

LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

Department of Information Technology

MASTER'S THESIS

OUTSOURCING AND OFFSHORE SOFTWARE DEVELOPMENT IN AFRICA

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ABSTRACT

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Outsourcing and Offshore Software Development in Africa

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Globalization of software today is making many companies in the industrialized nations to outsource their work to low-wage countries. This thesis aims at obtaining an initial general overview of offshore software development in Africa. It seeks to explore the state of offshore software outsourcing in Africa with a focus on the factors contributing to the successes and challenges of offshore software development practices in Africa.

The thesis made use of electronic questionnaires and voice interviews to collect the data. Identified African vendors were interviewed, and the data was analyzed qualitatively.

The study found that the African software outsourcing industry is still at its infancy. It is expected that the industry will grow. However, a lot needs to be done, and African governments are called upon to actively implement supportive infrastructures that will promote the growth of the local and export software industries. Further research is recommended to cover the wide context of the topic.

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16 July 2007

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TABLE OF CONTENTS

ABSTRACT	i
Acknowledgements	ii
The List of Figures	v
The List of Tables	v
The List of Abbreviations	vi
1. INTRODUCTION	1
1.1 Background.....	1
1.2 Objectives	2
1.3 Limitations	3
1.4 Structure.....	3
2. BACKGROUND LITERATURE	4
2.1 Outsourcing.....	4
2.2 Offshoring.....	9
2.2.1 Reasons for offshoring.....	10
2.2.2 Risks of offshoring.....	12
2.2.3 The Issue of Trust	13
2.2.4 Offshore Outsourcing Destinations	15
2.2.5 Enablers of Offshoring.....	17
2.3 Offshore Software Development – What can be offshored?	18
2.4 Africa’s ICT Infrastructure	22
3. RESEARCH PROCESS	26
3.1 Data Collection	27
4 RESULTS	30
4.1 Background information of the companies.....	30
4.2 Scope of Service Provision	31
4.3 Successes and Challenges	33

4.3.1 Availability of skilled personnel.....	34
4.3.2 Language Skills.....	36
4.3.3 Infrastructure.....	37
4.3.4 Laws and Policies	38
4.3.5 The Issue of Trust	39
4.3.6 Other Factors.....	40
4.4 Future expectations	44
5. DISCUSSION.....	46
5.1 Availability of highly skilled labor and low cost wages.....	46
5.2 Language skills	47
5.3 Geographical location / time-zone proximity	48
5.4 Infrastructure.....	48
5.5 Government involvement	49
5.6 The Issue of Trust	50
5.7 Other factors	51
5.8 Future expectations	53
6. CONCLUSION	55
REFERENCES.....	57

APPENDICES

Appendix 1. The Questionnaire

Appendix 2. The List of Participating Companies.

The List of Figures

Figure 1. Research Model

Figure 2. Virtuous and vicious cycles of structure, trust and performance (Sabherwal, 1999)

Figure 3. Mobile and fixed telephone subscribers per 100 inhabitants in Africa, 1995-2004

Figure 4. Annual average percentage growth in mobile network subscribers, 1999-2004 world regions

Figure 5. Internet penetration by region, 2004

Figure 6. Internet penetration by world region, 2007

The List of Tables

Table 1. Reasons for Outsourcing IT function (Lacity & Willocks , 2001) in (Turkama, 2007)

Table 2. Overall importance ratings of offshore outsourcing benefits (Djavanshir, 2005)

Table 3. Overall importance ratings of offshore outsourcing risks (Djavanshir, 2005)

Table 4. The 4-tier Taxonomy of the world's software exporting nations (Carmel, 2003)

Table 5. Global Sourcing Powers (Gartner, 2003)

Table 6. Number of interviews from each country

Table 7. Data collection methods

Table 8. Company size in terms of number of employees

Table 9. Company categories

Table 10. Length of time in operation

Table 11. Market targets

Table 12. National Government Tactics to Support Software-Related Infrastructure (Heeks and Nicholson 2002)

The List of Abbreviations

ICT	Information and Communications Technology (or Technologies)
IT	Information Technology
BPO	Business Process Outsourcing
IP	Intellectual Property
UK	United Kingdom
USA	United States of America
QA	Quality Assurance
CMM	Capability Maturity Model
VoIP	Voice over Internet Protocol

1. INTRODUCTION

1.1 Background

The prevalence of Information and Communication Technologies (ICT) has contributed to the continued growth of globalization of the software industry. The wide spread of the internet and the availability of standardized software development techniques and packages has made it possible for software development activities to be outsourced. Software companies in the industrialized regions are increasingly being faced with the need to offshore part or all of their software development process so as to be competitive in the global software market. At the same time, low-wage countries are continually making efforts to develop their own local software industries to enhance economic growth and be considered as viable offshore destinations.

Discussions surrounding offshore outsourcing of IT services continue to spark various reactions from both low-wage countries and the industrialized ones. Be it the concern of some in the industrialized countries about the loss of jobs, the distress of others in low-wage countries on the negative effects of offshoring or the celebration of others about the economic benefits of offshoring to both industrialized and low-wage countries, it is undeniable that “the globalization of software is here to stay, so that policymakers, educators, and employers all need to address the realities of offshoring” (Aspray et al. 2006). For the industrialized regions, this may be, finding ways of helping those people whose jobs get moved to other countries, while for the developing countries, it may be putting effort in improving the education systems to meet the demands of offshoring.

During recent years, India and China have been the most preferred offshoring destinations for companies from developed nations like the United States of America and the United Kingdom. IT outsourcing is expected to continue growing and offshore experts say that every country in the developing world seems to have an offshoring advantage that is likely to attract foreign companies to offshore some of their services. Africa is a sleeping giant,

with a large pool of unused talent. Could it rise to become a viable offshoring destination for the western companies? “Can Africa capture a share of the offshore IT market?”(Bianca, 2004). Despite the shortage of IT professionals in Africa, a few talented companies are already offering offshore software development services. In order to reap the benefits of offshore outsourcing, Africa must find ways of maximizing the potential of the youth and developing a robust ICT industry.

As the outsourcing trend continues to become a global issue, I found it fit to explore Africa’s play in it. This thesis is aimed at making an exploratory study of Africa as a software offshoring destination. The study basically aims at gaining a general overview of what is going on in Africa with regard to offshore software development.

1.2 Objectives

The main aim of this study is to find out the state of offshore software development in Africa. The study will focus on answering two research questions followed by an objective to discuss the envisioned future of offshore software development in Africa. The research questions of the study are as follows:

What is the present state of offshore software development in Africa?

What are the factors contributing to the successes and challenges of the identified offshore software development vendors?

The research follows the model illustrated by Figure 1. The arrow from the present state box represents the first research question. Similarly, the arrow from the successes and challenges box represents research question two.

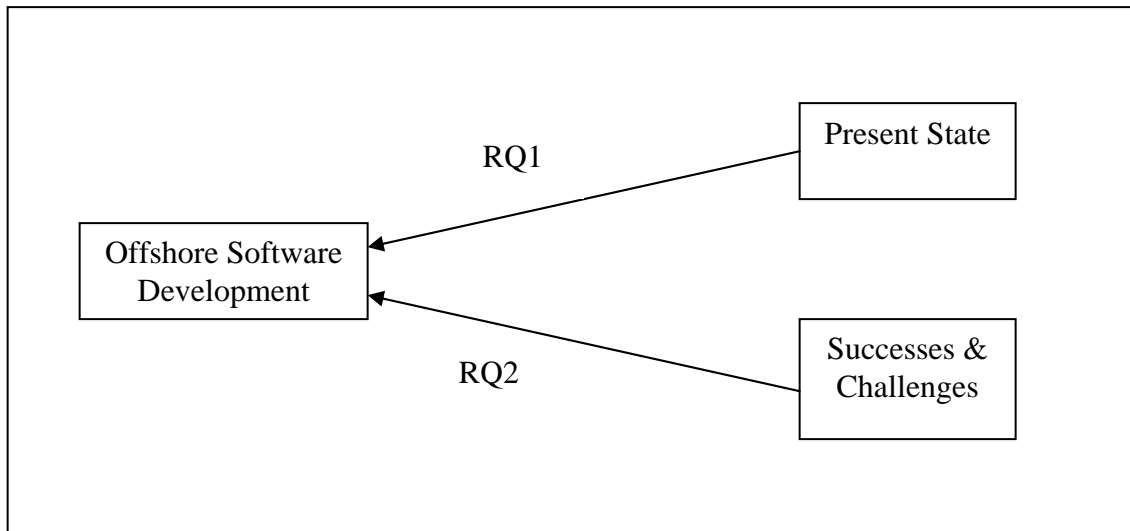


Figure 1. Research Model

1.3 Limitations

Due to the fact that the IT industry in Africa is still at its infancy, in majority of the countries, there are not many companies that are providing offshore software development services. Hence, there was lack of available information about offshore software development in most African countries. Therefore, the information gathered relates to a few identified companies in five countries.

1.4 Structure

This thesis is composed of six chapters. Chapter 2 describes the basic concepts of the thesis, giving the background literature of the study. Chapter 3 defines the research process of the study. Chapter 4 presents the findings. Chapter 5 presents the discussion based on the gathered data and supporting literature. Finally, Chapter 6 gives the conclusions of the study.

2. BACKGROUND LITERATURE

2.1 Outsourcing

Outsourcing is defined as a situation in which a company shifts a part or parts of its work to another organization (William et al, 2006).

Outsourcing dates back to the early years of the 20th century when most companies were responsible for producing their goods right from the raw materials to the final products. As time went by, automobile companies that manufactured most of the car parts began to subcontract other companies to make some of the parts. The main reason for this was to cut down cost. Nowadays, all automobile companies “outsource parts, sub-assemblies, assemblies, and modules of autos” (Gordon et al, 2006).

Similarly, the IT industry has had its own share in the evolution of outsourcing. IT outsourcing began in the 1960s when computers were highly priced and required large amounts of space (Jae-Nam et al, 2000 and Karen and John, 1993). A lot of money was needed to buy the computer hardware and this cost was further increased by the need for space and environmental conditions required to run and maintain the computers. In order to exclude the cost of the hardware, many companies contracted with a data processing bureau that would be responsible for performing the data processing operations.

In the 1970s, as computer hardware became more powerful and affordable, many companies were able to buy computers and process data internally. On the other hand, companies were lacking in computer skills, resulting in the need to seek external experts to perform some of the computer operations. It was during this time that the idea of standardized application packages was born (Jae-Nam et al, 2000).

Vertical integration dominated the way companies operated during the 1980s. Vertical integration defines a situation whereby an organization assumes complete control of all its functions. Companies made use of available standardized hardware and software to make systems that met the individual needs of each company. However, the 1989 Eastman Kodak's decision to outsource its IT functions marked the beginning of the outsourcing trend by many companies (Sulaiman, Jaafar and Beng, 2005)

In the 1990s, companies started outsourcing once more, but in different ways from the way it had been practiced in the 1960s. In the 1960s, outsourcing was done from an off-site location, while in the 1990s, vendors aimed at on-site facilities management (Jae-Nam et al, 2000). A vendor is any person or company that supplies goods and services to other companies (<http://whatis.techtarget.com>). An example is whereby the vendors bought the client's hardware and provided their services from the client's location. Furthermore, total outsourcing was practiced whereby the IT employees moved from the client to the vendor. On the other hand, partial outsourcing was also done, with companies hiring external experts to perform at least one of their functions.

There are various enablers for outsourcing. Among them are technology change, technology management and business change as identified by Clark, Zmud and McCray (1995) in Klepper and Jones (1998). These are described below.

Technological change enables outsourcing and provides more options in the following ways.

- The advancement of computer technology has enabled a lot of IT related products and services to become readily available at affordable prices. As a result, many firms now regard the identification and acquisition of these products and services as non-core activities that can be outsourced.
- Technology change also makes the management, operation, and delivery of information services to become independent of each other. This avails a wider range of choices for outsourcing and helps to minimize the risks of outsourcing.

The demand for outsourcing is also enhanced by technological change.

- The performance-to-price ratio of information technology in the last 50 years has increased, resulting in the widespread and innovative use of information technology in all business angles. However, due to the fast technological change, older hardware and software becomes outdated. This makes a lot of technological equipment and personnel skills to be phased out while some crucial skills and hardware become scarce. Outsourcing gives organizations the power to minimize the human and equipment resources that are not necessary for the strategic operations so that they can focus on updating their resources to meet their critical needs.

Outsourcing is also enabled by changes in the management of information technology.

- The increased use of computer equipment and automated systems has caused a parallel rise in information systems budgets. Generally, it is hard to quantify the profits to be obtained as a result of making use of information technology. This attracts senior managers to outsource as a way of forecasting costs to ensure that the organization pays the "market price" for information systems services.
- Because chief information officers mostly have business backgrounds that are likely to be higher than their technology experiences, their outsourcing decisions are likely to take a business perspective, rather than a technology perspective.
- As a result of decentralization and distribution of information systems control, many organizations are faced with the possibility to outsource those IT functions that were previously centralized.

Industry-level changes may also promote outsourcing:

- The quick technology change breeds new roles and functions that provide opportunities for outsourcing. A given example is that of routine data processing functions in banking that have been widely outsourced to third parties (sometimes other banks) as a way of achieving lower costs.

- There is an increasing number and quality of outsourcing vendors who are offering competitive prices and quality services. “Barriers to entry are low, and technological change creates discontinuities in needs that vendors can exploit.” Competition increases as new vendors join the field. This leads to a further cost reduction and improved quality of service.
- Vendors are continuously facing growing demands for their services and they can manage to grab, pay, and promote personnel with commendable technical skills within the industry. By doing so, they further heighten their potential and the attractiveness of outsourcing.
- Technological change combined with globalization of business today provides new possibilities to manage the complexities of issues related to magnitude, distance and fast-paced change. This makes it easier to rely on distant vendors with specialized skills.

Cost reduction was, and still is, the biggest driver for companies that decide to outsource. Automobile companies that started outsourcing for cost saving reasons also found out later on that there was an improvement in quality and delivery time. As computer technologies continue to advance, IT outsourcing can also achieve these objectives. In this modern day, outsourcing has become a strategic and economic way of doing business. Lacity & Willocks (2001) in Turkama (2007) outline six types of categories that influence a company’s outsourcing decision (Table 1).

Type	Driver Characteristics
Organizationally Driven	Enhance effectiveness by focusing on core business, Increase flexibility, Transform the organization, Increase product and service value, customer satisfaction, and shareholder value, Streamline the IT function, Comply with organizational strategic direction, Acquire additional resources.
Improvement-Driven	Improve technical services, gain access to new technologies & innovations, focus internal IT staff on core technical activities, Improve credibility and image, operating performance, management and control.
Financially Driven	Reduce investments in assets and free up these resources for other purposes, Generate cash by transferring assets to the provider. Improve cost controls & ROI
Revenue Driven	Gain market access and business opportunities through the provider's network, Accelerate expansion by tapping into the provider's developed capacity, processes, and systems, Expand sales and production capacity during periods when such expansion could not be financed, Return to core competences, facilitate mergers and acquisitions, Start up new companies and re-evaluate organizational and managerial structures.
Cost Driven	Reduce costs through superior provider performance and the provider's lower cost structure, Turn fixed costs into variable costs.
Employee Driven	Give employees a stronger career path, increase commitment and energy in non-core areas, reduce uncertainty.

Table 1. Reasons for Outsourcing IT function. Source: Lacity & Willocks (2001) in Turkama (2007)

Outsourcing has been reported to provide more than cost-saving benefits such as better ability to plan, improved operational reliability, and faster implementation of new business strategies and initiatives (Keith, 2003). A variety of IT jobs are being outsourced. The next section will discuss offshoring of IT services with emphasis on software development.

2.2 Offshoring

In the 1990s, outsourcing usually occurred within the same borders, such that both the vendor and client were located in the same country (Weber, 2004). However, this changed when the offshoring trend began to gain popularity. Offshoring is defined as having work for a company done in another country, whether or not it is done by part of the same company (Aspray et. al, 2006) and whether this country is overseas or not (Gordon et. al, 2006). The offshoring trend is a plain extension of the outsourcing trend. Offshoring is usually done from a high-wage country to a low-wage country. Just as with outsourcing, the offshoring trend was common among manufacturing companies but is now being done for IT services.

Deol (2007) outlines four categories of companies that provide offshore services. These are:

- i. **Fully Offshore:** These are small companies established in offshore countries, with up to 50 employees. They do not spend much on external marketing. Often, their business comes from word of mouth promotion and referral from existing clients. They hardly have offices in the countries where their clients come from. Freelancers and informal teams of friends and associates working together are part of this group.
- ii. **Fully offshore with own representative office in client countries:** These are medium sized companies, with 50 to several hundred employees. The representatives in client countries undertake responsibilities such as marketing, requirements engineering etc. Examples are Indian Satyam and Wipro companies.
- iii. **Western companies with their own development centers located in offshore countries:** These are usually multinationals that make use of the offshore centers to leverage the local talent of the offshore country and use it to work on various products and services for their global market. Various multinationals have an offshore presence. Examples are Siemens in Tunisia and Amazon in South Africa. Nowadays, several medium sized companies are also turning to this alternative.

- iv. **Western companies acting as middlemen for offshore companies:** These are usually known as service brokers having their own network of offshore companies. Sometimes, they may provide end to end project management, including project and financial risk management, or introduce a Western firm to an offshore company and charge a commission on the work done.

2.2.1 Reasons for offshoring

There are many reasons why companies decide to offshore their work. According to a survey done in 2005 by Djavanshir of John Hopkins University, labor cost reduction and access to the offshore country’s skilled workforce and talents were rated as the most important benefits of offshoring. Table 2 shows the respondents’ importance ratings of five outsourcing benefits factors.

Benefit	Importance Rating*
Labor cost reduction	4.9
Access to the host country’s skilled workforce and talents	4.9
Follow-the-sun (24/7) continuous operation	3.7
Improved flexibility and agility	3.4
Taking advantage of a host country’s universities	3.1
*Based on a scale of 1 to 5, 5 being the most important	

Table 2. Overall importance ratings of offshore outsourcing benefits.
Source: Djavanshir (2005)

Lowering costs enhances a company’s competitive advantage in the global market. The above mentioned survey by Djavanshir (2005) showed that IT companies in the US could save up to 40 percent in operational expenses in comparison with a US-based operation. However, as offshoring continuously becomes more popular, companies now seek for more strategic benefits other than lowering cost. Client companies from high-wage countries

search for vendors with special skills to perform non-critical software and project-management functions so that the client company has more time and resources to focus on core activities (Leavy, 2004 and David & Jill, 2005). Offshoring gives companies the chance to expand to other parts of the world and hence enabling them to take part in global competitiveness.

There is a motivation to operate from the different time zones so as to follow-the-sun and be able to provide services on a 24/7 basis (Bianca, 2004). This kind of a continuous operation enables companies to reduce the time needed to complete projects leading to improved time to market (Djavanshir, 2005 and Ferranti, 2004). Reports have it that some companies have been able to obtain better quality software from their offshore vendors than from their own internal developers (David and Jill, 2005).

Additional advantages of offshoring include the company's flexibility to accommodate the changing market and customer demands, ability to increase IT services when required, improved project management skills and tax holidays.

At this point, an important question to ask would be: Why should African countries become offshore vendors? The benefits of offshoring cannot be ignored. Offshoring provides opportunities such as new jobs, new skills and new income streams (Heeks, 2005) that enhance economic development. In addition, outsourcing increases a country's export revenues and enhances the national infrastructure, especially in telecommunications (<http://acci.asn.au>). Furthermore;

“Offshoring aligns with the notion that Africa needs to trade its way to development. It aligns with the notion of building an ‘information/knowledge society’. It aligns with the need to stop Africa’s IT talent brain draining away plus it can build on the existing Diaspora: such contacts have been fundamental to offshoring in other countries. It turns Africa’s low wage levels from a problem into an opportunity” (Heeks, 2005).

2.2.2 Risks of offshoring

While offshore outsourcing brings many advantages, most companies are careful when considering going offshore. This is due to the risks associated with offshore outsourcing.

1. Effective communication between the vendor and client is hindered by language problems. Populations in developing regions are not English-native speakers. Many of them have their own native languages, which affects the spoken English accents. In addition, the physical distance and lack of face-to-face interaction between the vendor and client adds further hindrance to effective communication. Synchronous and asynchronous methods of communication e.g. email, file transfers, telephones, conference calls, chat facilities and videoconferencing can be used to facilitate communication (Sakthivel, 2007).
2. A cultural difference between the vendor and client companies is another risk factor. The client company also risks losing control of its own development work to the vendor company. Sakthivel (2007) says this can be minimized by the client company employing a project manager who is familiar with the language and culture of the offshore company. It would further help to minimize the chances of misunderstandings resulting from communication breakdown between the two companies.
3. Knowing and finding the offshore company with the right skills for the development work required by the client company is not straightforward. It is important for the client company to work with an offshore vendor in possession of the right skills and the needed communication resources. Furthermore, the vendor country's political situation and government policies are factors to be considered. To lighten the complexities of choosing the right vendor, Sakthivel (2007) advises client companies to consult with outsourcing experts.

4. Loss of intellectual property or trade secrets is also a risk that most client companies have to contend with. During the development process, the offshore company can acquire information about the client company that is meant to remain confidential. However, since most offshore vendors work on contract basis, there is a chance that the information could be used in projects with other companies (Gregory and Terry, 2005). Other risks include the added costs of communications infrastructure, management of the work being developed from the offshore location and differences in the hardware and software platform being used by the client and vendor.

Table 3 below shows the importance ratings of five risk factors that were obtained from a survey conducted by Djavanshir (2005).

Risk	Importance Rating*
Political	4.8
Legal, enforcement of intellectual property rights and business contracts	4.6
Information vulnerability and security	4.5
Immature business environment	4.3
Socio-cultural problems	4.1
*Based on a scale of 1 to 5, 5 being the most important	

Table 3. Overall importance ratings of offshore outsourcing risks.

Source: Djavanshir (2005)

2.2.3 The Issue of Trust

Trust is a vital aspect of interpersonal and interorganizational relationships (Sabherwal, 1999). It is easy for people working for the same company under the same project to trust each other because they have developed working relationships already and share a common goal for the project at hand. However, when it comes to offshored projects, the client and

vendor usually do not have past relationships with each other. Building trust in offshored projects can be a challenging process.

Offshored projects are normally monitored through structural mechanisms, including deliverables, penalty clauses and reporting arrangements (Sabherwal, 1999). A study conducted by Sabherwal in 1999 from a group of clients and vendors revealed that “distrust hurts performance whereas trust improves performance”. Trust encourages co-operative teamwork while distrust leads to conflict. Figure 2 shows the virtuous and vicious cycles that offshored projects go through. The virtuous cycle combines mutual trust and structural controls leading to good performance. On the other hand, the vicious cycle is characterized by distrust and lack of appropriate structure which breeds poor performance. Structural controls refer to procedures such as reporting mechanisms and frequencies, change-management procedures and client-involvement plans.

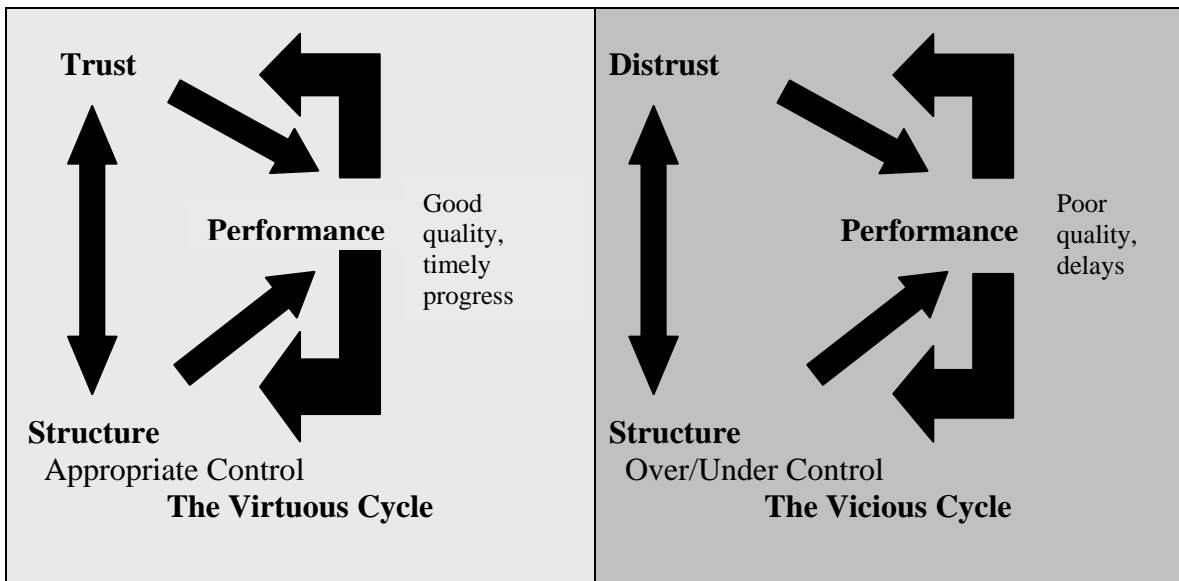


Figure 2. Virtuous and vicious cycles of structure, trust and performance
Source: Sabherwal (1999)

2.2.4 Offshore Outsourcing Destinations

The 1990s experienced a rising interest in the globalization of the software industry as a result of offshore outsourcing. This drew the attention of different experts, some of whom started to categorize the countries that were already taking part in the global software market. One such categorization was made by Carmel (2003) who created a taxonomy of software exporting nations. The countries were categorized into the tiers depending on the maturity of their software industries (Table 4). Egypt was the only African country appearing in the fourth tier.

	Label	Nations
Tier 1	Major software exporting nations	Mostly OECD nations such as: USA, Canada, UK, Germany, France, Belgium, Netherlands, Sweden, Finland, Japan, Switzerland, Australia Includes entrants from the 1990s: Ireland, Israel and India
Tier 2	Transition software exporting nations	Only Russia and China
Tier 3	Emerging software exporting nations	Brazil, Costa Rica, Mexico Philippines, Malaysia, Sri Lanka, Korea, Pakistan, Romania, Bulgaria, Ukraine, Poland, Czech Republic, Hungary, others
Tier 4	Infant stage software exporting nations	Cuba, El Salvador, Jordan, Egypt, Bangladesh, Vietnam, Indonesia, Iran, Others
Non-competing	Non-competing	Most of the (smaller least developed) countries of the world

Table 4. The 4-tier Taxonomy of the world's software exporting nations
Source: Carmel (2003)

Another classification was made by Gartner (2003) who divided the offshore destinations into four categories: Leaders, up-and-comers, challengers and beginners (Table 5). Gartner's report focused mainly on the low-wage countries that were entering the global software marketplace at the time. India has undoubtedly made a name for itself as the outsourcing giant. Other countries continue to pursue their share in being recognized as viable offshore destinations. Five African countries appear here: South Africa, Egypt, Ghana, Senegal and Mauritius

Leader		Up-and-Comers	
India		Belarus Brazil Caribbean Egypt Estonia Latvia	Lithuania New Zealand Singapore Ukraine Venezuela
Challengers		Beginners	
Canada China Czech Republic Hungary Ireland Israel	Mexico Northern Ireland Philippines Poland Russia South Africa	Bangladesh Cuba Ghana Korea Malaysia Mauritius	Nepal Senegal Sri Lanka Taiwan Thailand Vietnam

Table 5. Global Sourcing Powers. Source: Gartner (2003)

2.2.5 Enablers of Offshoring

Aspray et al. (2006) identify many drivers and enablers of offshoring:

- The dot-com boom years experienced a fast spread of the telecommunications systems, making available extensive, low-cost broadband available in many nations at pleasant rates. This facilitated fast transfer of data between a client and vendor.
- Software platforms became more stable and many big companies were using a few standard options e.g. IBM or Oracle for database management, SAP for supply chain management etc. This enabled vendors to focus on gaining expertise in these few technologies as well as hiring employees that possessed the same qualifications.
- Companies are able to use cheap commodity software packages instead of customized software, leading to some common benefits as those from software platforms.
- Technology changed rapidly which made software investments to become outdated. This led many companies to opt to outsource instead of investing in resources that would soon have to be dumped.
- Companies felt pressurized to offshore as their competitors started to do so.
- Famous and exemplary people in the industry, for example Jack Welch from General Electric, became fond of offshoring.
- New entrepreneurs used offshoring as a way of reducing capital costs.
- Some companies began to operate as middlemen and this made it feasible for small and medium-sized companies to offshore their work.
- Work became more digital and routine such that it could be broken into modules and some of these modules could easily be outsourced.
- Education became more globalized as professional computing societies provided standard training, setting up of computer laboratories became more affordable, countries began to improve undergraduate education so as to become globally competitive, and Western graduate education became easily accessible as immigration laws were loosened.

- In the case of India and China, Indian and Chinese citizens who had gone to the United States or Western Europe for their graduate education and remained there to work, started to go back home in huge masses. This led to reverse Diaspora that provided highly educated and experienced personnel and managers to these countries. In addition, India has a large population of English speakers and its legal and accounting systems resembled those in the United Kingdom and the United States.
- Globalization of trade is becoming more popular. This is due to the liberalization of some economies e.g. India and China, lowering of trade barriers as a result of the fall off communism, and the formation of international trade organizations that bring together many countries.

2.3 Offshore Software Development – What can be offshored?

Software development can be referred to as “the applied side of software engineering” (Gary, Pollice, 2005). Software engineering is the analysis, design, construction, verification and management of computer software (Pressman, 1997). Pressman categorizes the software development process into three generic phases. These are:

1. Definition phase
2. Development phase
3. Maintenance phase

The definition phase includes the initial stages of the development process. It is concerned with identifying what requirements are necessary to build an appropriate system. The requirements of the system include the kind of information that needs to be processed, the expected performance of the system, the design constraints and the validation criteria to be used.

Next is the development phase which deals with how the system is to be implemented. It is during this phase that major decisions concerning the system are made. The designed system is translated into a programming language and after the coding has been completed, the system is tested to validate its correctness.

The last phase is the maintenance phase which focuses on changes in the system due to errors and changes in software environment and customer requirements. The four different types of changes are corrected through corrective maintenance to correct errors, adaptive maintenance to accommodate changes to the software's external environment, perfective maintenance to extend the software beyond its original functional requirements and preventive maintenance to enable the software to serve the needs of its end users.

Software development work is a demanding process which requires careful planning, implementation, testing and maintenance. More and more companies are now opting to offshore their software development work. Whether it is done locally or at an offshore location, software development normally adopts the software development life cycle. The production of a good software system or product requires thorough execution of each of the development phases.

The decision to offshore the whole software development life cycle or part of it usually depends on the needs and preferences of the client company. At the same time, some offshore vendors might offer the full range of development phases, while others might provide part of the software development cycle. The more common process of developing the software begins with the client company giving the requirements of the system, and then handing over the design, coding and testing work to the offshore vendor. After the system has been developed and delivered to the client, further testing is done on the system to verify its correctness.

The question of what kind of software work can actually be offshored is very important. In a report to the Association of Computing Machinery by Aspray et al (2006), six types of IT related work are often offshored. These are:

1. Programming, software testing, and software maintenance
2. IT research and development
3. High-end jobs such as software architecture, product design, project management, IT consulting, and business strategy
4. Physical product manufacturing – semiconductors, computer components, computers
5. Business process outsourcing/IT Enabled Services – insurance claim processing, medical billing, accounting, bookkeeping, medical transcription, digitization of engineering drawings, desktop publishing, and high-end IT enabled services such as financial analysis and reading of X-rays
6. Call centers and telemarketing.

According to these authors, the initial belief by many people was that only low-level type of software work could be offshored, e.g. routine software maintenance and testing, routine business office processes and call centers. However, there has been growth in offshoring of high-level software work such as research and development, project integration and knowledge process outsourcing e.g. reading X-rays and doing patent checking. This, according to the authors is because many offshore vendors have taken steps to gain high-level skills and are therefore able to offer these services.

The risks associated with offshore outsourcing should carefully be considered when deciding the type of development work to send offshore. David and Jill (2005) advise that the suitable types of software development work to send offshore are normally those comprising of software that is “not proprietary to the client company’s core intellectual property”. According to Savitr Software in David and Jill (2005), the suitable types include:

- Web design and development

- E-Commerce projects (but have a 3rd party check of security)
- Remote software maintenance and feature enhancements
- Internal record keeping, database, help-desk software

From the same authors, the poor types for offshore software development include:

- Software development in the regulated industries (medical, aviation etc)
- Software pertaining to military applications
- Government software requiring a physical presence in the client's country
- Work that needs special government clearances should not be outsourced outside the client's country (because offshore developers cannot obtain clearance)
- Software development requiring sensitive knowledge related to the legal structure of the client's country.
- Projects involving proprietary knowledge of the client company's IP, which cannot be safe-guarded by means other than trust and dependence on the laws of the land.
- Complex technical projects because of the large amount of communications required.

As the offshore outsourcing marketplace continues to gain a large number of investments from multinational companies, African countries are beginning to get their share in the international market place. In Africa, according to McCue (2006), South Africa and Morocco are currently the dominating offshoring destinations, while countries like Kenya and Senegal are mentioned as up-and-coming destinations.

Egypt appears in a list of top offshore outsourcing destinations whose growth is expected to rise. John (2006) is quick to mention that "Egypt could be for Europe like India is to the American Xceed." Furthermore, Egypt "has foreign language skills" and "low labor costs" that raise Egypt to a competing position with India and Eastern Europe (McCue, 2006). Egypt's geographical positioning makes it a desirable offshore destination for many foreign countries especially those from Europe.

In an article by Russell Southwood, a few African companies are said to be developing “original branded software”. These are: Soft in Ghana, Software Technologies in Kenya and Pastel in South Africa (<http://www.balancingact-africa.com>).

2.4 Africa’s ICT Infrastructure

Africa is the world’s second-largest and second most-populous continent (<http://en.wikipedia.org/wiki/Africa>). It has 53 countries including all the surrounding islands. It is made up of five regions namely North Africa, West Africa, East Africa, Central Africa and Southern Africa. The ICT statistics presented here are those freely available from the International Telecommunications Unit until end of 2004 and the internet world statistics in 2007.

The ITU 2004 statistics had it that 13% of the world’s population was from the African continent. Dubbed “the least wired region in the world”, Africa had a total of about 100 million telephone subscribers, with 76 million of them being mobile subscribers (<http://www.itu.int/ITU-D/ict/statistics/ict/index.html>). Despite being the least wired region, the statistics revealed that it was the region with the highest mobile cellular growth rate, with a five year history of about 60% yearly growth rate.

Africa is experiencing a fast growth in the use of mobile phones. By the end of 2004, the number of mobile phone subscribers was 8.8 per 100 inhabitants, which was almost three times the number of fixed lines subscribers (Figure 3). It can also be observed that Africa had the world’s fastest growth of the mobile market (Figure 4). This growth has mainly been facilitated by the mobile operators’ ability to provide rapid mobile coverage (Gray, 2006). According to a more recent report, mobile phones have now become the most common electronic communication medium in Africa, increasing from 15 million in 2000 to over 160 million by the end of 2006 (ITU and UNCTAD, 2007)

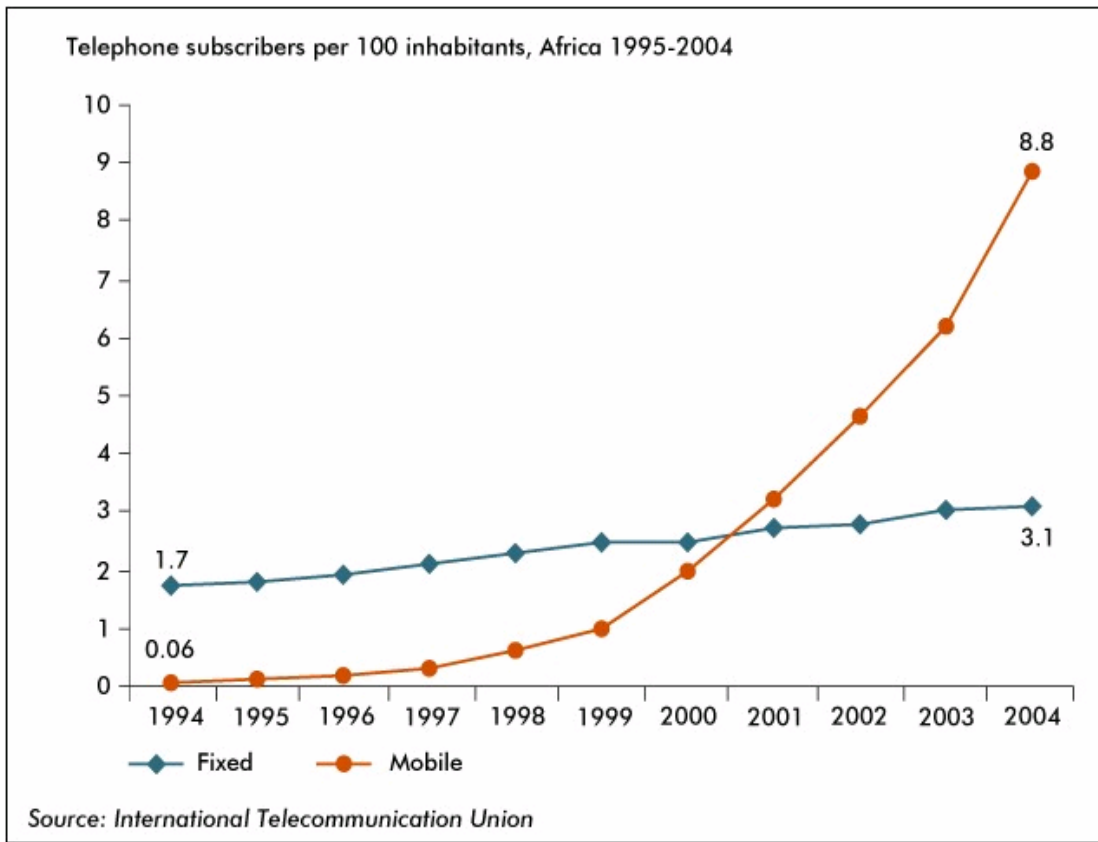


Figure 3. Mobile and fixed telephone subscribers per 100 inhabitants in Africa, 1995-2004

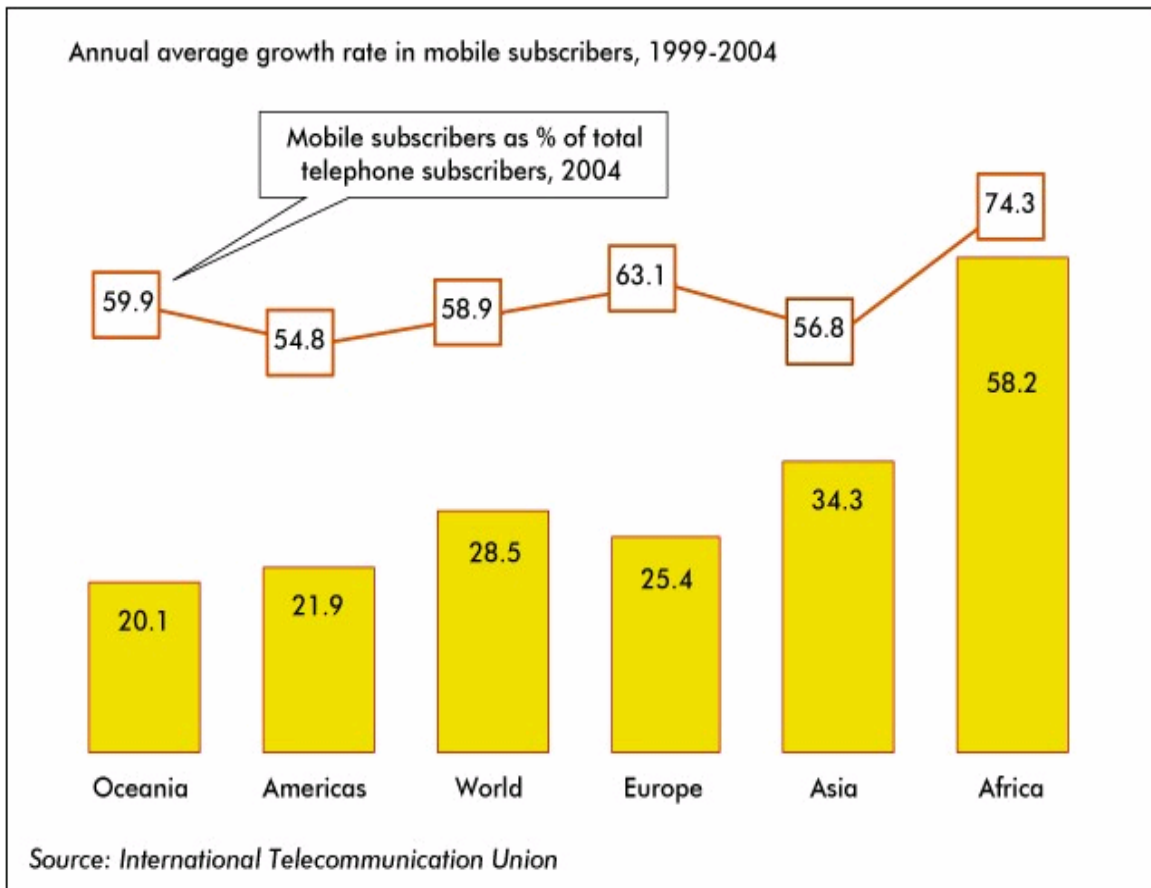


Figure 4. Annual average percentage growth in mobile network subscribers, 1999-2004, world regions

However, while mobile usage grows at a fast rate, it is not so with internet usage. ITU's statistics in 2004 showed that the growth of internet usage was slightly less than 3% (Figure 5) and the latest observations from the internet world statistics show a small increase (Figure 6). Between 2000 and 2007, Africa has had an internet growth rate of 638.6% (<http://www.internetworldstats.com/stats.htm>).

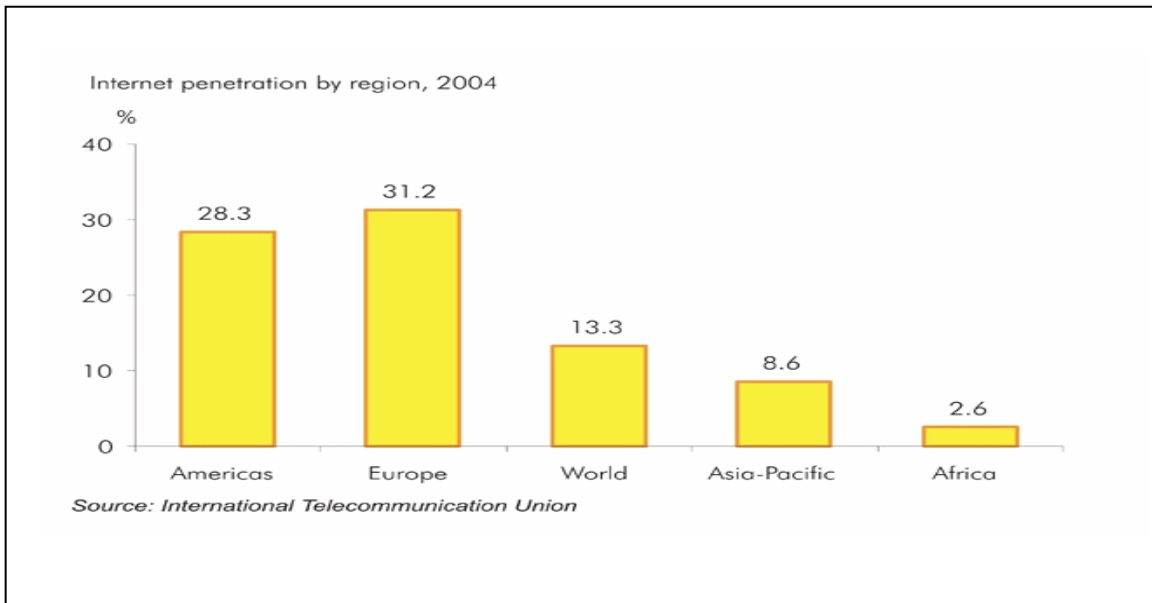


Figure 5. Internet penetration by region, 2004

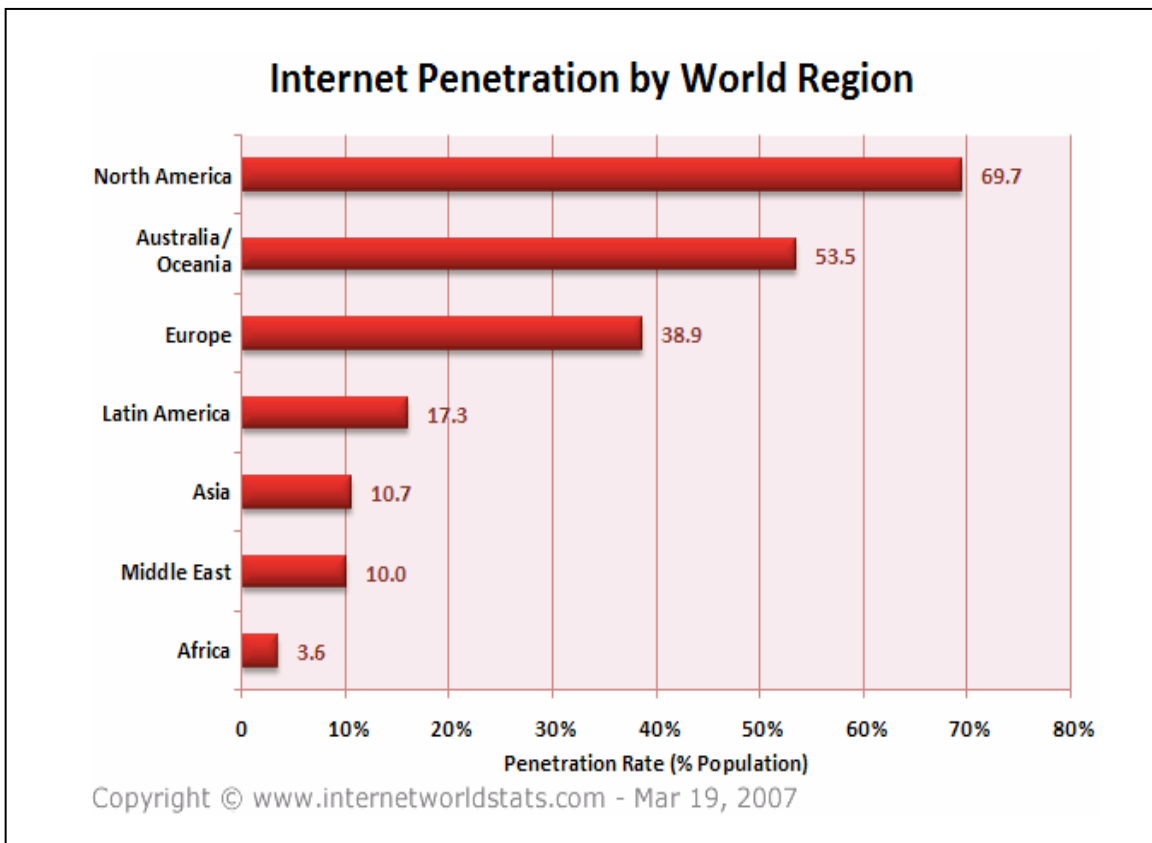


Figure 6. Internet penetration by world region, 2007

3. RESEARCH PROCESS

The study is of an exploratory nature. Exploratory investigations are suitable when there is no prior knowledge of a part of reality or a phenomenon (Jarvinen 2004, 66). Since not much is known about the current state of offshore software development in Africa, the study seeks to “explore” and gain a general overview of the current situation.

A questionnaire in a paper or electronic format contains many structured or unstructured questions that the selected people are expected to answer (Jarvinen 2004, 144). In this research, electronic questionnaires and voice interviews were chosen as the data collection methods mainly due to the fact that these were cheap and convenient data collection methods for research being carried out from distant locations. Kerlinger (1988, 360) in Jarvinen (2004, 146) says that the mail questionnaire has some disadvantages unless it is used in conjunction with other methods. These setbacks could be low number of replies and difficulty in checking the given responses. With this in mind, we sent reminder emails so as to acquire more replies. The voice interviews mainly depended on the availability and willingness of the companies to spare some time for the interview.

Due to the fact that the IT industry in most African countries is still at its infancy, the main limitation to the study was the difficulty in getting the data for most of the countries and finding companies in the countries. This is mainly due to the fact that most countries do not yet have offshore outsourcing activities. Hence, there is no available information about these countries with respect to offshore outsourcing activities and especially with regard to software development.

Africa is a huge continent with 53 countries including all the surrounding islands and its population makes up approximately 14% of the world’s population. (<http://en.wikipedia.org/wiki/Africa>). The participating companies came from 5 countries; Egypt, Ethiopia, Kenya, Mauritius and South Africa. Although the number of companies interviewed is not representative of the whole of Africa, the data gathered was able to contribute to the research questions of the study and helps to give a somewhat general

initial overview of offshore software development in Africa. Table 6 below shows the number of interviews from each country. With permission from the interviewees the names of the companies are in the list of participating companies (Appendix 2). Although some literature mentions Ghana, Morocco, Senegal and Tunisia as other countries already in the outsourcing industry, the author did not get replies from the vendors she had identified and contacted.

Country	Number of Interviews
Egypt	1
Ethiopia	1
Kenya	5
Mauritius	5
South Africa	1

Table 6. Number of interviews from each country

3.1 Data Collection

Google search engine was used to look for companies to contact as interviewees, or any further literature and information that would help to point out potential interviewees. To gather more company references, a few members of academic staff in institutions of higher learning and representatives of other relevant organizations were contacted. The search targeted companies involved in offshore software development activities from any African country. After the companies were identified, they were contacted by sending an initial e-mail introducing the thesis and requesting for their contribution to the study as interviewees. The email also assured them of the confidentiality of the data. Upon receiving positive replies, voice interviews were conducted with some of the companies and electronic questionnaires were sent out to those who were not able to have voice interviews. In one occasion, however, the interview was conducted through normal text chatting using yahoo messenger. Table 7 below shows the number of interviews conducted through each data collection method.

Electronic questionnaire	Voice interview	Yahoo chat
6	6	1

Table 7: Data collection methods

The voice interviews were recorded and transcribed for analysis. The average length of each voice interview was about 35 minutes. Transcription software was used for transcribing the interviews and Microsoft Word was used to type them in text format. The total number of transcribed interviews was 25 pages.

The questionnaire (Appendix 1) was constructed in line with the research questions and theoretical background of the topic. The questions were open ended in nature, so that the participants would have room to freely contribute to the study by describing their areas of responsibility, relationships and experiences with respect to offshore software development in their countries. The questionnaire had a total of 21 questions divided into five sections:

- Personal information
- Scope of the service provision
- Successes and challenges
- Future expectations
- Other relevant issues

The background information of the company was gathered from section one consisting of four (4) questions. This included information related to the company's name, location and size (number of employees and/or revenue) as well as the interviewee's role in the company. The second section, also composed of four (4) questions, collected information pertaining to the kind of services provided by the company such as the product/service specialization of the company and percentage of work for export and local market among others. Section three contained seven (7) questions that were meant to obtain the factors contributing to successes and challenges of the companies' current work. Two (2) questions made section four. This was aimed at getting the respondents' views on what they perceive

of the future trend of offshore software development in their respective country and in Africa as a whole and the changes that they propose to improve the current situation. There were four (4) questions in the last section which was aimed at getting any other information that would help to build onto the thesis e.g. the respondents' knowledge of the software development offshore activities in their neighboring countries.

In all cases except one, it was possible to interview people who played senior roles in the companies' offshore outsourcing activities. Most of them shared similar views and this helped to strengthen the reliability of the data. As each of the companies is one that is offering offshore software development services to one or more industrialized countries, the interviewees portrayed special interest in the topic. The exception was a staff member at an academic institution.

The process of gathering the data faced many difficulties and took a much longer time than had initially been planned. Finding the companies took time and most of them were very busy and took long to respond. Many of them failed to respond despite several follow-ups. Five of the companies clearly indicated that they were very busy and therefore could not be able to answer to the questionnaire. Two people responded saying that it was not possible to participate because it was against their company policy to disclose any confidential information. One company reported that it was no longer involved in software development activities. The targeted minimum was twenty (20) responses but thirteen (13) were obtained.

4 RESULTS

The decision to study offshore software development in Africa was due to the fact that not much had been published about offshore software development in Africa. Offshore outsourcing has grown in recent years, and African countries are beginning to take part as offshore providers. By 2005, there were more call centers operating in Africa compared to business process outsourcing (BPO) and offshore outsourcing of software development (Lacey, 2005).

4.1 Background information of the companies

As mentioned earlier, all except one interviewee had senior roles in the company. Nine of them included senior, general, engagement, global executive and business development managers. The remaining three were a chief operations officer, a chief executive officer and a lead consultant.

The least number of employees in the companies was five and the maximum was 300 (Table 8). It can be observed that the total number of companies is twelve. The remaining company said that it had stopped hiring permanent employees and opted to work with contract-based freelancers because according to the interviewee, the company was becoming a perpetual “nursery” of trainees who would leave the company for greener pastures soon as “they (employees) could start earning the firm any meaningful returns after training”(Lead Consultant, Kenya). Seven of the companies did not mention the size of their companies in terms of revenue. Therefore, this criterion was omitted from the findings and does not feature in the table.

Less than 10 employees	10 – 50 employees	More than 50 employees
2	7	3

Table 8. Company size in terms of number of employees

The companies fell into three categories of offshore providers: fully offshore, fully offshore with representative in client country and western companies with their own development centers located in offshore countries (Table 9). Eight companies belonged to the fully offshore category. Two of the companies were fully offshore company with representatives in the client countries and two others were offshore development centers of big western companies.

Fully offshore	Fully offshore with representative in client country	Development centre of a western company
8	2	2

Table 9. Company categories

4.2 Scope of Service Provision

The companies offer a wide range of services. These include graphic design, web development, business intelligence / data warehousing, internet marketing, software development (partially or the entire process) and e-learning content development. In addition, two of the companies have developed their own software that they use to provide document management services. The companies acting as offshore centers of big western companies concentrate on developing and maintaining software for the big companies.

Most of the companies are relatively young, having been in operation for five years or less (Table 10).

Less than 1 year	1 – 5 years	More than 5 years
3	6	3

Table 10. Length of time in operation

With varying percentages, most of the companies also affirmed that they also offered their services to the local market as well (Table 11). Seven of the companies provided their services for both local and export markets. The remaining five provided their services entirely to the export market. Three of these companies were those operating as subsidiaries of western companies in France and the United Kingdom.

Market		Number of companies
Local (%)	Export (%)	
95	5	1
50 - 80	50 – 20	4
5	95	2
0	100	5

Table 11. Market targets

In carrying out the projects, assignments meant for the local market involves carrying out the entire software development cycle. For the export market, the customer requirements are the determining factor of what will be done i.e. part or the entire process. The United Kingdom (UK), the United States of America (USA), Germany, Sweden, France, Italy and Switzerland were mentioned as the client countries. Two interviewees, one residing in Egypt and the other in South Africa also said that they had clients from the Middle East region. On one occasion, a Kenyan company had failed to carry out a project with Spain due to the language barrier. He explained this in the statement below.

“We tried to do some work with Spain, but we have not gone so far because of the language barrier. The deal has not been executed yet because of the language barrier”

4.3 Successes and Challenges

An Association for Computing Machinery Report on Globalization and Offshoring of Software (Aspray et al., 2006) outlines four categories of countries that do offshored work:

- (1) Those that have a large capacity of highly educated workers and have a low-wage scale (e.g. India, China)
- (2) Those that have special language skills (e.g., the Philippines can serve the English and Spanish customer service needs of the United States by being bilingual in these languages)
- (3) Those that have geographic proximity (“nearsourcing”), familiarity with the work language and customs, and relatively low wages compared to the country sending the work (e.g. Canada accepting work from the United States, the Czech Republic accepting work from Germany)
- (4) Special high-end skills (e.g. Israeli strength in security and anti-virus software)

These categories were used to form the basis for the factors contributing to the successes and challenges of the identified companies’ offshore work. Infrastructure and legal issues were also included as factors for consideration and the interviewees were also asked to mention any other factors that they thought were important but had not been included in the questionnaire. In addition, the interviewees were asked why they thought their clients had chosen to offshore work with them.

All interviewees unanimously mentioned lowering cost as the main motivation for the foreign companies to offshore their work with the interviewees’ companies.

“It’s simple, COST!”(General Manager, Ethiopia)

“We are about two times cheaper than the local market in Europe and USA, and the quality of our work is about the same...” (Company Director, Mauritius).

“Some of our customers have actually come out very clearly, to say that it would cost them \$5000 a month to retain a graduate in the US, but in Kenya, I can get the same job done at about \$1000 a month...” (Business Development Manager, Kenya).

Although not all interviewees mentioned it, quality of the work done was also a motivation for offshoring.

“...We are credible, we have our own standards and they feel quite satisfied with our services” (Engagement Manager, Egypt).

“in the case of clients potentially in Europe and the middle east, it relates to the level of quality compared to the relative locals especially for SAP training development” (Global Executive, South Africa).

“Quality...” (Managing Director, Mauritius)

4.3.1 Availability of skilled personnel

There were mixed responses relating to the available skilled talent in corresponding countries. While some said that they had enough to meet their current obligations, others thought otherwise. Below are some of the responses that were given:

“We have an overflowing abundance, but there simply aren’t enough contracts coming our way” (Lead Consultant, Kenya).

“That is a huge problem, just recently, we were trying to hire programmers and we got 150 applications for 2 posts but upon filtering, we only got about 5 people that we really wanted to interview. So, there is a huge problem of competent skilled personnel. However, considering our current workload, we have quite enough

personnel, but we would definitely need more people (which should be very difficult to acquire) if our work load increases” (General Manager, Ethiopia)

“We are skilled; most of our employees are university graduates and some with MBAs and MScs” (Managing Director, Mauritius)

“We don’t have enough; we currently can’t employ people quickly enough” (Global Executive, South Africa)

On the whole, there were more of the interviewees saying there was available skill for the time being. However, in view of the challenges, most of them were of the opinion that there would be a lack of skilled workers in the future.

“In the future, I think we will face a problem with skilled personnel because right now, the Gulf is absorbing most of the graduates and technical skills from Egypt and Egyptians can speak the languages they have, and they offer almost two times the salaries that can be found in Egypt” (Engagement Manager, Egypt)

“Not at the moment, but in Mauritius, you are beginning to feel that there will be a shortage of labor in the future” (Managing Director1, Mauritius)

“The few developers now are available, but by the time people realize Kenya as a potential for outsourcing, these developers will be gone...for now, very few people are doing it, so the skill is available. We are talking of a market that will probably not be able to provide sufficient developers when people start doing their own businesses” (Business Development Manager, Kenya).

“So far it has not been difficult but we expect that in the days to come, it will become more of a challenge to get high end talents especially in software engineering...”(Managing Director2, Mauritius)

4.3.2 Language Skills

When it comes to communication with clients, all interviewees said they did not have a problem because they were able to speak English and/or French depending on the clients they served. One interviewee who represents a Mauritian company in Germany said that the German clients were well versed in English. The issue of accents was pointed out by three interviewees who said:

“Written communication is generally good. When spoken communication is required, some of our staff may have strong accents or the customers may have strong accents which take getting used to but they are able to communicate without too much difficulty.”(Senior Manager, Kenya)

“The biggest problem we have is when you get people used to doing work for a client in the US, and you get the same guys to do work for someone in Europe. The accents are different. You find that after you are exposed to a client for a month or two, you will be able to understand each other better. But when you get a client from another geographical region you have to start up before you can understand their accent, idiomatic expressions etc” (Business Development Manager, Kenya)

“Personnel are English speaking, accent can still be difficult to understand” (Chief Executive Officer, Kenya).

To tackle this accent issue, one of the interviewees further said:

“But what we are trying to do is to provide training mostly on the idiomatic expressions, how people pronounce certain words etc. We train them so that they know what they are dealing with” (Business Development Manager, Kenya).

4.3.3 Infrastructure

Physical infrastructure in terms of office buildings was not a problem. Working from an office, (as opposed to working from home) is an obvious fact for many people, but its importance was pointed out by one interviewee:

“Well, you see, we have tried this work without an office from our home and after having got an office, we have seen a major difference” (General Manager, Ethiopia)

Hardware infrastructure although costly, was also available. However, an interviewee mentioned the availability of locally assembled computers which had made it possible to acquire new hardware at cheap prices. Occasional power cuts were mentioned by two interviewees but *“these did not last long”*, one of them said. The other one pointed out that his company had bought a *“diesel generator to ensure effectiveness of operations”*.

All except two cases (Egypt and South Africa) complained of low and/or costly bandwidth. This was regarded as the biggest problem for most of the companies:

“Communications speed is a huge problem, that and the cost of the communications in general” (Chief Executive Officer, Kenya)

“Internet connectivity is unreliable and expensive... it already happened that we delivered to the customer late because of the connection” (Director, Mauritius).

“We use a dial-up connection since all other kinds are extremely expensive! And that there was a communication gap with one client and in the end, he was very dissatisfied with the work done” (General Manager, Ethiopia).

“Communication is the biggest challenge. The poor reliability and poor speed of the internet is the main problem. In Kenya, all international traffic is routed

through VSAT dishes to satellites. This introduces a delay of between 0.5 to 1 second. This delay is very obvious in voice calls. This means that we cannot use voice or video-conferencing as often as we would like. If we could, it would greatly ease the speed and effectiveness of our communication with our customers” (Senior Manager, Kenya).

“We are very limited with internet connectivity. We are an island, and it is a bit difficult to connect to other parts of the world” (Managing Director, Mauritius).

4.3.4 Laws and Policies

Some of the interviewees, especially those based in Mauritius, two in Kenya and one in Egypt felt that their government was putting efforts in promoting the outsourcing industry, and therefore, there were no constraints in running their business. One of the interviewees pointed out another common problem among companies worldwide, that of securing visas:

“The main issue is getting visas for some project phase e.g. when we start a project with a new client, it makes sense to send some staff onsite for a few weeks and the visa process is at least cumbersome.” (Managing Director, Mauritius)

The lack of international legislations relating to outsourcing was also a concern:

“For example, if I am signing a contract with a US company, which law will be applied, and who determines who is wrong and who is right if anything goes wrong” (Engagement Manager, Egypt)

“The matter of resolving disputes. In case there is a dispute, how long does it take to resolve a trade dispute in the United States, and how long does it take to resolve the same in Kenya? That puts some insecurity in some clients. These are genuine

concerns because you do not want to have a business partner and you cannot resolve the fight if one arises” (Business Development Manager, Kenya)

“The legal framework and process needs to be reviewed so that companies wanting to outsource to Kenya are absolutely sure that they are protected by the law” (Senior Manager, Kenya)

4.3.5 The Issue of Trust

Whenever two companies, a client and vendor, get into an offshore relationship, they both need time to gain the other’s trust. The major concern that clients have relates to the quality of work that the African companies can offer. To gain credibility, most of the interviewees said that they had put in place internal quality assurance measures that were used before delivering the work to the client e.g. thorough documentation and test plans. Some companies have acquired certification from international quality standards e.g. Six Sigma. This is what some of the interviewees had to say:

“Not an issue. We put a permanent QA person in place, and have worked with the client to create programming standards and a comprehensive set of standard operating procedures” (Chief Executive Officer, Kenya).

“Mauritius in general is viewed as a quality destination. We have proved this in many sectors. We have ISOs, Six Sigma” (Managing Director, Mauritius).

“We have a QA department that verifies each deliverable that we release. This department has refined its processes and has extensive documentation on procedures, test plans and so on” (Senior Manager, Kenya).

In an attempt to secure contracts, one interviewee said that they would be stretched to do unpaid free sample works to people who turned out to be con men.

“We are forced to do so much unpaid sample works before we secure contracts. Some of the ‘clients’ appear to be cons out to get free work done for them. They pretend to send samples whereas the truth is they are only sending different parts of their work to firms that work so hard to impress on the sample but we never hear from them afterwards. These usually take the form of ‘consultants’ with quickly assembled websites” (Lead Consultant, Kenya).

4.3.6 Other Factors

The interviewees also provided other interesting factors influencing the success and challenges of their work. Two companies were having difficulties with the nature of payment methods.

“Opening a bank account in Europe was not good for us. Until now, I have not found a bank that is able to open an account unless the Swiss banks that ask for 25000euros or 100000euros in order to open an account. They are afraid that my company is not registered in Mauritius and they need to see that you are a financially big company. Up do date, this is our main problem because our customers or us have to pay very big fees for bank transfers or to receive payments” (Director of a fully offshore Mauritian company with a representative in Germany).

“The biggest problem is the means of payment [which is non-existent for us]...When we want to get paid, there are no formal means of payment for us to get the money from there [client’s country] to here [interviewee’s country]” (General Manager, Ethiopia).

Secondly, as in any software development project, requirements gathering and understanding the customer requirements usually are complex processes.

“The biggest issue on customer side is writing the specifications quickly enough to keep us busy. There is still a big lag on projects between business requirements and programming specification, which is the point when we actually get to do some work” (Chief Executive Officer, Kenya).

“The main problem is to understand what the customers really want because most of the time, the customer does not know what they want at the start. I mainly work by emails or phone calls. The risk that I have seen is that sometimes we have a problem understanding what the customer wants because it is not always easy to type in an email an idea that you want to express ” (Director, Mauritius).

“The biggest problem, whether it’s outsourced to us or India, is in the design process. It’s really understanding and doing a thorough analysis. Customers do not necessarily have the ability to visualize what it is they want, so it takes us a long time to translate what they want into the required product” (Global Executive, South Africa).

Thirdly, there are many existing stereotypes that the developed world has about Africa. These stereotypes create a huge hindrance to the African companies wanting to enter the outsourcing market. This is obvious in the following responses.

“We need to be known. Mauritius is quite new in this industry I would say and it is only taking its first steps in the IT industry market. Some people don’t even know about Mauritius, for instance when you speak to people in America, sometimes they ask, Mauritius, where is it? ... And the image that Africa has in the world is not strong enough. So it’s important to build a reputation” (Managing Director, Mauritius)

“From a recent experience that I went through, what I learnt was that the potential clients abroad do not know about people like us and even if they do, they don’t trust that we are capable because all they associate us with is famine and poverty” (General Manager, Ethiopia).

“We first need to deal with the basics. As long as the talk on CNN is about war, hunger and poverty in Africa, for sure, no company will want to outsource its critical applications to Africa because they fear that there will be a cue every other minute and work will not be done. We need to deal with the negative perception out there...May be the governments can invest, buy space in the big media companies like CNN, Newsweek etc and just explain that there is something good coming out of Africa other than the war and hunger”(Business Development Manager, Kenya).

Fourthly, companies that have some employees working during the night are also faced with transportation and insecurity issues, as was the mention of one interviewee:

“Transportation of personnel working night shifts is an issue, as it is not safe for them to walk home, and no public transit is available (during the night)” (Chief Executive Officer, Kenya).

Finally, with India being the champion in offshoring, it was obvious to expect comments from some of the interviewees regarding the competitive atmosphere surrounding their work.

“We still have to compete with India. On the overall, the mark is changing ...I think South Africa and African countries might have the ability to provide a certain level of innovation with regard to the instruction design and design process [in the e-learning industry]. I think we will have the chance to compete especially with the Indian based industry with regards to cost and availability. E.g. one of the teams within TATA interactive systems, I think it’s a team of 23 people, of which all of them have MBA degrees and they work at a section of the cost of what I would be

able to pay somebody like that. It just makes it almost impossible to compete with India.” (Global Executive, South Africa).

“...In addition, costs for development in India continue to rise. I believe we are in a position to be more cost effective than India once our internet issues have been resolved” (Senior Manager, Kenya).

“I think the strategy would be for Africa to be perceived as a nearshore solution compared to India. To be perceived as more flexible and closer to the clients. From language and cultural point of view, there is a huge cultural gap between India and France, for instance. So because India has a lot of success at the moment, India is not ready to make efforts to be more flexible. I think that medium sized customers will have difficulties working with India. Very large organizations will be fine with India because they have huge projects, they can work in English and they can put up the right processes to work in India. But a lot of the medium sized companies lack the specialized processes for which I think India would not be a good solution at the moment. It will be easier for Francophone African companies to attract French customers because of the language and cultural issues” (Managing Director, Mauritius).

“We have a problem with exposure. People like brand names and India is already a brand name. On the other hand, we must use our competitive advantages. For instance, the Indian accent is difficult to understand ...I think we have fewer language problems compared to India, and with time this would work to our advantage. Another thing is the time difference and geographical location. It takes about 2 to 3 hours to fly to any European City, but it’s about 12 to 15 hours from India.”(Engagement Manager, Egypt).

4.4 Future expectations

The interviewees affirmed the future growth of offshore outsourcing within their own countries. Low costs, availability of young talent, language capabilities, open talks on fighting corruption, more and more companies starting up, companies' increased capabilities among others, were the given reasons. However, the growth would require a lot of efforts, which, according to all interviewees, needed the intervention of the government because it was not possible for a single company, or small group of companies to build the country's outsourcing industry. The interviewees expressed the need for African governments to take a central position in promoting the outsourcing industry in their respective countries.

“I think that the government has to improve the education policy...If the government wants the IT industry to flourish, it will have to make efforts to increase young people's competences” (Chief Operations Officer, Mauritius).

“The governments should look for means to support local companies. e.g. Providing infrastructure, funds and training to local companies, promoting the local companies by looking for customers abroad” (Director, Mauritius).

“Governments will have to provide a competitive, open infrastructure. Secondly, the governments will have to make the industry grow internally, and therefore enabling it to offer services externally” (Global Executive, South Africa).

“I think the solutions [to outsourcing challenges] are not just in the hands of an individual, the question of infrastructure for example is something which has to be considered on a national level”(General Manager, Ethiopia).

Does offshoring mean that Africa's young IT talent is being exploited to profit western companies? Not so according to these two interviewees:

“Outsourcing provides a very good win-win situation. It helps the client as well as the vendor to make profits and compete in their respective markets. In Africa, for example 1000euros is good money ...” (Engagement Manager, Egypt)

“...the money is decent. We are talking about 20US dollars an hour or 1000US dollars per month. I find that acceptable comparing it with the salary levels here...” (Business Development Manager, Kenya).

Two of the interviewees were managers of companies that have been set up as ‘incubators’ at two university premises. This is a great opportunity for the companies to take advantage of the readily available skilled labor, for the students to gain industrial experience and for the universities to be involved in developing both the local and export software industries. The same trend appears to attract the attention of other universities. One of the interviewees was confident that this would facilitate the growth of the software industry:

“We are the pioneers and almost every other university has come to see what we are doing, trying to learn from us. I expect the industry to grow. There is a lot of interest from other universities. They have idle capacities at night and trying to utilize them. They have students that are not able to pay fees and would like the students to have other revenue channels. Yes, I expect it to grow (offshore software development)” (Business Development Manager, Kenya).

5. DISCUSSION

The last chapter presented the views of the interviewees regarding the factors contributing to the successes and challenges. This chapter now gives an analysis of these findings, based on already presented factors in the previous chapter and other available literature.

5.1 Availability of highly skilled labor and low cost wages

All the interviewees affirmed that low costs were a major reason why their customers had chosen to offshore work with them. This confirms that leveraging costs is a major driver for managers to consider taking their work offshore. Coupled with other valuable factors such as quality of work and speed of delivery, African companies would be able to present themselves as attractive offshore vendors.

While some interviewees said that they had available skilled talent for their current obligations, others felt that this was lacking. Whether or not a country currently has readily available highly skilled talent, it is necessary that African graduates develop their competences in computer science and information systems to prepare themselves for the demands of the outsourcing industry. Universities and other institutions of higher learning should improve IT training and education so as to breed a pool of IT experts. Academic institutions should collaborate with the industry to come up with curricula that are balanced between theory and practice. In addition, the curricula should teach the students soft skills so that the students are equipped with the capabilities to run successful outsourcing relationships. These include issues such as cultural and linguistic issues, communication, management and teamwork (Hawthorne and Perry, 2005, Aspray et. al. 2006).

West and Bogumil (2001) argue that “as long as IT professionals remain mobile and world demand and market circumstances give some nations advantages in recruiting IT professionals, the disadvantaged nations will come up short”. As reflected in the Egyptian case where young Egyptian professionals are being swallowed by the Middle East market,

Africa's brain drain continues to deny the continent of its very best. African countries need their IT talent to contribute to economic growth. Therefore, African governments must come up with ways to retain their IT experts within the continent.

5.2 Language skills

In any offshoring relationship, communication is important. Africa is endowed with a variety of language capabilities that help to increase its attraction as an offshore destination. The Anglophone countries can serve the UK, US as well as Europe; the Francophone countries can attract French speaking customers and some of the northern African countries that speak Arabic can extend offshore services to the Middle East region. Additionally, Morocco can further secure Spanish customers.

While the spoken English may be with different accent, it is well understood compared to some Chinese and Indian English speakers who may sometimes be difficult to understand (Rive in Bianca 2004). Both the client and vendor need some time in order to adjust to and understand each other's accents. As pointed out by one interviewee, the European accent is also different from the American accent and the vendor also needs time to get used to the customers accents. These accent difficulties can further be minimized by providing employees with language training to help them enhance their understanding of how other people pronounce certain words and improve their own.

Effective communication does not only depend on language familiarity. Technical writing skills should also be emphasized so that students can produce clear project documentation. Other important aspects are non face-to-face communication and cultural sensitivity between the client and vendor. Students also ought to learn cross-cultural communication skills, which, in addition to technical writing skills, would help them to document the projects in "culturally neutral language"(Ferguson, 2004).

5.3 Geographical location / time-zone proximity

Outsourcing is undoubtedly a phenomenon that is here to stay. Western companies are on the look out for new locations to outsource their work (Lacey, 2005). It is unrealistic for African countries to expect the same level of India's outsourcing success within a short period of time. However, this should not deter them from capitalizing on the advantages that would bring outsourcing contracts their way. African countries have two advantages. These are: (1) Geographic proximity to the UK and European countries. (2) Time-zone proximity with the UK and Europe.

African countries can make use of these advantages to advertise themselves as “nearshore” destinations for offshore outsourcing especially to the UK and European countries. By being nearshore vendors, it would mean shorter traveling times, operating in the same time-zone and lower communication costs, shipping and tariffs (Carmel and Abbott, 2006). Furthermore, it would increase the chances of potential clients to outsource their “business-critical work” to African vendors.

5.4 Infrastructure

All interviewees said they had access to physical and hardware infrastructure necessary for operating their businesses. Good examples of government support in providing physical infrastructure are the two cyber towers set up by the government of Mauritius available for use by both local and foreign investors wanting to set up offshore companies. Such government investments are essential for the growth of the local and export ICT industry. Three of the Mauritian-based interviewees gave an estimated 30% annual growth rate in the outsourcing industry in Mauritius.

Most of the interviewees complained mostly about the slow and expensive internet connectivity. “Software firms require abundant, reliable, and cheap telephone and broadband data communication connections” (Carmel, 2003) and governments have an

important role to play in the development of telecommunications infrastructure (Heeks, 1999). Most interviewees agreed to the fact that better and faster connectivity means would greatly improve their business operations. One of the ways to deal with this problem is the construction of technology parks equipped with high speed communications facilities for software companies. The Kenyan government has made a move to carry out The East African Marine System (TEAMS) project, which will construct an undersea optic cable from Mombasa in Kenya to Fujairah in the United Arab Emirates (Daily Nation, 2007). This is expected to provide faster internet access at reduced costs and further spur the growth of the outsourcing industry.

5.5 Government involvement

The interviewees strongly emphasized the importance of the government's involvement as a vital driver for the success of the offshore outsourcing industry (for software development and other IT services in general) within the respective countries. Studies have shown that the success of many software exporting nations was driven by the active role that their governments took in promoting the industry (Heeks and Nicholson, 2002 and Carmel 2003). Some of the countries have already started making deliberate efforts in doing so. Egypt and Mauritius have put in place strategies that are aiming at increasing each of the country's attractiveness as an offshore destination in order to welcome many foreign investors and create more jobs for the citizens. In Egypt, there is an Information, Technology Industry Development Agency (ITIDA) whose one objective is to increase the export of ICT products from Egypt. In Mauritius, there is a board of investment agency that aims at attracting international investment, including outsourcing. In addition, some African countries are actively working on ICT policies and strategies aimed at promoting the vibrancy of the local ICT industries. Recently, there was a Sub-Saharan Africa Information and Communications Technology conference in USA that brought together officials from 19 African countries who presented the major ICT project and ICT policy initiatives in their countries.

Some of the interviewees from Egypt, Kenya and Mauritius acknowledged that it was becoming easier for new companies to establish themselves because of their governments' pro-investment outlook. African governments should take a closer interest in reviewing the laws and regulations so as to enhance a favorable trading environment for local entrepreneurs wanting to venture into the outsourcing arena e.g. ensuring that the entrepreneurs have access to stable physical, hardware and communications infrastructure, providing funds and training for those wanting to start up. The legal frameworks should also be in such a manner that encourages the western companies wanting to outsource to Africa. An example worth emulating is India's formulation of policies that help to build the offshoring industry e.g. the regulation policy, tax policy and infrastructure policy (Aspray et. al, 2006).

The media commonly reflects Africa as a place full of problems such as poverty, corruption, illiteracy, poor infrastructure and war. This is the image mostly adopted by an average western person. Some of the interviewees mentioned that they had encountered customers with such stereotypes. These stereotypes play a role in discouraging potential customers from offshoring their work to Africa. This calls for the attention of African governments - they should find ways to reinforce the fact that the majority of the African population is not sick or at war. One major step would be to join Microsoft's Africa chairman, Cheick Diara in his campaign to "alter perceptions of Africa as a war-torn continent, plagued by disease and poverty" (Calypso, 2007).

5.6 The Issue of Trust

African companies trying to find their place in the outsourcing market should not expect that their clients will readily trust them. To gain credibility, they should be ready to show something tangible e.g. their skills. They should develop stable and professional work ethics that make them reliable business partners e.g. doing what they say they will do.

Some of the interviewees said that they had taken measures to perform internal quality assurance before delivering the finished work to the clients. As a result, their clients did not have a problem trusting the quality of the work done. To further boost their credibility, African companies should also follow the example of Indian companies by focusing on acquiring software quality standards. An example is the software quality measure by the Software Engineering Institute's Capability Maturity Model (CMM). David and Jill (2005) state that many US companies say that achieving CMM Level 5, (the highest) is more costly in the US than to offshore their software development work. This adds more to reasons why the African companies should seek to get international software quality standards so that they can be regarded as credible vendors.

Noting from one of the enablers of offshoring, it was that Indian and Chinese citizens who had gone to the United States or Western Europe for their graduate education and remained there to work, began to return home in larger numbers, creating a reverse Diaspora that provided highly educated and experienced workers and managers to these countries. The Indians and Chinese have been the biggest drivers of offshoring in their own countries. Africans living in the Diaspora should nurture relationships with potential clients while at the same time maintaining connections back in their home countries. When they decide to set up offshore businesses back home, it will be easier for their clients to trust them.

5.7 Other factors

Given the open ended nature of the questionnaire, the interviewees had the opportunity to discuss other factors affecting their operations. These additional factors were those not initially given in the questionnaire. I consider them as general factors even though they may have been mentioned by less than three interviewees.

Payment mechanisms are vital part in any business. The lack of favorable and smooth methods of payment for two interviewees introduces two risks: (1) Working and not being paid for it. (2) Discouraging a potential long-term client from continuing to partner with the

vendor due to the strain that might spring up between the client and vendor. This calls for the attention of those governments with a pro-investment outlook, to consider policies that would enable small and medium sized software companies to open international bank accounts required for their type of businesses.

For any software company, the main goal is to develop software that will meet the client's requirements. The client should be able to clearly describe his/her needs for the vendor to understand them. Even with the modern means of communications infrastructure like VoIP, the distance between the client and vendor still means that there is a possibility for difficulties in the requirements gathering and definition phase. It is therefore mandatory to maintain constant communication between the client and vendor throughout the project. This will help in minimizing any misunderstandings throughout the software development life cycle.

There is an urgent need for African countries to work on building a better image in the world. In order to attract more outsourcing contracts to African companies, the hand of the African governments is essential in changing the stereotypes that many people have about the continent. Section 5.5 on "government involvement" has discussed this in greater detail.

As was the mention of one interviewee, there is a security problem for those companies that have employees working during the night. The lack of reliable public transport might mean that the companies have to arrange for transportation of their employees. However, this would definitely introduce more costs and it is a bit difficult to visualize how this dilemma would be solved.

With India having already made a name for itself as the outsourcing giant, any new entrants must face the reality of the competitiveness of the software and IT outsourcing industry. India is popular amongst large companies, and might be unwilling to be flexible to service the needs of small and medium sized companies. It is likely that African offshore vendors might be at a good position to start with small and medium sized clients before they can gain the favor of big multinational companies. As discussed in section 5.3 on "geographical

position / time-zone proximity”, African companies can capitalize on advertising themselves as nearshore destinations to clients potentially in the UK and European.

5.8 Future expectations

For various reasons, the interviewees were optimistic about the future growth of the software outsourcing industry in their own countries and in Africa as a whole. Low costs, availability of young skilled personnel and language capabilities were mostly the given reasons. Furthermore, it seems that many people are increasingly becoming aware of the benefits that outsourcing brings to the economy. As a result, more people want to set up their own outsourcing companies.

However, there are many existing challenges that need immediate attention. Education and IT training should be improved to make available the required skills for software offshoring. African governments should form policies that nurture the growth of their software industries and the legal systems should be extended to include laws relating to trade disputes that may occur between the vendors and clients. Of great importance is investment in communications infrastructure with the aim of providing access to high bandwidth at reduced prices. All the interviewees emphasized on the importance of government support in developing the software industry. To ensure success of software offshoring, African governments need to develop “national visions for software” (Heeks, 1999). The table below summarizes the tactics recommended for governments in their efforts to build supportive infrastructure for their software industries.

Factor	Possible Promotional Intervention
People	General education at primary to tertiary levels; Specific further and higher education and training in IT- and software-related skills/knowledge; Investment/subsidies for research and development; Encouraging diffusion of best practice
Technology	Investment in telecommunications infrastructure; Encouraging/facilitating greater involvement of private and foreign investment in telecommunications; Reduction of tariff barriers on IT imports
Money	Investment in and facilitation of venture and working capital funds; Encouragement of foreign investment
Information	Investment in freely-accessible market research; Subsidized marketing activities
Innovation	Investment/subsidies for commercialisable research and development
Other	Investment in transportation and utilities; Reduction in bureaucratic procedures

Table 12: National Government Tactics to Support Software-Related Infrastructure

Source: Heeks and Nicholson (2002)

In addition to providing education, universities can also take part in offshore outsourcing. Good examples are two companies that had been set up as incubators in two universities and are attracting the attention of other universities that want to do the same. It is recommended that the universities and industry collaborate in setting up such initiatives. This will bring financial benefits to both the universities and students. In addition, students will have the chance to gain practical working experience alongside their studies. These incubators could further be used to provide more opportunities for research and development.

It is undoubtedly certain that offshore outsourcing of software development and other IT services will grow in Africa. The future is bright and the African sleeping giant should arise now. African countries have the potential to compete with other outsourcing destinations. It is necessary for African youth to develop a culture of work that drives them to be competent professionals that can be trusted by their clients.

6. CONCLUSION

The goal of this thesis was to investigate the present state of offshore software development in Africa and to identify the factors contributing to the successes and challenges of the identified vendors. The initial intention had been to collect information for as many countries as possible and interviewing as many companies as possible. However, this was limited due to lack of available information on offshore software development in majority of the countries. Twelve companies from five countries (Egypt, Ethiopia, Kenya, Mauritius and South Africa) were willing to be interviewed.

The findings depict that Africa's software export industry is at its infancy. The future expectation is that it will continue to grow. The success of Africa's software export industry depends on joint efforts from members of the governments, academia and industry. The three groups should collaborate to build an environment that supports the software industry in a manner that fosters economic development. African countries should not tire in their efforts to venture in outsourced IT services and software development. This will create new IT jobs, enhance economic growth and help to improve Africa's image in the world.

The sample obtained during this study is too small to make any kind of generalization. The study has given a picture of a few African companies and analyzed their challenges and successes. In view of the successes and challenges, the interviewees expressed similar experiences that are highly likely to be faced widely in Africa. On the overall, the author is content with the thesis because it has helped her to better understand the successes and challenges that African software outsourcing vendors are facing.

Since offshore outsourcing in Africa is just beginning, an extension of this research is necessary so as to acquire more data to cover the wide context of the study and produce more generalizable findings. The suitable data collection method would be face-to-face, theme based interviews conducted over a longer period of time. This would be supported further by using manuscripts and post-mortem reports from the companies. Moreover, due

to the vital role of the government in supporting the development of the software industry, further research can be carried out to analyze the different national strategies and how successful they would be in building the necessary infrastructure for software export.

The two peculiar cases of having incubators set up at universities raise interesting ideas for more research. If the incubators rely mostly on students as employees, how efficient will the students manage to balance studies and work given that they would work during the night and study at daytime? How do the universities handle the risk of turning into money-making schemes other than focusing more on providing good education? What measures can be used to evaluate the success (and/or failure) of such initiatives? These questions would require attention in the future.

Outsourcing involves a vendor and a client. The thesis focused mainly on interviewing the vendors. Another intriguing topic for further research would be to interview those clients that have opted for African vendors. The views from this “other side of the story” would present a full mix of ideas regarding outsourcing in Africa. Outsourcing also means that the industrialized countries are losing jobs that go offshore. How they are addressing this outcome would also be another topic for further study.

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Appendix 1

The Questionnaire

Dear respondent,

I am a master's in IT student from Lappeenranta University of Technology in Lappeenranta, Finland. I am writing my master's thesis titled "Outsourcing and Offshore Software Development in Africa."

This questionnaire is intended to gather data for writing my thesis. I would like to assure you that the information you provide will be treated as confidential, and will only be used for the purpose of writing an informative thesis.

The questionnaire is open ended in nature, to allow you to answer the questions as you find fit. You may answer the questions on a separate Microsoft word document, or you can put your answers after each question.

Thank you for you participation
Leah Riungu

Personal Information:

1. What is your name?
2. What is the name of your company, business unit and location?
3. What is your job title and what roles do you play in the company/organisation?
4. What is the size of your company? E.g. in terms of number of personnel, or revenue?

Scope of service provision:

1. What is the product/service specialization of your company/organisation?
2. To which countries are you providing offshore software development services?
Please, mention the application domain of the company and the country.
 - a) Do you offer services to the local market as well?
 - b) What percentage of your work is for
 - i. Export market
 - ii. Local market
3. For how long have you been providing this service?
4. Which part of the software development life cycle do you provide? E.g. analysis, programming, testing, maintenance or on whole, the entire process.

Successes and Challenges:

1. In your opinion, why do you think the foreign company decided to offshore their work with you?
2. What is the present status of your work in terms of:
 - a. Availability of skilled personnel.

- b. Communication/interaction with your customers. E.g. language problems
 - c. Infrastructure
 - i. Physical facilities
 - ii. Internet connectivity / Communication infrastructure
 - iii. Hardware infrastructure
 - d. Any other factor not mentioned above.
3. Which of the factors mentioned above have been the major contributor(s) to the success of your work so far?
 4. Can you in anyway share the experience of the customer's difficulties while outsourcing/offshoring their work with you (that they may have shared with you)?
 5. What challenges are you facing as you do offshore software development in terms of:
 - a. Availability of skilled personnel
 - b. Assuring your customers of the quality of your work.
 - c. Effective communication with your customers. E.g. language problems.
 - d. Infrastructure.
 - e. Laws and policies.
 - f. Any other factor not mentioned above.
 6. What do you think is/are the solution(s) to these challenges?
 7. If not mentioned in question 6 above, what do you think are the changes needed and expected so as to improve the situation?

Future expectations

1. Do you expect offshore software development in your country to grow? Can you please give reasons?
2. In your opinion, what do you think needs to change in order to increase the viability of your country and Africa as a whole as a software development offshoring destination?

Other relevant issues

1. Do you know other companies that are acting as software development subcontractors in your country or elsewhere in Africa? If yes, can you please give their names?
2. What can you say about offshore software development in other neighboring countries? Please mention the country.
3. Is it fine to mention the name of your company in my thesis (In the list of participants)?
4. Do you have anything else that you would like to say?

Appendix 2

The List of Participating Companies

1. Link Egypt, Egypt
2. Amest Santim Systems PLC, Ethiopia
3. Ascribe Limited, Kenya
4. G7 Systems Limited, Kenya
5. Way Forward Technologies, Kenya
6. Strathmore Research and Consultancy Center, Kenya
7. Eucis Global Services, Mauritius
8. Online Outsourcing, Mauritius
9. Spoon Consulting, Mauritius
10. TNT Document Services, Mauritius
11. Urgence Informatique Europe SARL, Mauritius
12. EPI-USE, South Africa