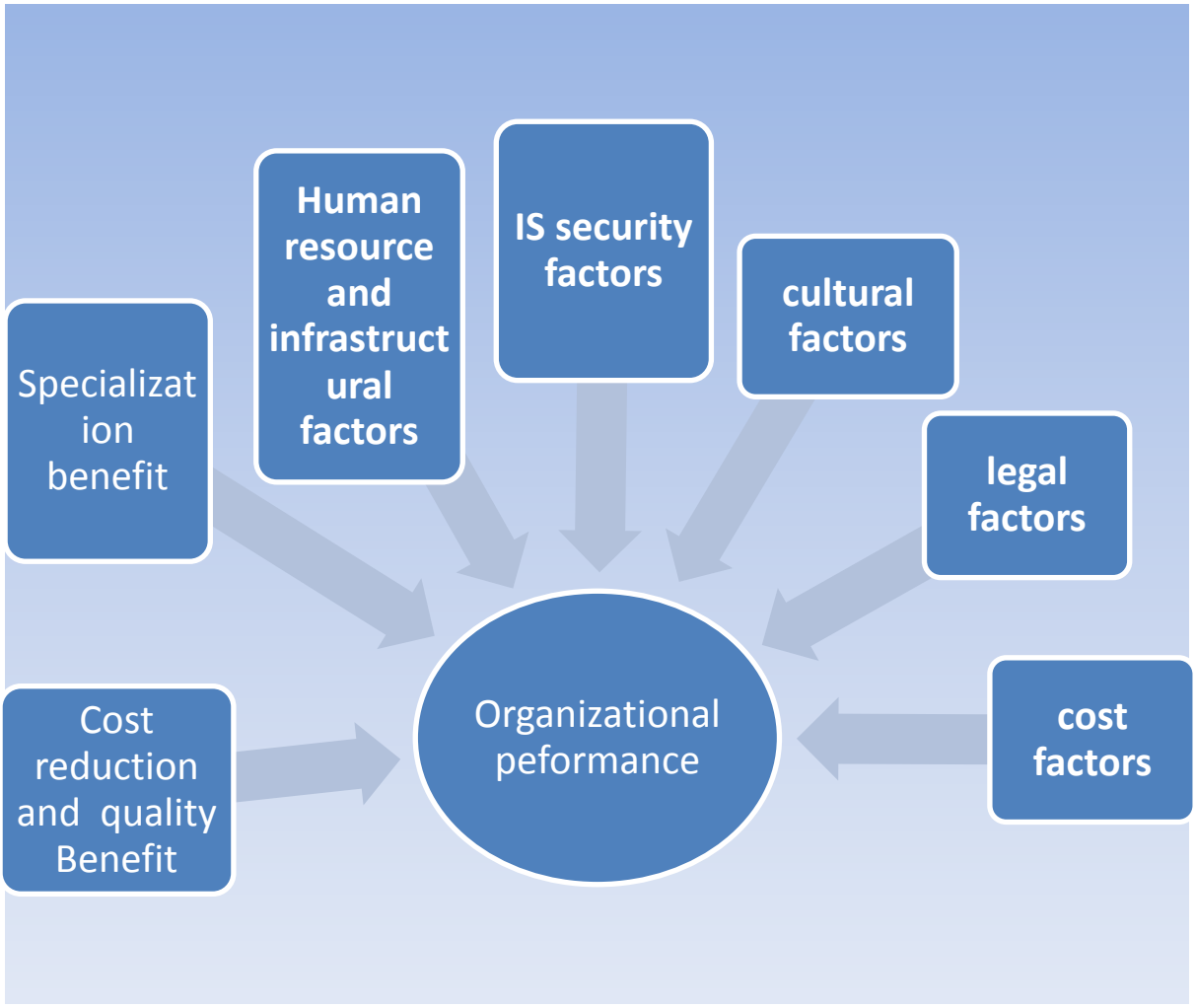
	Factor
1. Sometimes to minimize costs,offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed.	**Human resource and infrastructural factors**
2. Through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains	
3. Offshore systems developments require new management skills that are sometimes not readily available within your organization.	
4. Offshore systemdevelopments in organizations lead to loss of jobs.	
5. Sometimes communication infrastructure breakdowns e.g. unavailability of internet is a great challenge to offshore system development arrangement	
1. In offshoring systems developments engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose c	**IS security factors**
2. During offshore systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks that thus causing threats to availability and integrity of systems	
3. Offshoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations	
1. Sometimes cultural differences, language barrier between offshore vendors and your the performance of project.organization affect	**cultural factors**
2. Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process	
1. Offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss.It becomes difficult for client to get out o	**cost factors**
2. In an offshore systems development transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer (additional bandwidths or reinforce security measure) etc.	
1. Locally there are no policies/guidelines formulated that govern offshore systems development arrangements.	**legal factors**

	Factor
2. Oversees legal requirements of offshore system development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts	

Source: Research

4.8:The Model from factor Analysis

Factor analysis results indicates that the 5 statements representing benefits of offshore deployment and 14 statements representing the challenges of offshore deployment can be reduced to 7 factors i.e.



Source: Research

4.9: Model Validation using Correlation

Validation ensures that the model meets its intended requirements in terms of the methods employed and the results obtained. The ultimate goal of model *validation* is to make the model useful in the sense that the model addresses the right problem, provides accurate information about the system being modeled, and to make the model actually used. The end result of validation is technically not a validated model, but rather a model that has passed all the validation tests. In addition, validation is for a better understanding of the model's capabilities, limitations, and appropriateness for addressing a range of important questions.

Hypothesis 1: Offshore systems development and deployment result in cost savings because of low development costs. Cost savings is one of the drivers of the offshoring of system development and deployment in Kenyan organizations.

A correlation coefficient of 0.796 indicated that the respondents who rated the statement "Offshore system development and deployment lead to cost savings because of low development costs in offshore countries" highly also rated the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.000 is less that the benchmark probability value (p value) of 0.05. H1 is therefore accepted.

Table 4.25: Cost savings

		Offshore system development and deployment lead to cost savings because of low development costs in offshore countries.	Offshore systems development has led to an improvement in the performance of the organization
Offshore system development and deployment lead to cost savings because of low development costs in offshore countries.	Pearson Correlation	1	.796**
	Sig. (2-tailed)		.000
	N	42	42
Has offshore systems development enhanced your ability to accomplish your targets as an organization	Pearson Correlation	.796**	1
	Sig. (2-tailed)	.000	
	N	42	42

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 2: Systems are developed and deployed through offshore arrangements due to time saving ability. Kenyan organizations engage in offshore system developments and deployments in order to achieve the time saving advantage.

A correlation coefficient of 0.367 indicated that the respondents who rated the statement "Time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment." highly also rated the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is insignificant since the reported probability of 0.207 is more that the benchmark probability value (p value) of 0.05. H2 is therefore rejected.

Table 4.26: Time saving

		Time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment.	Offshore systems development has led to an improvement in the performance of the organization
Time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment.	Pearson Correlation	1	.367
	Sig. (2-tailed)		.207
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	.367	1
	Sig. (2-tailed)	.207	
	N	42	42

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 3: Systems are developed and deployed through offshore for quality service which is offered by offshore vendors, who are quality accredited

A correlation coefficient of 0.910 indicated that the respondents who rated the statement "Organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited." highly also rated the statement that "Offshore systems development has led to an improvement in

the performance of the organization". The correlation is significant since the reported probability of 0.000 is less that the benchmark probability value (p value) of 0.05. H3 is therefore accepted.

Table 4.27: Quality service

		Organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited.	Offshore systems development has led to an improvement in the performance of the organization
Organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited.	Pearson Correlation	1	.910**
	Sig. (2-tailed)		.000
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	.910**	1
	Sig. (2-tailed)	.000	
	N	42	42

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 4: Systems development and deployment through offshore happen due to lack of availability of required skill. Very often, organizations offshore because there isn't enough talent in the own country or lack sufficient qualifications.

A correlation coefficient of 0.368 indicated that the respondents who rated the statement "There isn't enough talent on systems development and deployment locally i.e. i.e. available personnel for specific tasks do not have the sufficient qualifications.." highly also rated the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.016 is less that the benchmark probability value (p value) of 0.05. H4 is therefore accepted.

Table 4.28: Lack required skill.

		There isn't enough talent on systems development and deployment locally i.e. i.e. available personnel for specific tasks do not have the sufficient qualifications.	Offshore systems development has led to an improvement in the performance of the organization
There isn't enough talent on systems development and deployment locally i.e. i.e. available personnel for specific tasks do not have the sufficient qualifications.	Pearson Correlation	1	.368*
	Sig. (2-tailed)		.016
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	.368*	1
	Sig. (2-tailed)	.016	
	N	42	42

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 5: Systems are developed and deployed through offshore because ICT function is not the core activity of our business. A correlation coefficient of 0.225 indicated that the respondents who rated the statement "ICT function is not the core activity of our business, offshoring systems development and deployment will help our organization to remain focused.." highly also rated the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is insignificant since the reported probability of 0.151 is more that the benchmark probability value (p value) of 0.05. H5 is therefore rejected.

Table 4.29: ICT function not core activity

		ICT function is not the core activity of ourbusiness,offshoring systems development and deployment will help our organization to remain focused.	Offshore systems development has led to an improvement in the performance of the organization
ICT function is not the core activity of ourbusiness,offshoring systems development and deployment will help our organization to remain focused.	Pearson Correlation	1	.225
	Sig. (2-tailed)		.151
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	.225	1
	Sig. (2-tailed)	.151	
	N	42	42

** Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 6: Hidden costs such as cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer is a significance challenge in offshore development.

A correlation coefficient of -0.348 indicate that the respondents who gave a high rating to the statement "In an offshore systems development transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer (additional bandwidths or reinforce security measure) etc..." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.024 is less that the benchmark probability value (p value) of 0.05. H6 is therefore accepted.

Table 4.30: Hidden costs

		In an offshore systems development transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer (additional bandwidths or reinforce security measure) etc.	Offshore systems development has led to an improvement in the performance of the organization
In an offshore systems development transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer (additional bandwidths or reinforce security measure) etc.	Pearson Correlation	1	-.348*
	Sig. (2-tailed)		.024
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.348*	1
	Sig. (2-tailed)	.024	
	N	42	42

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 7: organizational privacy is a significant challenge in offshore systems development and deployment since connections with networks in multiple legal and political juristications increase risk of illicit access to information and pose considerable risks to the security and privacy of organizations.

A correlation coefficient of -0.355 indicate that the respondents who gave a high rating to the statement "In offshoring systems developments engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose challenge." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.021 is less that the benchmark probability value (p value) of 0.05. H7 is therefore accepted.

Table 4.31: Organizational privacy challenge

		In offshoring systems developments engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose c	Offshore systems development has led to an improvement in the performance of the organization
In offshoring systems developments engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose challenge	Pearson Correlation	1	-.355*
	Sig. (2-tailed)		.021
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.355*	1
	Sig. (2-tailed)	.021	
	N	42	42

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 8: Hacking and threats to availability and integrity of systems is a significant challenge in offshore systems development and deployment.

A correlation coefficient of -0.432 indicates that the respondents who gave a high rating to the statement "During offshore systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks thus causing threats to availability and integrity of systems." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.004 is less that the benchmark probability value (p value) of 0.05. H8 is therefore accepted.

Table 4.32: Hacking and threats

		During offshore systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks that thus causing threats to availability and integrity of systems	Offshore systems development has led to an improvement in the performance of the organization
During offshore systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks that thus causing threats to availability and integrity of systems and r	Pearson Correlation	1	-.432**
	Sig. (2-tailed)		.004
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.432**	1
	Sig. (2-tailed)	.004	
	N	42	42

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 9: Organizations risk of industrial espionage is a significant challenge in offshore systems development and deployment.

A correlation coefficient of -0.393 indicates that the respondents who gave a high rating to the statement "Offshoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.010 is less that the benchmark probability value (p value) of 0.05. H9 is therefore accepted

Table 4.33: Industrial espionage

		Offshoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations	Offshore systems development has led to an improvement in the performance of the organization
Offshoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations	Pearson Correlation	1	-.393*
	Sig. (2-tailed)		.010
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.393*	1
	Sig. (2-tailed)	.010	
	N	42	42

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 10: Loss of jobs is a significant challenge in offshore systems development and deployment.

A correlation coefficient of -0.487 indicates that the respondents who gave a high rating to the statement "Offshore systems development in organizations lead to loss of jobs" also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.001 is less that the benchmark probability value (p value) of 0.05. H10 is therefore accepted.

Table 4.34: Loss of jobs

		Offshore system developments in organizations lead to loss of jobs.	Offshore systems development has led to an improvement in the performance of the organization
Offshore system developments in organizations lead to loss of jobs.	Pearson Correlation	1	-.487**
	Sig. (2-tailed)		.001
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.487**	1
	Sig. (2-tailed)	.001	
	N	42	42

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 11: Organization risks of losing its competencies is a significant challenge in offshore deployment

A correlation coefficient of -0.524 indicated that the respondents who gave a high rating to the statement "Through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is insignificant since the reported probability of 0.230 is more than the benchmark probability value (p value) of 0.05. H11 is therefore rejected.

Table 4.35: Organization risks losing its competencies

		Through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains	Offshore systems development has led to an improvement in the performance of the organization
Through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains	Pearson Correlation	1	-.524
	Sig. (2-tailed)		.230
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.524	1
	Sig. (2-tailed)	.230	
	N	42	42

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 12: Increased costs due to client-lock-in effect are a significant challenge in offshore deployment.

A correlation coefficient of -0.354 indicates that the respondents who gave a high rating to the statement "Offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss. It becomes difficult for client to get out ." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.022 is less than the benchmark probability value (p value) of 0.05. H12 is therefore accepted.

Table 4.36: Client lock-in effect

		Offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss. It becomes difficult for client to get out o	Offshore systems development has led to an improvement in the performance of the organization
Offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss. It becomes difficult for client to get out o	Pearson Correlation	1	-.354*
	Sig. (2-tailed)		.022
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.354*	1
	Sig. (2-tailed)	.022	
	N	42	42

** Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 13: Poor quality of work from vendors who employ young inexperienced programmers is a significant challenge in offshore deployment

A correlation coefficient of -0.497 indicates that the respondents who gave a high rating to the statement "Sometimes to minimize costs, offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is insignificant since the reported probability of 0.211 is more that the benchmark probability value (p value) of 0.05. H13 is therefore rejected.

Table 4.37: Poor quality of work

		Sometimes to minimize costs, offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed.	Offshore systems development has led to an improvement in the performance of the organization
Sometimes to minimize costs, offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed.	Pearson Correlation	1	-.497
	Sig. (2-tailed)		.211
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.497	1
	Sig. (2-tailed)	.211	
	N	42	42

** Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 14: Lack of management skills is a significant challenge in offshore systems development and deployment.

A correlation coefficient of -0.505 indicates that the respondents who gave a high rating to the statement "Offshore systems developments require new management skills that are sometimes not readily available within your organization." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.001 is less that the benchmark probability value (p value) of 0.05. H14 is therefore accepted.

Table 4.38: Lack of Management skills

		Offshore systems developments require new management skills that are sometimes not readily available within your organization.	Offshore systems development has led to an improvement in the performance of the organization
Offshore systems developments require new management skills that are sometimes not readily available within your organization.	Pearson Correlation	1	-.505**
	Sig. (2-tailed)		.001
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.505**	1
	Sig. (2-tailed)	.001	
	N	42	42

** Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis15: Cultural differences and language barrier is a significant challenge in offshore systems development and deployment. A correlation coefficient of -0.547 indicates that the respondents who gave a high rating to the statement "Sometimes cultural differences, language barrier between offshore vendors and your organization affect the performance of the project." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.000 is less that the benchmark probability value (p value) of 0.05. H15 is therefore accepted

Table 4.39: Cultural differences and language barriers

		Sometimes cultural differences, language barrier between offshore vendors and your the performance of project.organization affect	Offshore systems development has led to an improvement in the performance of the organization
Sometimes cultural differences, language barrier between offshore vendors and your the performance of project.organization affect	Pearson Correlation	1	-.547**
	Sig. (2-tailed)		.000
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.547**	1
	Sig. (2-tailed)	.000	
	N	42	42

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 16: Legal requirements is a significant challenge in offshore deployment

A correlation coefficient of -0.814 indicates that the respondents who gave a high rating to the statement "Oversees legal requirements of offshore systems development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.000 is less that the benchmark probability value (p value) of 0.05. H16 is therefore accepted.

Table 4.40: Legal requirements

		Oversees legal requirements of offshore system development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts	Offshore systems development has led to an improvement in the performance of the organization
Oversees legal requirements of offshore system development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts	Pearson Correlation	1	-.814**
	Sig. (2-tailed)		.000
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.814**	1
	Sig. (2-tailed)	.000	
	N	42	42

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 17: Detailed specifications during Systems development, local culture and customs is a significant challenge in offshore deployment

A correlation coefficient of -0.498 indicates that the respondents who gave a high rating to the statement "Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.001

is less that the benchmark probability value (p value) of 0.05. H17 is therefore accepted.

Table 4.41: Detailed specifications

		Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process	Offshore systems development has led to an improvement in the performance of the organization
Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process	Pearson Correlation	1	-.498**
	Sig. (2-tailed)		.001
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.498**	1
	Sig. (2-tailed)	.001	
	N	42	42

** Correlation is significant at the 0.05 level (2-tailed).

Source: Research

Hypothesis 18: Lack of policies/guidelines formulated that govern offshore systems development is a significant challenge in offshore deployment

A correlation coefficient of -0.786 indicates that the respondents who gave a high rating to the statement "Locally there are no policies/guidelines formulated that govern offshore systems development arrangements.." also gave a low rating to the statement that "Offshore systems development has led to an improvement in the performance of the organization". The correlation is significant since the reported probability of 0.000 is less that the benchmark probability value (p value) of 0.05. H18 is therefore accepted.

Table 4.42: Lack of Policies/guidelines

		Locally there are no policies/guidelines formulated that govern offshore systems development arrangements.	Offshore systems development has led to an improvement in the performance of the organization
Locally there are no policies/guidelines formulated that govern offshore systems development arrangements.	Pearson Correlation	1	-.786**
	Sig. (2-tailed)		.000
	N	42	42
Offshore systems development has led to an improvement in the performance of the organization	Pearson Correlation	-.786**	1
	Sig. (2-tailed)	.000	
	N	42	42

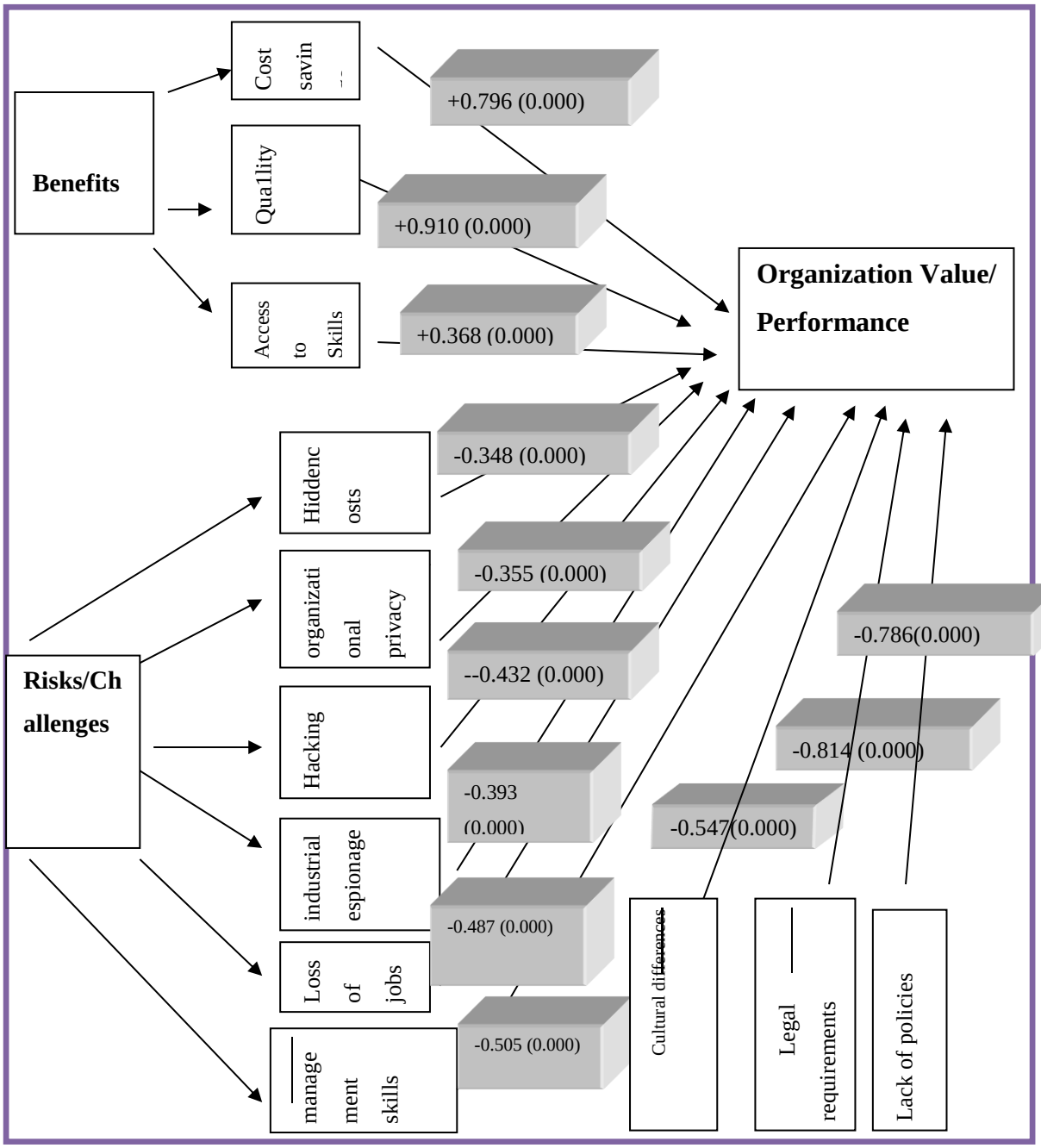
** Correlation is significant at the 0.05 level (2-tailed).

Source: Research

4.10: Framework for offshore systems development and deployment.

The main objective of this research was to develop a framework for offshore systems development and deployment in local organizations. The hypotheses developed and tested, helped to develop the framework below.

Figure 4. 11:Framework for offshore systems development and deployment



Source: Research

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.0: Introduction

The chapter addresses the summary of the findings, the conclusions and the recommendations. This is done in line with the objectives/research questions of the research.

5.1: Summary of Findings

5.1.1: Benefits of off shore systems development and deployment.

One of the objectives of the research was to identify the benefits of offshore systems development and deployment. Results indicated that indeed there are several benefits of engaging in offshore systems development and deployment. One of the benefits is that quality of service is offered by offshore vendors, who are quality accredited. This was supported by a majority of respondents who agreed that organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited. The findings agree with those by Nasscom (2002) who noted that when engaging in offshore outsourcing, companies not only pursue cost savings, but they also want a quality service. This also noted that most Indian firms are quality accredited with capability maturity Model (CMM) level 5 and CMM level 4 thus making it the most preferred destination for offshore systems development.

The second benefit identified was that offshore systems development and deployment result in cost savings. This was supported by majority of the respondents who agreed that offshore systems development and deployment lead to cost savings. These findings agree with findings of Amoribieta et al (2001) who affirmed that firms gain strategic advantage from lower wages and benefits prevailing in countries such as India, where hourly, fully loaded programming rates can be 40-60 % below those in the US. This was also supported by Nasscom (2002) findings which found out that software developments costs in India are estimated to be between 30-40% lower than those in developed markets.

The research also found that offshore personnel are talented and have sufficient qualifications on systems development and deployment. This was supported by a majority of respondents who agreed that there isn't enough talent on systems development and deployment locally i.e. available personnel for specific tasks do not have the sufficient qualifications on systems development and deployment. The findings agree with those by Robb (2000) who notes that one main reason for offshore outsourcing is that very often there isn't enough talent in the own country. Robb (2000) in his research found out that some firms want to outsource in their own country, but the personnel available for specific tasks does not have the sufficient qualifications whereas, the programmers from countries like India do have the right qualifications, e.g. JAVA and other Internet related skills.

The other benefit identified was that with offshoring of systems development and deployment, organizations remain focused. This is supported by the findings by Lacity and Willcocks (1997) who argued that outsourcing can benefit firms to focus on their core competences and activities while contracting out the less noncore work which the market can do more cost effectively.

However, majority of the respondents disagreed that offshore systems development and deployment lead to time savings because of different time zones between local organization and offshore countries. Khan et al (2003) in their study noted that different time zones enable a nearly 24 or 18 hour programming a day for example the US and UK respectively. This reduces the development life cycle by half. Due to this time zone difference, if an error occurs in the system it can be fixed overnight and the system can be fully available on the next day. This is only possible if the local organization and offshore vendor have a good telecommunications and infrastructure.

5.1.2: Risks and challenges associated with offshore systems development and deployment.

The other objective of this research was to investigate the risks and challenges associated with offshore systems development and deployment. Results indicated that there are several challenges and risks associated with offshore systems development and deployment. One of the risks/challenges is that there exist

transition/additional/hidden costs. This was supported by a majority of respondents who agreed and strongly agreed with the statements that in an offshore systems development transition/additional/hidden costs exist. The findings agree with those in research by Scheier(1996) which indicates that many companies enter into an offshoring arrangement believing they understood all major costs. However, few businesses had considered the costs of transitioning to a new vendor, which are not negligible. Examples of transition costs include; costs of maintaining internal staff while vendor learns the system, efforts by staff assisting vendor, business disruption while mentoring the vendor, inability by vendor to respond as internal staff. Barthelemy (2001) found that the more complex the activity being offshored, the more expensive will be the transition costs.

The other risk/challenge is that privacy of organization's sensitive information/data is compromised and external access to organization's internal systems is opened. This was supported by majority of respondents who agreed/strongly agreed that in off shoring systems developments and deployments, privacy of organization's sensitive information/data is compromised and external access to organization's internal systems is opened.

The other risks/challenges noted by respondents were; off shoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations, offshore systems development in organizations lead to loss of jobs, through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains, offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project , sometimes to minimize costs, offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed , sometimes cultural differences and language barrier between offshore vendors and the local organization affect the project performance, oversees legal requirements of offshore system development are not clear in majority of the organizations, systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process. Sometimes communication infrastructure breakdowns e.g. unavailability of internet is a great challenge to offshore system development arrangement and that

locally there are no policies/guidelines formulated that govern offshore systems development arrangements.

5.1.3: The factors associated with offshore systems development and deployment.

Factor analysis results indicate that the benefits of offshore development and deployment can be reduced to two namely " cost and quality benefits" and " specialization benefits".

Factor analysis results indicate that the challenges of offshore deployment can be reduced into five namely "cost factors" ," Human resource and infrastructural factors", "cultural factors", "legal factors", "IS Security Factors".

5.2: Conclusions

From the research findings, and using the rankings of Pearson correlation, quality of service offered by offshore vendors and cost savings are the main benefits of offshoring systems development and deployment in Kenyan organizations.

It was also possible to conclude that the main risks/challenges of offshoring systems development and deployment as per the rankings of Pearson correlation are unclear overseas legal requirements , lack of policies/guidelines that govern offshore systems development and deployment, cultural differences and, language barriers between offshore vendors and local organizations.

The insignificant benefits include ICT function not being core activity of organization's business and time savings due to different time zones between offshore countries and local companies.

The insignificant risks/challenges includes existence of transition/hidden costs, privacy of organization's sensitive information/data being compromised, increase in organization's risk of industrial espionage by competitors.

5.3: Recommendations

The research makes the following recommendations based on the objectives of the research; companies entering into offshore system deployment arrangements should consider the transition costs, time and effort managing the vendor, legal and liability issues, lock-in, and personnel costs.

The organizations should come up with policies which will curb the risk and challenges associated with off shoring. The research recommends that the legal requirements be made clear to all organizations, cultural differences be observed and neutral arrangement be made for all organizations.

5.4: Suggested areas for further Research

Further studies on the potential of offshoring systems development and deployment specified for SMEs need to be undertaken. Further studies should concentrate on public institutions while a separate research should be done for private institutions. The two studies should be compared to see if differences exist. It may also be important to address the critical success factors for the success of offshore system development and deployment in Kenyan organizations.

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Appendix I: Research Questionnaire:

Introduction

I am a post graduate student at the University of Nairobi pursuing MSC- Information systems.
I am conducting a research on a framework for offshore systems development and deployment in Kenyan Organizations. The framework will be useful for organizations which have offshored systems development and deployment or those planning to deploy offshore systems.
Your contribution in answering this questionnaire is critical and highly appreciated for the success of this study. This study is only for academic purposes and remains confidential. All information provided in this survey shall be used for the purpose of this study and kept in strict confidence.

Instructions

- Fill only one set of the questionnaire per individual.
- Please answer each question as completely and clearly as possible by ticking appropriately on only one answer (unless otherwise advised) from the choices given or writing your response as appropriate in the space provided.

Participant's Name: _____
Organization: _____

Do you wish to keep the above information confidential? Yes / No:
_____ *(please specify)*

Section A: Background information *(Please mark X in the relevant box)*

1. Gender

   Male [ ] Female [ ]

2. Please indicate your age bracket

   <25 Years [ ]

   25 - 34 Years [ ]

   35 - 44 years [ ]

   45 – 54 years [ ]

   Over 55 years [ ]

3. Please indicate the level of your education

   Diploma [ ] Higher National Diploma [ ] Bachelors [ ] Masters [ ] Phd [ ]

4. Please specify your position in your organization

   ICT Manager [ ] Systems Analyst [ ] Analyst programmer [ ]

   Other [ ] specify.....

5. For how long have you served in the current position?

   < 2 Years [ ] 2- 5 Years [ ] 6 – 10 Years [ ] > 10 Years [ ]

6. Has your organization ever engaged in or planning to offshore of systems development and deployment? *(Please mark X against your choice).*

   Yes [ ] No [ ]

7. If your answer to (6) above is [Yes], how long has your organization been engaged in offshore of systems development and deployment? Or after how long will your organization plan to engage in offshore systems development and deployment?.

   < 1 Year [ ]

   1 - 5 Years [ ]

   5 - 10 Years [ ]

   > 10 Years [ ]

8. Please specify which country(s) your organization has been getting offshore services? *(Please type your answer in the space provided)*

……
……

……
……

9. Please specify which service(s) your organization has been offshoring for systems development and deployment?
   (Please type your answer in the space provided)

……
……

……
……

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……

……
……

Section B: Benefits

10. To what extent do you agree with the following statements on the benefits of offshore system development and deployment at your organization?

    Key: **5** -strongly agree, **4**- agree, **3**- undecided, **2** -disagree, **1** -strongly disagree *(please mark X as appropriate)*

	1	**2**	**3**	**4**	**5**
Offshore system development and deployment lead to cost savings because of low development costs in offshore countries.					
Time saving due to different time zones between your organization and offshore countries is one of the reasons for offshoring systems development and deployment.					
Organizations not only pursue cost savings, but they also want a quality service which is offered by offshore vendors, who are quality accredited.					
There isn't enough talent on systems development and deployment locally i.e. i.e. available personnel for specific tasks do not have the sufficient qualifications.					
ICT function is not the core activity of our business,offshoringsystems development and deployment will help our organization to remain focused.					

Additional benefits

11. Are there any additional benefits that your organization has achieved as a result of offshore system development arrangements? *(Please specify your answer in space provided below)*

……
……
……
……
……
……

Section C: Risks /Challenges

12. To what extent do you agree with the following statement on the risks/challenges associated with offshore system development and deployment at your organization?

Key: **5** -strongly agree, **4-** agree, **3-** undecided, **2** -disagree, **1** -strongly disagree *(please mark X as appropriate)*

	1	**2**	**3**	**4**	**5**
In an offshore systems development transition/additional/hidden costs exist e.g. cost of maintaining internal staff while vendor learns system, efforts by staff assisting vendor, data transfer (additional bandwidths or reinforce security measure) etc.					
In offshoring systems developments engagements, privacy of organization's sensitive information/data is compromised i.e. connections with networks in multiple legal and political jurisdictions increase the risk of illicit access to information and pose considerable risks to the security and privacy of organizations'.					
During offshore systems development, external access to organization's internal systems is opened. This potentially opens a backdoor through which hackers can enter, presenting risks that thus causing threats to availability and integrity of systems and resources.					
Offshoring systems development increases organizations risk of industrial espionage by competitors since intellectual property (IP) rights are often a gray area in developing nations.					
Offshore system developments in organizations lead to loss of jobs.					
Through offshore systems development, an organization risks losing its competencies or its otherwise deep knowledge of its systems and operations in relevant domains.					
Offshore system development arrangements sometimes result in client-lock-in effect thus increasing cost of the project i.e. a situation where a client cannot get out of a relationship except by incurring a loss. It becomes difficult for client to get out of contract or engage another vendor.					
Sometimes to minimize costs,offshore vendors employ young inexperienced programmers and as a result, poor quality of work is performed.					
Offshore systems developments require new management skills that are sometimes not readily available within your organization.					

	1	2	3	4	5
Sometimes cultural differences, language barrier between offshore vendors and your organization affect the performance of project.					
Oversees legal requirements of offshore system development are not clear in majority of the organizations. These sometimes call for lengthy formulations of legal requirements and contracts.					
Systems development requires detailed specifications, the entire process of doing this offshore can be a lengthy procedure, sometimes the local culture and customs can affect the process.					
Sometimes communication infrastructure breakdowns e.g. unavailability of internet is a great challenge to offshore system development arrangement.					
Locally there are no policies/guidelines formulated that govern offshore systems development arrangements.					

Section D: Additional risks/challenges

13. Are there any additional risks/challenges your organization face due to offshore system development arrangements? *(Please specify your answer in space provided below)*

    ……

    ……

14. Please indicate your agreement with the following statements that measure the usefulness of offshore systems development in achieving organization performance.

    Key: **5** -strongly agree, **4**- agree, **3**-slightly agree, **2** -disagree, **1** -strongly disagree *(please mark X as appropriate)*

	1	2	3	4	5
a) Offshore systems development and deployment has led to an improvement in the performance of my organization					

End

(Thank You Very Much for Your time, co-operation

Appendix II: Table for determining sample size from a given population.

N	S	N	S
10	10	200	132
20	19	300	169
30	28	400	196
40	36	500	217
50	44	600	234
60	52	700	248
70	59	800	260
80	66	900	269
90	73	1000	278
100	80	10000	370

N- Population Size, S-Sample size
Extracted from Robert V.K and DaryleW.Morgan (1970)

Appendix III: Chi-square Distribution Critical Values

	Alpha					
Df	**.10**	**.05**	**.02**	**.01**	**.001**	
1	2.76	3.841	5.412	6.635	10.826	
2	4.605	5.991	7.824	9.210	13.815	

Source:Extracted from chi-square distribution table