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Desafios e determinantes do sucesso na implementação de projectos de modernização da administração pública baseados em tecnologias da informação e da comunicação na África Subsariana.

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Mestrado em Estudos de Desenvolvimento

Orientador:

Doutor Ulrich Schiefer, Professor Auxiliar com Agregação Aposentado e Investigador

ISCTE - Instituto Universitário de Lisboa

Julho, 2023



CIÊNCIAS SOCIAIS
E HUMANAS

Departamento de Economia Política

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Acknowledgements

I would like to express my deepest gratitude to Professor Ulrich Schiefer for his endless patience and guidance, as well as for all the knowledge and advice shared. Many thanks to my teachers at the ISCTE - Mestrado em Estudos de Desenvolvimento for their expertise and drive, and to my classmates for being such an inspiration. Special thanks to my wife for her support and belief I could complete this work.

Resumo

As agências doadoras internacionais têm procurado modernizar as instituições governamentais na África Subsariana através de soluções de software de gestão, mas muitos projectos falharam. Esta investigação identifica as principais razões para esta falta de sucesso e fornece orientações para um planeamento e implementação eficazes de projetos de modernização da administração pública utilizando as TIC. O estudo destaca os factores humanos como principais determinantes, incluindo lacunas de competências, disponibilidade limitada e capacitação dos utilizadores, gestores de projectos e especialistas em TIC. A ausência de processos integrados nas instituições públicas também contribui para os fracassos conhecidos. Os novos sistemas são frequentemente abandonados em favor de processos manuais devido a uma integração deficiente e falta de manutenção. A falta de envolvimento e apoio dos patrocinadores, juntamente com a resistência à mudança por parte da gestão de nível superior, é outra característica comum. Além disso, a escassez de fornecedores locais de TIC aumenta os prazos e os custos de aquisição, afectando os planos e orçamentos dos projectos. A manutenção torna-se um desafio devido à ausência de componentes sobresselentes e de actualizações de software. Para que os projectos sejam bem sucedidos, é necessário abordar os factores humanos, melhorar a integração dos processos, envolver os patrocinadores, apoiar a manutenção e aumentar o número de fornecedores locais de TIC.

Abstract

International donor agencies have aimed to modernize government institutions in sub-Saharan Africa through management software solutions, but many projects have failed. This research identifies key reasons for this lack of success and provides guidance for effective planning and implementation of public administration modernization using ICTs. The study highlights human factors as primary determinants, including skill gaps, limited availability, and empowerment of users, project managers, and ICT specialists. The absence of integrated processes within public institutions also contributes to failures. New systems are often abandoned in favour of manual processes due to poor integration and lack of maintenance. Lack of sponsor engagement and support, along with resistance to change from upper-level management, is another common trait. Additionally, the scarcity of local ICT suppliers increases procurement lead times and costs, impacting project plans and budgets. Maintenance becomes challenging due to the absence of spare components and software updates. Successful projects require addressing human factors, improving process integration, engaging sponsors, supporting maintenance, and increasing local ICT suppliers.

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CHAPTER 1

Introduction

1. Introduction

Since the 1980s several African countries have launched initiatives to modernize their public administration organizations, in particular at central government level.

These initiatives have mostly focused on IT projects to integrate and automate their back-office administrative functions, following the trend of similar programs in developing countries. Due to the lack of established work processes, these projects have consisted mainly of vanilla implementations of the software core functions, without any previous study of the adaptability of those functions to the African public organizations' realities or needs.

The primary reason behind these modernization projects via IT systems employment, have been the demands of donor organizations that contribute significantly to the African governments' budgets, and seek a credible way to control and report on the way the donated funds are employed, since the "flow of money and resources through the dissipative structures of the agencies to produce change in societies requires an organised upstream flow of information" (Schiefer, 2008).

Nevertheless, a significant majority of such projects on African public administration organizations have failed to deliver on their objectives. Either because of insufficient resources assigned to the projects, lack of involvement or even resistance from the organizations' management, or the complexity of the solutions selected to perform those tasks in the African contexts, only very few of the systems have reached the go-live stage, and even less have continued to operate for a considerable period after that.

There is a multiplicity of actors, internal and external who influence the attempts for modernization of the African public organizations, some of them with approaches to these projects that derive from their own cultures and past experiences. However, African cultures, societies and the perceived functions and governments' responsibilities are very different from Western or Asian contexts.

African public administrations have inherited colonial models of state organization imposed by the illegitimate conquest by the European countries. These were dissimilar to the local models that have supported African societies for centuries, based on their own affinities and well-established hierarchies.

International donors that government institutions, and the way they assign resources follow a different approach, based on an “universal” principle where all citizens should be entitled the same rights and duties within a nation. Public administration modernization initiatives are no exception. They are developed using the same model and approach as similar projects developed in Western nations, where a “high trust” setting has allowed a larger proportion of such projects to be successful, either in total or partially.

African countries are in general “low trust” societies, with a significant impact on the organizational culture, that in Africa is based on ethnic or other belonging loyalties, where public administrations are appropriated by the ruling party and associated groups of interest.

In this study, some of the factors that are usually nominated as causes for the failure of IT modernization projects in sub-Saharan African public organizations will be reviewed in the existing literature and complemented by case studies. The question to answer is:

- **What are the main factors that lead to the lack of success of ICT modernization programs in the context of sub-Saharan public administration?**

1.1. Definitions

In this section, we include the main definitions used in this study. Information, Data, Information Technologies, Communications, and Enterprise Resource Planning systems are part of the same digital world, nonetheless they represent not only different concepts but concurrent facets of the same reality.

Russel Ackoff said that “an ounce of information is worth a pound of data” and that “an ounce of knowledge is worth a pound of information.” Data are symbols representing the properties of events and objects. Information consists of processed data and the processing is aimed at increasing its value.

Like data, information also represents the properties of objects and events, but it does so more compactly and usefully than data. The difference between data and information is functional, not structural. Information is contained in descriptions, answers to questions that begin with

such words as who, what, when, where, and how many. Knowledge is conveyed by instructions, answers to how-to questions (Ackoff, 1999).

The existing literature proposes various definitions for Information Technology (IT), and these definitions have evolved in time, along with the evolution of the technology itself.

Choo Wou Onn and Shahryar Sorooshian conducted a literature review of IT definitions, and based on their review, the term information technology covers a wide range of information processing and computer application in organizations. It covers systems of information, the Internet, information and communication related technologies, and their infrastructure including computer software, networks, and hardware, which processes or transmit information to enhance the effectiveness of individuals and organizations. However, the term information technology also includes any computer application, required packages of hardware, Electronic Data Interchange (EDI), and Enterprise Resource planning (ERP), which positively affects the productivity of organizational cooperation (Onn & Sorooshian, 2013).

The concept of Information and Communication Technologies (ICTs) can then be extended to a shorthand for computers, software, networks, satellite links, mobile data access and related systems that allow people to access, analyse, create, exchange, and use data, information, and knowledge (Barakabitze et al., 2019).

Enterprise Resource Planning (ERP) systems are “adaptable and evolutive software systems that supports real-time and integrated management of a majority of process in an organization”. ERP systems are “integrated, modular, customizable and uniform systems”, with the same database, technology, application layer and user interface. ERP implementation projects are often mistakenly considered IT projects, when actually they are major organizational transformation programs, that will greatly change the processes, structure and even the culture of an organization. (Primeau, 2019).

Another contribution to the definition of ERP systems is presented in the International Journal of Enterprise Information Systems: “Enterprise resource planning (ERP) is a recent information technology (IT) innovation that improves organizational efficiency by integrating many information systems performing different functions and existing on different management levels” (Bamufleh et al., 2021). In this work, only the software components of the ERP solutions will be studied.

1.2. Methodology

Glaser e Strauss delineated that at the beginning of a study adopting a grounded theory methodologic approach, the researcher must perform some important choices regarding the conceptualization or definition of the limits of the object of the analysis. Thus, the researcher defines the empiric or philosophical orientation to follow during the investigation, using the available documentation (Charmaz & Bryant, 2007) .

The authors assert that grounded theory is based on induction, understood as building from the specific to the generic. Grounded theory is founded in data, and theory construction attempts emerge from data analysis. The researcher remains sensitive to data, capturing events and detecting occurrences without previous filtering or shaping based on earlier hypothesis or bias (Charmaz & Bryant, 2007) .

Theory must be changeable, based on the additional ideas that could rise after more data is obtained and analysed. The researcher should not initiate his/her project with a pre-conceived theory in mind unless the objective is to elaborate about or extend existing theory. The researcher starts working in a study area allowing theory to emerge from data. His/her creativity is materialized in the ability to identify and name categories, pose stimulating questions, establish comparisons, and extract an innovating, integrated and realistic framework from groups of unstructured raw data (Charmaz & Bryant, 2007).

Grounded theory offers a structure for investigators at the beginning of their research projects, excluding the need for initial hypothesis or assumptions, and involves a comparative approach. The research thrives to represent the phenomenon that is the object of study as reliably as possible, illustrating the “realities” of the different subjects involved in the object of study, in all its diversity and complexity.

This methodology allows the linking of the realities and their interpretations. It produces tentative and limited generalizations, not universal statements. It places the investigator in a role of phenomena analysis and interpretation, not as the highest authority in the particular subject. The researcher uses a constant comparison process to generate concepts, not to uncover differences or similarities (Charmaz & Bryant, 2007).

The integration of the research resulting product should be executed in a way where each component is in harmony with the remaining components. Although it needs to fit the social phenomenon in analysis, it must have a sufficient level of abstraction to allow it to be applicable

to a wider field of social, psychological, or structural situations. Finally, the researcher should place the theory developed in his/her research in the context of the work of other scientists, and demonstrate it reaches beyond the existing knowledge. If performed after data analysis is complete, the review of other investigators work can complete and enrich the research (Charmaz & Bryant, 2007) .

Instead of verification, the researcher is required to demonstrate that his/her work adds a new dimension or a new element that was ignored before. A fully developed theory according to this methodology and principles does not simply propose that A leads to B, but that the degree in which A leads to B and the details of that relation depend on a set of factors that influence A, B and the relation between them (Charmaz & Bryant, 2007).

A qualitative approach was employed to examine the current knowledge of the most important success factors for ICT projects in developed and developing countries. The conclusions were complemented by in depth interviews with a diverse, yet restricted group of IT projects participants in different roles, including end-users, IT specialists and project managers.

The results of this analysis were later compared with three case studies of IT projects performed in sub-Saharan African countries.

In consonance to Thomas Schwandt and Emily Gates, a case of study can be among others, an instance, an incident, a person, an organization, or an event. Also, cases can already exist as empirical objects or be developed during the research as theoretical constructs (A. Schwandt & F. Gates, 2018).

Still according to Schwandt and Gates, case studies will potentially serve four main purposes: description, hypothesis or theory generation, hypothesis and theory testing, and development of standardizing theory. The description purpose is to create a complete and detailed representation of an experience, using approaches such as document review, participant observation and detailed interviews. Describing several cases allows the focus to be set on what they have in common (A. Schwandt & F. Gates, 2018).

Even a small number of cases, if they are cases of something, can be representative of an unusual group, an unexpected even or a typical institution. In this assertion, the researcher establishes a group of features that determine what is typical, and selects cases to match those attributes. (A. Schwandt & F. Gates, 2018). Another form of generalizing from a single or few cases is analytical generalization, where the researcher employs some theoretical propositions

to define what is the case of, and then elaborates on suppositions or principles that could be applicable in other situations (A. Schwandt & F. Gates, 2018).

Therefore, the three cases in the present study have certain features in common, that could contribute to their typification. Firstly, they were all IT projects that took place in public institutions. Secondly, these were organizations from governments of African sub-Saharan countries. Thirdly, all cases involved both external team members experts in the technology and relevant functional processes, and users that were supposed to possess knowledge of their organization processes, requirements, and constraints. Thirdly, none of the three institutions had a legacy integrated back-office information system in place; in fact, two of them had no information system at all. And finally, there were no IT department or IT professionals in the payroll of any of the three institutions.

These factors set the scenario for a similar public organization background and an analogous lack of internal know-how and experience in the formulation, implementation, and management of IT projects. The same is applicable to the use of information systems, and the capture, processing, managing, and analysis of digital data.

Although the economic and social circumstances of the two sub-Saharan countries were significantly different, we can argue that the level of maturity of their public institutions was similar at the time these IT projects took place. Likewise, there was a considerable shortage of experienced IT resources, that required the participation of foreign consultants in all the cases under analysis.

The selection of cases can also be associated to theoretical ideas or hypothesis generation (A. Schwandt & F. Gates, 2018). Although the scope of the present dissertation is too limited to be an attempt to generate theory, it may be help raising hypothesis as to what works and what does not work in a certain type of ICT projects in sub-Saharan government agencies.

Hypothesis and theory testing can take place by a combination of case analysis and comparative case study (A. Schwandt & F. Gates, 2018). According to the same authors, qualitative case study is in a privileged position to discover casual relations.

This can be achieved using two different approaches; the first is analytic induction, through the search for common features and relevant aspects of variation among the cases, as well as possible explanations for those features and variations. The second is process tracing, to identify the casual connections between potential causes and effects or results. The main steps of process

tracing are: (1) create a hypothesis of how the cause leads to the effect; (2) gather evidence that the causal processes really existed; (3) identify alternative reasons for those effects; and (4) gather evidence that those alternative reasons did not occur, or are not the cause for the effects (A. Schwandt & F. Gates, 2018).

In “Methods of Field Research 2: Interviews as Conversations”, Robert Burgess illustrates the importance of non-structured interviews as a research method. Burgess describes non-structured interviews as in depth conversations, without a set of pre-defined questions to which the interviewed answers lacking significant interaction between the interviewer and the interviewed (Burgess, 1997).

Burgess upholds that the absolute control of the interviewer and interviewed relationship is impossible, but that it is vital to create a trust environment between both participants. Personal characteristics of the investigator such as age, personal experience, ethnicity, or status are always present on research activities. They project an image of the researcher and may impose limits to the roles the interviewer is able to perform.

Non-structured interviews can be used as a complement of participant observation. They may help the investigator accessing situations that were not visible or were unknown (Burgess, 1997).

The main points to consider when preparing and performing these conversations are, according to Burgess: (1) To establish some sort of connection between the interviewer and the interviewed. Thus, the interviews should always be performed by the investigator. (2) It is important to explain the topics to address during the interview, but also make clear that it is not mandatory to cover all the points. All questions or doubts raised by the interviewed should be covered and clarified. (3) The order in which the topics are addressed is irrelevant, as it is irrelevant if the conversation is guided by the interviewer or not. (4) Initial questions may be placed to commence the interview, or any specific topics.

Questions can be of three sorts: descriptive questions, which allow the interviewed to describe their activities; structural questions that try to establish how the interviewed organize their knowledge; contrast questions to promote a discussion of the meaning of situations, and to compare circumstances and events in the interviewed’ s world (Burgess, 1997).

CHAPTER 2

Literature Review

2.1. ICT for Development

Information and Communication Technologies (ICTs) are fundamental to the growth and development of modern economies. They are likewise essential to expedite, rationalize and audit internal government operations, and promote greater integration between government agencies. ICTs can also be leveraged to expand the offer and quality of the services governments provide their citizens. Modern technologies in the 21st century may even facilitate the participation of disadvantaged groups in the political process.

The present chapter illustrates contemporary discussions about the relevance of ICTs for Development, as well as the challenges ICT implementation initiatives face, in the private sector and in government organizations.

The provision of ICTs is significantly demanding from a resource perspective, either technical, human, or financial. Though, it also poses important challenges to organizations and individuals in the subject of procurement, deployment, management and support of infrastructures and solutions.

Despite the significant means and attention dedicated to ICT projects, they frequently fall beyond expectations to provide their anticipated benefits. Several studies have reviewed in detail the realities of these projects, if they achieved their planned objectives, what went well and what went wrong during their life and often after they were concluded, in what is commonly designated as the post-production phase.

However, most of those studies encompass projects implemented in the most advanced economies. Analysis of ICT deployment in developing countries is sparse, and indicators are incomplete and sporadic, in particular for the African continent.

The significant effort and cost of opportunity of ICT investments in developing countries deserve additional investigation, to confirm and/or expand current knowledge in this area. Are the most frequently identified success factors for ICT implementation projects relevant for African societies, economies, and organisations? This insight could be used by those making

policy choices, investment decisions, or managing projects, to increase the probability of success of such initiatives.

In the Data for Better Lives report published in 2021, the World Bank (*World Development Report 2021*, 2021) asserts there are three main paths by which information contributes to development. For governments and international organizations, data supports the evaluation of public policies effects. For individuals and the civil society data can make governments accountable for their options and policies. Lastly, information is an enabler for market and finance sources access for individuals and small and medium size businesses.

In *Development Informatics in a Changing World*, Walsham discusses four main challenges for ICTs in the context of Development (Walsham, 2013). The first is related to the concept of development, such as what type of development is being advocated, which groups benefit from it, if that development is sustainable, and how to evaluate the development impact on economies and populations. The second challenge is that interdisciplinary work is required to connect the technology and development fields, including disciplines as diverse as anthropology, sociology, development studies, computer science, and geography. Walsham proposes a third challenge as working at the strategic policy level. The fourth and final challenge is the importance of new ICT models at both strategic policy and project implementation levels, that can change the processes and constructs of development.

There is a significant amount of research on whether the introduction of ICT contributes or not to development. However, the concepts of development are far from unique and there is little knowledge on the measure that ICT actually promotes it. Reports and analysis of failed ICT projects in developing countries are numerous, and yet international donors and Western agencies still continue to promote these projects.

The Wallace Chipidza and Dorothy Leidner study is an attempt to bring light to these questions. They conducted a literature review of ICT for Development (ICT4D) studies, and identified four distinct connotations of development: (1) increased freedom, (2) expanded inclusion, (3) increased economic productivity, and (4) improved well-being (Chipidza & Leidner, 2019).

In the same literature review, it is stated that the two main reasons for the lack of success of ICT4D projects are lack of infrastructure and lack of skills in intended beneficiary communities; that being the case, investments should be channelled to these main two areas of intervention: nevertheless, efforts continue to be directed mainly to e-learning, agricultural and healthcare IT

solutions and building telecentres, and very few to education and infrastructural projects (Chipidza & Leidner, 2019).

The literature analysis indicates that ICT4D projects may have been successful according to one of the four development perspectives above, but falter according to some of the others. To overcome these shortfalls, Chipidza and Leidner propose a new approach to ICT4D in which development is interpreted as “an increase in power parity between dominant stakeholders and intended beneficiaries”.

Also, high inequality between those who benefit from ICT projects and those who do not is a powerful cause for the project’s mishap. The authors focus on understanding the relations between stakeholders, ICT and institutions that affect development effects. They employ a post-colonial theory of articulation from subordinates and resource dependency to characterize the meaning of development as a social strive. Post-colonial theory is articulated as “the ways in which colonialism continues to affect former colonies after political independence” (Chipidza & Leidner, 2019) .

The same study reviewed the available literature by main activity in what the authors classify as the ICT4D value chain, namely: Chartering and Implementation, Use, Diffusion, Project Outcomes and Development Outcomes. Their main observations of the literature by project value chain activity are:

- 1) ICT for Development projects face a high-risk of failure.
- 2) Mobile devices may offer higher impact possibilities than personal computers.
- 3) ICT for Development studies have low theorization about development and ICT projects results.

Also, according to Chipidza and Leidner the notion of development in the researched literature is organized in four main categories, all described using limited perspectives, when in fact the reality can be seen through different lenses if we apply a post-colonial view.

From a freedom point of view, the common perspective describes ICT4D beneficiaries as having no self-action, and limited in what they can achieve. The authors defend that, in reality, recipients can articulate their abilities, and are not just at the grace of inflexible structures and environments.

Regarding inclusion, there are limited perceptions that the simple access to ICTs promotes development, and that technology by itself triggers development. In fact, the authors claim access is a necessary but not sufficient condition for development.

According to the authors, the available literature commonly considers all well-being factors, either health, education, or other social effects, as equivalent in terms of development. Chipidza and Leidner defend that this perspective ignores that powerful factions may have created a stereotyped view of development recipient actual needs and/or priorities.

Finally, economic productivity gains are considered as an equivalent to development. Here, the authors alert to the almost intuitive notion that productivity gains can be appropriated by the most influential groups.

Chipidza and Leidner propose that postcolonial theory, stressing the effects of power inequality on development results, supports their perspective of development as increase in power parity. They define power parity as equality in the control of resources and information. Since subordinates possess little power, development happens when they acquire or maintain power via ICT4D, hence increasing power parity. Power parity is influenced by resource independence and voicing. In this context, voicing means to listen to subaltern opinion regarding success or failure of ICT4D initiatives. Resource independence in ICT4D is when a subordinate can get access to the materials required for ICT4D projects without being dependent on others, either those resources be software, hardware, programming skills, project management skills or money.

Another factor considered by the authors is logic congruence. Different stakeholders of an ICT project may have different logical approaches; those different rationalities between stakeholder groups can create incongruences or even clashes and compromise the sustainability of the projects.

Based on the above, Chipidza and Leidner establish a set of theoretical propositions on the factors that influence development effect in ICT projects. Those are:

- An increase in logic congruence increases resource independence.
- An increase in logic congruence increases subaltern voice.
- The effect of logic congruence on resource independence and on voicing is stronger when the main stakeholder of the ICT project is a non-profit agency, rather than a company.

- The effect of logic congruence on resource independence and on voicing is stronger when the main stakeholder of the ICT project is a global agency, than when it is local.
- The stronger the infrastructure, the higher the ICT resource independence of subordinate groups.
- The greater the availability of ICT skills, the higher the resource independence of subordinate groups.
- The greater the resource independence of subalterns, the stronger their voicing.
- The stronger the voicing of subordinates, the higher the after the project (ex-post) power parity between them and the mainstream.

In conclusion, the authors defend that by investing more in infrastructure and ICT skills education of the target recipient groups, ICT4D can reduce the subaltern dependence and provide them an effective voice, hence increasing the probability of success of ICT4D projects (Chipidza & Leidner, 2019).

2.2. Economic Impacts

A study published by the MDPI Foundation (Bahrini & Qaffas, 2019) evaluates the impact of ICT on the economic growth (GDP per capita) of selected 45 developing countries in the Middle East and Africa over the period 2007–2016.

The dataset used in this study was extracted from the World Development Indicators (World Bank). Results show that except fixed telephone, ICTs such as mobile phone, Internet usage, and broadband adoption are the main drivers of economic growth in African countries.

Governments are advised to enact policies that provide a more convenient regulatory and institutional environment to attract investors, enhance fair competition in the ICT sector, and promote Internet-enabled services and Internet presence, including e-government and e-commerce (Bahrini & Qaffas, 2019) .

A study published in *Technology Analysis & Strategic Management* (Chege & Wang, 2020) reviews the literature on the importance of technology innovation in job creation through Small and Medium companies (SMEs) in developing countries.

Results show that technology innovations influence employment creation in small businesses positively and act as a driving force for economic development. SMEs account for more than 50% of the GDP and, on average, 60% of employment in most developing countries. The

effective use of information technology in small businesses has a major impact on their competitiveness and access to international markets (Chege & Wang, 2020) .

Barriers to ICT use by SMEs in developing countries include high cost of access to telecommunications, lack of government ICT policy, use of obsolete technologies, lack of skilled human resources, poor communication infrastructure, high-cost ICT equipment, and resistance to change (Chege & Wang, 2020) .

Given the challenge that food security still constitutes in Africa, a wide variety of ICT platforms are currently being used to provide, exchange, and disseminate different types of information and technologies to farmers and other agricultural research and development stakeholders in the continent (*The Use of Information Communication and Technology in Advancement of African Agriculture*, n.d.).

The authors believe there is a need for better integration of information between the ICT service providers, agricultural research, development sector and the private sector, especially private seed companies and agriculture dealers. The study (*The Use of Information Communication and Technology in Advancement of African Agriculture*, n.d.) assesses those rural incomes have increased with the use of ICTs in accessing knowledge and information. However, there are still challenges in accessing of ICTs and related platforms by a large part of the rural population who are engaged in agriculture.

Another positive trend has been the research in ICT for development, following national ICT research priorities, that has focused in the agriculture sector in five different African countries (Schiefer et al., 2019) .

A recent study introduces a new perspective, examining the combined effects of ICT engagement and foreign direct investment (FDI) on inclusive economic growth in sub-Saharan Africa (Ofori & Asongu, 2021). The analysis uses quantitative techniques to conclude there is a positive combined effect of ICT and FDI in economic growth in sub-Saharan Africa, and also that FDI has a greater impact in shared growth when combined with ICT diffusion, and finally that ICT skills are more relevant in promoting growth in the region than ICT access and ICT usage.

For the authors, the gaps in infrastructure development and the large percentage of young population in the region are a good setting to employ ICT and FDI to trigger prosperity.

The study also sustains the role of ICT to promote inclusion during the COVID-19 pandemic, facilitating orders of essential consumables, settlement of bills, e-learning, online banking, access to government services and access to information in general.

Finally the authors defend that ICT has the potential to increase the levels of FDI, since it has the potential to reduce management risk, production and transaction costs and leveraging global market access and know-how and innovation transfer (Ofori & Asongu, 2021).

2.3. Public Sector Impact

Hans Scholl and Margit Scholl proposed a roadmap for the study and exercise of Smart Governance (Scholl & Scholl, 2014), sustaining that actionable and pervasive information as well as information technologies are essential for advancing frameworks of democratic governance, that promote smart and open governmental institutions and the participation and collaboration between different areas of government. Scholl and Scholl identified information sharing as fundamental for inter and intra-governmental collaboration in conjunction with government interactions citizens and the private sector. In parallel, they also advanced that Information and Communication Technologies are the enablers of the information revolution. ICTs and other technologies are critical as they technically facilitate good governance and by effect, government itself.

The Digital Health: ICT and Health in Africa study examines the correlation between ICT and health in Africa for the period 1995-2015 (Adeola & Evans, 2019). The results show that ICT has a positive and statistically significant relationship with health, showing that the higher the levels of ICT, the higher the level of health. Countries with higher internet usage and mobile penetration also have higher life expectancy (e.g., Algeria, Morocco, and Tunisia).

The combined use of ICT for research, data acquisition, surveillance, access to patient data and clinical care even at a distance, can be used to enhance the capacity of health workers, especially in resource-limited settings like Africa (Adeola & Evans, 2019).

2.4. ICT Projects Success Factors

This chapter covers available studies regarding the most important factors for the success or failure of ICT projects, both in more and less developed countries. Unfortunately, no such study was found that would perform the same analysis specifically for African countries, and more precisely for the public administration sector.

A study published in 2017 evaluated project characteristics, projects outcome, success factors, challenges and lessons learned from 35 software projects in the public sector in Norway (Mohagheghi & Jørgensen, 2017) .

Extensive involvement and competence of the client, high priority of the project, good dialogue between the client and the external supplier and application of agile practices were the main success factors.

Main challenges were also related to the involvement and competence of the client, project planning and management, software architecture and integration issues, and transition of the product to the user organization.

Success factors are usually human factors, e.g., involvement, competence, and collaboration (Mohagheghi & Jørgensen, 2017) .

A paper published in 2020 aimed to identify and collect the most discussed IT project success factors in the available literature (Durmic, 2020). About 88 books and scientific works were reviewed in the process and 72 success factors were identified. They were later organised in 6 main groups. The frequency that each group of factors is mentioned in the reviewed literature is displayed in the graphic below:

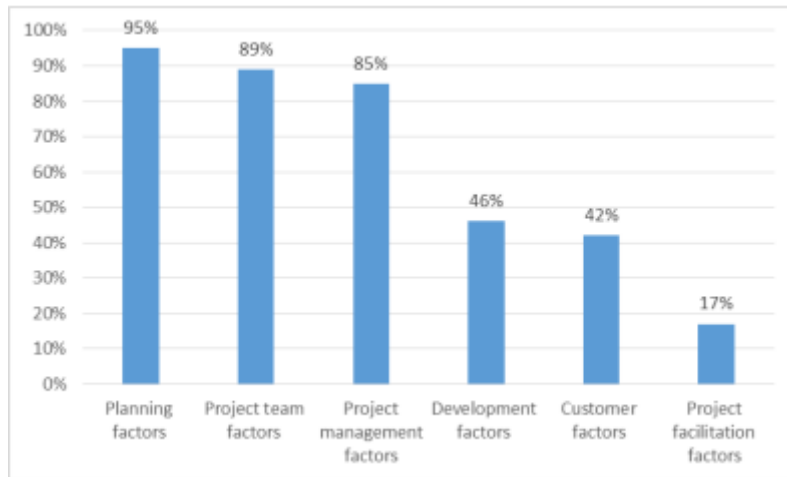


Figure 1. Frequency of success factors in literature (Durmic, 2020)

Again, the main IT project success factors are related to the project team skills and availability, as well as the importance given to project planning and management are the most important.

A comparative study of critical success factors in the implementation of ERP systems in developed versus developing countries (Moohebat et al., 2010) reached a few important conclusions.

The factors associated to Change Management considered are the most relevant in the study, both for developed and developing countries. On the other hand, the dependency in relation to the systems and software suppliers is stronger in developing countries. Lastly, national culture of developing countries has a notable effect on the success of ERP implementations in those countries (Moohebat et al., 2010) .

These, like most investigations, have tried to establish a ranked list of the key success factors for completing and delivering IT projects. Another study, published in 2021, tries to go beyond and determine possible relationships between the success factors, as well as finding how those relations between success factors can increase the probability of IT projects successful results (Hughes et al., 2020).

The main objectives of this study were: (1) to identify the key relationships between success factors, using empirical data; (2) create a model of the connections between success factors, including driving and dependent factors; and (3) introduce a framework of relationships where it is represented how some of the individual factors can affect and be affected by others in the framework, as well as how this can be related to in real situations.

The list of factors was selected from the available IT literature, and was the following:

1. Engaged and committed sponsorship.
2. User involvement throughout the project.
3. Use of skilled resources.
4. Skills, experience, and style of Project Manager.
5. Management of project scope.
6. Project audit process in place.
7. Use of project management methodology.
8. Clear business case for the project.
9. User resistance management process.
10. Organisation project maturity.
11. Formalised role definitions.
12. Tools and infrastructure.
13. Formal risk management.
14. Short stage duration.
15. Effective benefits management process.
16. Integrated change and project management.
17. Established post-mortem process.

A mathematically derived methodology, the Interpretive Structural Modelling or ISM process was employed as the research methodology. ISM enables the creation of models that represent interdependencies between a set of factors underlining potential influences they may have on each other.

The two factors identified in the model with the maximum driving power were *Use of skilled resources* (3) and *Project audit process in place* (6). This leads the authors to conclude that in cases where a project team has skilled and experienced members, and the project organisations has put in place project health check and audit capabilities, these factors will drive success (Hughes et al., 2020).

Engaged and committed sponsorship (1) also displays a high rate of driving power for project success and is strongly associated with factors *Skills, experience, and style of Project Manager* (4), *Use of project management methodology* (7), *Organisation project maturity* (10), *Formalised role definitions* (11) , *Tools and infrastructure* (12) and *Formal risk management* (13) (Hughes et al., 2020).

Also, the model displays that factor 1. Engaged and committed sponsorship is dependent on factor *Use of skilled resources* (3), which for the authors implies that for projects to profit from effective sponsorship, the organisation must have a skilled team assigned to the project, and audit processes are in place to ensure the benefits of that sponsorship.

Another very important outcome of this study is that factor *Short stage duration* (14), an approach used frequently to prevent projects from wandering, is shown to be highly dependent on *Engaged and committed sponsorship* (1), *Skills, experience and style of Project Manager* (4), *Use of project management methodology* (7), *Organisation project maturity* (10), *Formalised role definitions* (11), *Tools and infrastructure* (12) and *Formal risk management* (13).

2.5. ICT in Public Administration in Africa

In this chapter, the existing literature on the outcomes of ICT projects in public organizations in developing countries is reviewed, in particular in Africa. Sub-Saharan Africa is significantly behind other regions of the globe as far as ICTs are concerned. The chapter starts by a generic characterization of ICTs in Africa, for the rare dimensions where indicators are available. The second part of this chapter focuses on some of the available literature on ICT initiatives in the Public Administration in Africa.

2.5.1. African Context

The African continent is the world region with the lower internet usage per inhabitant, despite a significant increase between 2000 and 2020 (*World Internet Users Statistics and 2020 World Population Stats*, n.d.).

INTERNET USAGE STATISTICS

The Internet Big Picture

World Internet Users and 2021 Population Stats

WORLD INTERNET USAGE AND POPULATION STATISTICS 2021 Year-Q1 Estimates						
World Regions	Population (2021 Est.)	Population % of World	Internet Users 31 Mar 2021	Penetration Rate (% Pop.)	Growth 2000-2021	Internet World %
Asia	4,327,333,821	54.9 %	2,762,187,516	63.8 %	2,316.5 %	53.4 %
Europe	835,817,920	10.6 %	736,995,638	88.2 %	601.3 %	14.3 %
Africa	1,373,486,514	17.4 %	594,008,009	43.2 %	13,058 %	11.5 %
Latin America / Carib.	659,743,522	8.4 %	498,437,116	75.6 %	2,658.5 %	9.6 %
North America	370,322,393	4.7 %	347,916,627	93.9 %	221.9 %	6.7 %
Middle East	265,587,661	3.4 %	198,850,130	74.9 %	5,953.6 %	3.9 %
Oceania / Australia	43,473,756	0.6 %	30,385,571	69.9 %	298.7 %	0.6 %
WORLD TOTAL	7,875,765,587	100.0 %	5,168,780,607	65.6 %	1,331.9 %	100.0 %

NOTES: (1) Internet Usage and World Population Statistics estimates are for March 31, 2021. (2) CLICK on each world region name for detailed regional usage information. (3) Demographic (Population) numbers are based on data from the [United Nations Population Division](#). (4) Internet usage information comes from data published by [Nielsen Online](#), by the [International Telecommunications Union](#), by [GfK](#), by local ICT Regulators and other reliable sources. (5) For definitions, navigation help and disclaimers, please refer to the [Website Surfing Guide](#). (6) The information from this website may be cited, giving the due credit and placing a link back to www.internetworldstats.com. Copyright © 2021, Miniwatts Marketing Group. All rights reserved worldwide.

Figure 2. Internet Usage Statistics (*World Internet Users Statistics and 2020 World Population Stats*, n.d.)

The main constraint to Internet access in Africa appears to be the cost of data, according to the 2017 Research ICT in Africa survey (*Research ICT Africa*, n.d.).

The respondents placed the lack of time available and the deficient Internet speed as the second and third most important limitations. Specifically for households, the cost of services and equipment are the main difficulties accessing the web, and digital illiteracy also stands up as one of the most relevant issues.

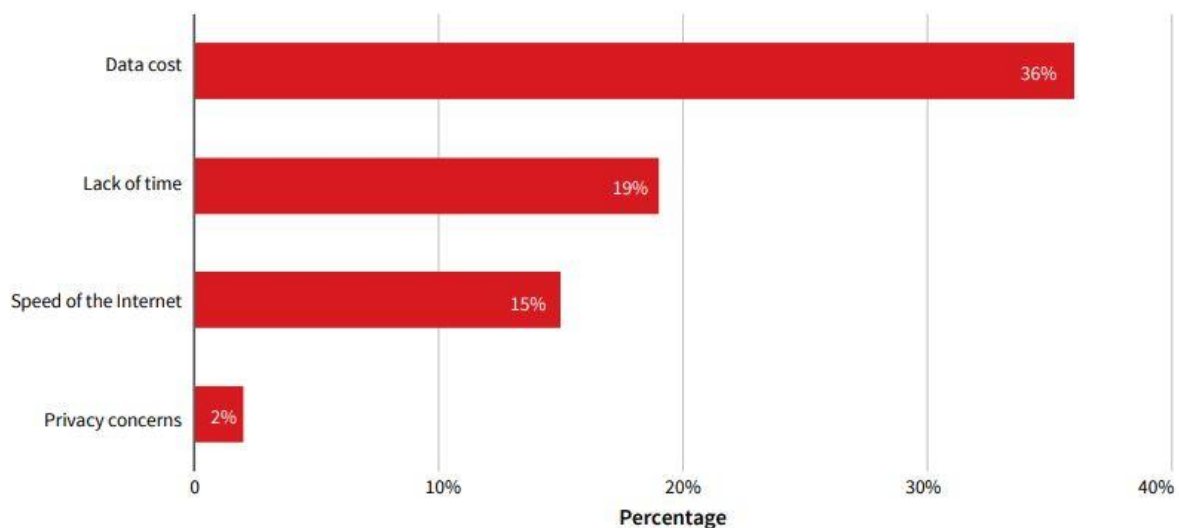


Figure 3. Main Internet access constraints in Africa (*Research ICT Africa*, n.d.)

Another important indicator is the ranking of countries according to social network usage published by the World Economic Forum in 2016 (Baller et al., 2016) , where Kenya emerges as the first African country in a modest 60th place.

The Afrobarometer Dispatch No. 410 (*Afrobarometer December 2020 / Afrobarometer*, n.d.) analyses the evolution of regular media consumption between 2015 and 2020 in 16 African countries; the main conclusion is that internet and social media still lag behind television and radio as the most used media to access the news.

In the above mentioned 2017 Research ICT in Africa survey (*Research ICT Africa*, n.d.), the net flow of IT professionals between higher and lower income countries is reviewed, as well as their earning in US Dollars.

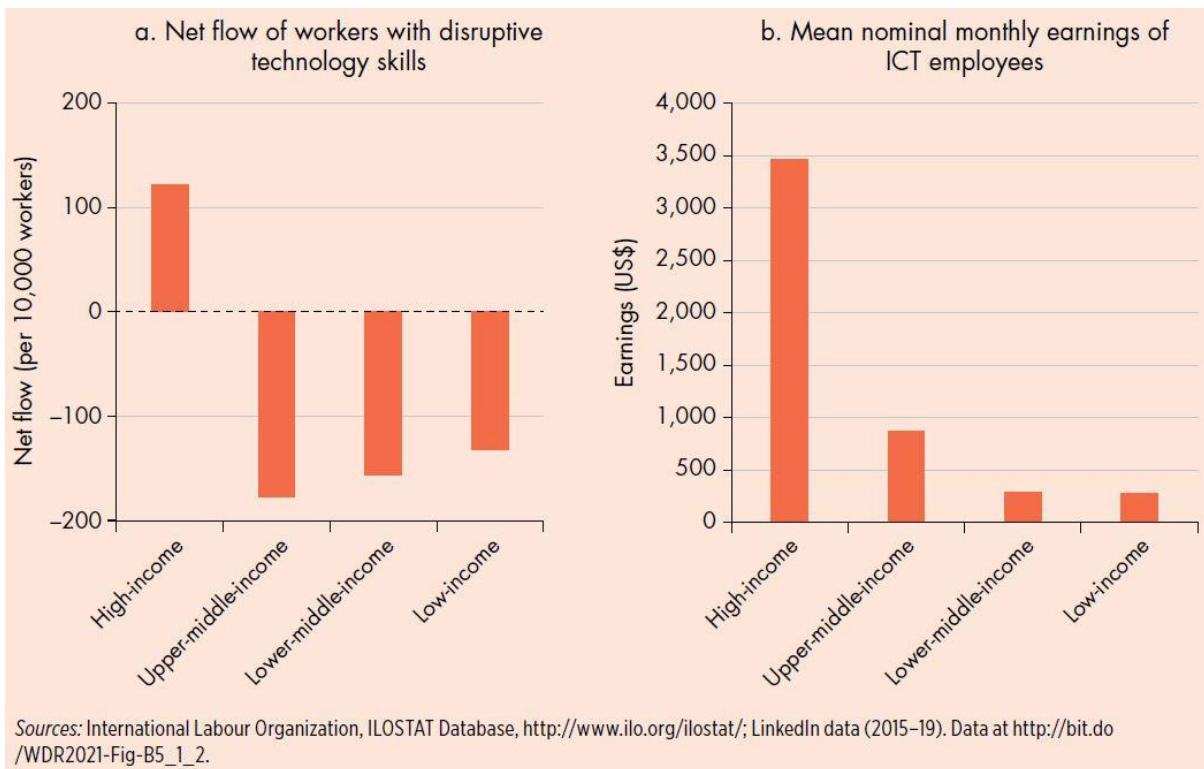


Figure 4. Flow of ICT Professionals (*Research ICT Africa*, n.d.)

The main conclusion from the figure above is the attrition of IT professionals with the most advanced or sought-after skills, from middle and low-income countries to the high-income ones. Also, there is a significant gap in pay for these professionals between the high-income countries and the others.

In an essay published back in 2010, Alison Gillwald pointed the insufficient ICT policy results in the African continent, in terms of the technology use for reducing poverty to the scarcity of research that recognises the necessary dimensions of reform and economic regulation (Gillwald, 2010) .

Gillwald stresses that large parts of the continent are in a data and analysis void in relation to ICT developments. The impacts on economic growth, development, and employment from the deployment of new technological developments such as broadband (both a necessary condition for a modern economy and largely absent in Africa) require examination, as do appropriate policy and effective regulation of it.

Finally, the evidence gathered in this essay suggests that it is more probable to experience poverty alleviation through the application of ICTs in commercial endeavours than through the state centric, intense approaches to universal services of the past (Gillwald, 2010) .

In a research paper published in 2018, Asamoah and Andoh-Baidoo (Asamoah & Andoh-Baidoo, 2018) examined 115 companies that implemented ERP systems from several industries in Ghana. The authors concluded that in a Sub-Saharan context, integrated systems are fundamental for the availability of data in the organizations.

They also sustain that the new systems contribute to better organizational integration and good practices adoption, since employees are more aware of expected ethical behaviour when using ERP type integrated systems. Finally, the authors defend that a successful ERP implementation enables a wide-range control of organizations in Sub-Saharan countries.

2.5.2. ICT in Public Administration in Africa

An ICT and Public Sector Management in Africa (Evans, 2018) study examines the effect of information and communication technologies on public sector management in Africa for the period 1995–2015.

Digital government is the use of electronic communication devices such as computers and the internet to provide public services. The study shows that ICT and economic and institutional factors play significant roles in public sector management. Data on corruption, government effectiveness, rule of law, regulatory quality, voice and accountability, political stability and absence of violence was used in this study.

The authors believe efforts should be made to use ICT for integration throughout government operations. Governments should take advantage of the increasing use of Web 2.0*, social media, and mobile and wireless ICT to influence the way public services are provided and how citizen engagement processes are delivered (Evans, 2018).

The case study of the implementation of a wide-ranging Enterprise Resource Planning in a University in Africa, showed that the period after system “go-live”, was characterized by the general underutilization of the ERP technology and doubts about its information quality (Brown & Mooketsi, 2018) .

According to the same study, these resulted from weak end user training, support, and guidance. Underuse was also resultant of relapse into old habits like use of parallel manual systems, triggered by weak support base and deficiencies in transitional change management.

However, stakeholders who participated in the development of the ERP system showed subsequently higher levels of familiarity, involvement, attitude, and system usage (Brown & Mooketsi, 2018) .

In a study published in 2018, Githiga investigated the results of an ERP system implementation in the Communications Authority of Kenya (Githiga, 2018) . According to the conclusions of the study, the new system led to improved business processes and productivity. However, to achieve the desired productivity from the system, Githiga defends technical improvements, and the reduction of operational costs are required. He also concludes that individual employee factors, information quality and organization considerations were statistically important for the accomplishment of the implementation. Finally, the study considers the alignment of organization processes and the involvement of all stakeholders early in the project, as critical for a successful project.

A study by the University of Addis Ababa (Kurabachew, 2017) to evaluate an Enterprise Resource Planning (ERP) system implementation against selected critical success factors at the United Nations Economic Commission for Africa, observed that effective project management, change management and training were the critical factors that influenced the unsuccessful implementation of the system. The same study also considers that given the considerable investments organizations allocate to an ERP implementation, it is critical that they understand the environment they operate in and prepare the institution and staff for the big changes those systems convey.

In a study of the evolution of ICT in Public Administration during a 25-year period span, Shuhua Liu and Qianli Yuan propose that the adoption of technology by government institutions has increased in most countries, but the level of positive solution adoption and operation of the varies from country to country (Liu & Yuan, 2015).

The initial efforts of public institutions were aiming to collect and process large amounts of data, regulate public and private activity, and perform crucial tasks. Liu and Yun have first addressed the types of ICT adopted by the public institutions in Western countries, how did ICT utilization interrelate and shape public administration, and what are the implications for the developing countries of those interactions and their impact in the creation of management structures.

The authors found ten main trends in the adoption of ICTs by public organizations, from the more modern-day e-democracy to earlier structural areas such as technology use in internal data collection and technology use in online data transaction. Those earlier technology tendencies were dominant in the 1990s in the developed world, impacting areas of public processes such as office automation, information sharing and file transfer across departments and geographies, and specialized public information services. The ICTs functions involved were mainly automation tools, static tools destined mostly to public servants and public managers (Liu & Yuan, 2015).

Thus, government administrators in Western countries initially employed ICT applications for internal information archiving, sharing, and storing, aiming to increase effectiveness and efficiency. But once it was deployed, ICT provided a platform for civil servants to change organizational standards, putting into practice rules and resources facilitated by ICT structures, norms, and new informational schemes.

What those managers did not expect was the impact of computing on better information for decision making and improved operational performance. It was then possible to generate exception reporting from financial and human resource management systems, capabilities that became critical in budget and organization control, as well as performance measurement and evaluation. Hence, public managers in developed countries became very dependent on information technology to manage routine operations (Liu & Yuan, 2015).

The authors suggest that foreign direct investment fomented a flood of technology transfer to the developing world, where ICTs were regarded as critical to economic development. During

this wave, government organizations adopted a range of ICTs imported from Western countries, for office automation and administrative efficiency. This the case mainly in the Asian Pacific area. However, rapid investments in ICT by those governments did not materialise without issues, that developed countries also experienced but had a lot more time to adapt to.

Liu and Yuan believe that most developing countries still do not grasp the potential of ICTs and are facing great difficulties in developing crucial technological capacity, assigning enough financial resources, and adjusting institutional contexts appropriately. Public administrations in those countries are still grappling with barriers such as traditional bureaucracies, lack of planning or lack of process redesign.

Several developing nations have public institutions with compartmentalized bureaucratic practices, which constitutes a challenge for data interchange and interaction between different IT systems used by different government organizations. In some cases, former manual processes were kept in place concurrently with the new ICT tools, causing frustration among civil servants, making them withhold or fake data to reduce workload. The authors conclude that ICT tools employed by developing nations governments do not, by themselves, reflect the nature of adoption or use. (Liu & Yuan, 2015).

Marie-Douce Primeau developed pioneering research on the implementation of ERP systems in public sector organizations in African countries. The author states that an increasing number of public administration organizations have been implementing ERP systems, a tendency also followed by developing countries, the later pressured mostly by international funding development agencies.

However, ERP systems implementation is still embryonic in developing countries, mainly in sub-Saharan Africa. In developing countries ERP systems are primarily deployed in large organizations. Public sector is the main employer in developing countries, hence the largest percentage of ERP systems is implemented in public organizations (Primeau, 2019).

Funding for those projects in developing countries is usually received from one or several external contributors, each with their specific interests in the project, as well as different procurement and project management approaches. According to the author, the success rate of ERP projects in developing nations public organizations is very low. Although ERP failure rate is high in both private and public organizations, in developing countries public organizations it

is believed to be even higher. Schedule overruns represent 67% and cost overruns 33% of all ERP projects in organizations backed by the United Nations.

The main reasons identified for these schedule slippages were changes in project or solution scope, delays in software personalization, user resistance to change, delays in data conversion, changes in project strategy and delays in redefinition of operating procedures. Regarding cost slippages, they were mostly due to unplanned personalization costs, inadequate definition of functional requirements and unrealistic cost forecasting. (Primeau, 2019).

Primeau could not find any data on ERP implementation successes or failures in African developing countries.

ERP projects in these countries public administrations are often imposed by donor agencies as a way to increase accountability and transparency in those organizations. When analysing the critical success factors of ERP systems in African public institutions, the author identified some that are common with the same type of institutions in developed countries, while others could only be found in the African public context. The most relevant among the later are national culture, donor-recipient relationships, ERP vendors relationships, country-related requirements, and local ERP and hosting infrastructures. Other important aspects are the fact that external consultants earn significantly more than the local project team, making collaboration efforts more difficult.

Another important particularity is the organisational commitment, or lack of it. In African public institutions the upper management are the one that benefit from the lack of accountability and transparency, and consequently oppose and boycott such modernization projects via ERP systems implementation (Primeau, 2019).

A research paper published by the Research ICT Africa organization in 2017 reviewed the adoption of ICTs for the modernising of public sector in South Africa (*Research ICT Africa*, n.d.). Main conclusions were that progress towards modernising ICT in the public sector has been slow and the government is behind the private sector in terms of ICT adoption. ICT policy environment remains fragmented and ICT adoption in the public sector has been hindered by prolonged policy processes and delayed decision-making. Also, there is a gap between what is specified in policy documents and implementation of these policies and guidelines in practice (Gillwald & Moyo, 2017).

According to the same paper, other barriers include issues around data classification, data protection, security and residency, availability and cost of essential broadband infrastructure, and lack of implementation of uniform open standards. Consequently, many government departments remain dissimilar and are not interoperable. Most computing deployments are ad hoc and unequal across different public organizations, as there is no centralised and aligned approach to ICT deployment across all areas of government (Gillwald & Moyo, 2017).

CHAPTER 3

ICT Projects experiences

This chapter includes two levels of analysis of real-life ICT projects. The first are interviews with IT professionals and key users with significant project experience, and the second are case studies of ICT projects that took place in the Public Administration in two sub-Saharan countries. The chapter closes with a reference to all success factors identified in the literature review, the interviews, and the case studies. There is also an objective to point out what appears to be distinct or common scenarios in the Public Administration in Africa compared to other realities.

3.1. Interviews

Individual interviews were conducted with a group of information systems professionals and organization users that took part in several IT projects. Those interviewed included project managers, team leaders, implementation consultants and key users.

The interviews took place between March and September 2022. The first interviewed was a financials functional consultant, with over 20 years' experience in projects using the Oracle ERP system in various European countries. The second subject was a project lead in the implementation, training, and diffusion of new software solutions for a large public organization in the United Kingdom.

The third interview was with another IT consultant, this one specialized in data mining and decision support projects for over 12 years, in several industries in Europe. The fourth

interview was with a consultant and project manager with 25 years' experience in Oracle ERP implementation projects and support, mainly in the UK.

The fifth interview was with a key user, that took part in several IT projects in a main University in the UK. The sixth interview was with a systems engineer, also with over 20 years' experience in network and communication infrastructure projects in Portugal and Spain.

The in-depth interviews evolved mainly around what went well and less well in the projects they participated in, and what in their opinion were the main reasons for the projects' problems.

The following list of topics to address during the interviews was previously elaborated:

- In what type of IT projects did you participate, in terms of objectives, duration, activity sector or dimension of the team?
- What was your most frequent role in the IT projects you took part in?
- Who were the other participants, and where did they come from?
- What went well in those projects?
- What went wrong in those projects?
- In your opinion, what were the reasons for failure?
- Where there any real benefits for the organizations as a result of those projects?

Several causes for positive outcomes were listed by the participants, the majority of which related to either human or institutional factors.

Almost all the interviews pointed out that IT projects tend to be successful when a strong relationship between the project team and the business users is established and adequate preparation and collaboration among the implementation team and the customer organization is set in place.

Likewise, if users are given the possibility of providing detail input of what the new system should be like and the right people are empowered, they make decisions to adapt best practice, uniform and standard processes and procedures.

From an organizational perspective the most recently arrived managers are more inclined to advocate for the new system, which by its turn supports different levels of responsibility.

The main beneficial impacts of the new ICT solutions mentioned during the interviews were the introduction of innovation solutions that create business or institutional advances.

Negative project results were also attributed by the participants to organizational and human related causes. According to them, a significant number of organizations are not prepared for the IT projects they are going to undertake, both in terms of their internal technological structures and of their human resources skills and know-how.

Another negative outcome is when the systems are delivered and go live, but the medium-long term results are not what was desired by the users, because they were in some way “forced” to accept the new system, typically for cost reduction purposes. It is well known that, in particular in finance and administrative departments, the introduction of modern and integrated information technologies leads more often than not to inevitable redundancies in their staff.

Barriers posed by older managers who refuse the level of scrutiny and having to learn and use a new system were brought up in more than one interview. Managers who have been in the organization for too long often expect the new technological solutions to do the same as the previous ones did. As a consequence, systems are not implemented in all planned areas, which creates inefficiencies and duplication of work since redundant systems continue to be used in parallel.

Lack of human resources was also frequently mentioned as an issue, as well as the incapacity of the accessible users to describe the organization requirements in detail, causing tensions around the go-live date due to lack of user availability. Similarly, when the project participants leave the organization, there is a significant loss of knowledge which is very difficult to replace during the life cycle of the project.

If the wrong team in terms of profile and availability is assigned to the project, we get bad quality organizational input and a deficient ability to interpret and deploy it.

Another important aspect are the organization expectations for the project, frequently unrealistic prospects regarding implementation timescales and solution scope.

Participants mentioned that expectations of all involved in the project should be set right in the very beginning, and that the team should spend more time understanding the people that are going to be an obstacle. Situations were identified where the project team spent too much time with the people struggling with the new system, instead of investing in those who would bear the bulk of the organization onboard the new system.

Wrong expectations result quite often of the inability to share the vision from the top to the basis of the organization, typical in the opaquer institutions where the objectives are not fully shared internally.

Also, during the interviews, the projects that are trying to change too many things at the same time were described as causing expectations to be raised too high from the beginning. This is believed to be the result of the lack of organizational knowledge of the system that is being implemented, which makes the organization believe the solution needs less time to become available.

It was mentioned in more than one interview, that several ICT projects are performed mainly to improve the organization's image, without real medium-long term benefits.

Most significantly, in more than one interview it was mentioned that the projects were more in trouble the more there were bespoke processes, as they created *bugs* due to insufficient testing, that sometimes those processes are outdated, and their uniformization can be an issue for different people within the organizations.

Finally, deficiencies in the procurement process were also mentioned, during which salespeople typically do not transmit a real idea of the project effort during the sales cycle.

3.2. Case Studies

Cases were selected were IT projects in Angola and Mozambique, which took place a few years before the present analysis. These projects were developed in government institutions and involved both external IT consultants, and internal individuals, including team leaders and end users.

In previous chapters, the most important IT project key success and unsuccess factors were illustrated based on the available literature. This section will add to that list of causes with the experience of IT projects in sub-Saharan countries and that of other professionals interviewed in this work. These projects included the Financial Management Systems implementation in a Health Ministry and in an Energy Management Agency, and a Human Resources Management System deployment in an Electoral Committee Commission.

The project in the Health Ministry was initially estimated to last only 3 months by the local consulting company, which did not have skills on the system to be implemented. This created a wrong expectation from the beginning in all the parties involved, either the donors who

financed the project, the Health Ministry, or the internal users. *This was an important negative aspect mentioned in the in-depth interviews, the frequent unrealistic expectations regarding implementation timescales.*

The project took part in the finance department headquarters in the country's capital. They are located in the main city hospital, an old colonial building with several floors and a myriad of sections, rooms, and corridors. The finance department personnel were spread along these premises, making it difficult to reach them simultaneously during the project.

A solution for this problem was to assign a meeting room in permanency for the project duration. Users were asked to join in the meeting room whenever the project tasks involved them, either during requirements gathering, system testing or training. Users frequently missed their project appointments. Since their own working spaces were so far and spread away, it was very difficult to contact them in person and ask them to meet, especially when the accounting manager or the finance director were away. This had an obvious and significant impact on project duration slippage, and also on the accuracy of the system tests performed, and on the effectiveness of user training. *During the interviews, significant negative project results were attributed to human related causes, resulting for example of lack of user onboarding.*

The meeting room was not designed to hold several system users working simultaneously. Electric and internet connection sockets were not enough, and some were improvised, often causing electric blackouts. Intranet connection speed was also very low, making the simplest system operations arduous and longsome.

The finance department organization was almost absolutely flat in terms of hierarchy. All users reported to the accounting manager, who on his turn reported to the finance director. User participation during the project was quite ineffective, as a result of their low skills both in finance processes and information systems operation. It was also very difficult to coach them, given the almost inexistent management team. *According to most of the interviews, significant number of organizations are not prepared for IT projects, in terms of their human resources skills and know-how. That is applicable not only to IT skills, but more importantly to organizational processes knowledge. This results in bad quality of input from the organization during the requirements gathering and design phases of the project.*

Perspectives for the post go-live utilization of the new system were not positive either. An integrated ERP system like the one implemented in the Finance Ministry requires a chain of

work where each user enters or updates information that is required for the next user to perform his/her job. For example, a supplier invoice needs to be entered in the system to be approved by a manager, and later paid when appropriate. Once the invoice or the payment are entered, they can be accounted in the ledger books.

Given the constant absence of personnel and the difficulty to find a replacement within the finance team, integrated back-office processes faced considerable delays, that could result in manual processes being used, for example when an urgent payment was required for a mission critical supplier. In time, these exceptions would turn to the norm, due to the backlog of missing information in the system. *Lack of human resources was also frequently mentioned as an issue during the interviews, causing tensions around the go-live date due to lack of user availability. Similarly, when the project participants leave the organization, there is a significant loss of knowledge which is very difficult to replace during the life cycle of the project.*

As a consequence of the above hurdles, the project evolved to the implementation of a version of the solution that would be as “light” as possible, to require as little human intervention as conceivable, but some of the finance process steps would always have to be put in place. Otherwise, most of the objectives behind the IT project effort and investment would have been in vain. *This is another aspect mentioned throughout the interviews. ERP implementation methodologies are often too heavy. Methodology can simplify or complicate the project adaptability to the organization circumstances.*

The financials back-office solution being adopted by the Health Ministry created a duplication of payment processes with the centralized payment system of the central government. Users were not happy with the fact that they would have to enter the same payment twice, in different systems. Although this has not been identified before the project start, the project team tried to evaluate the effort and impact of developing an interface between the two systems. However, this was blocked by the top decision makers in the Ministry. *Barriers posed by older managers who refuse the level of scrutiny and having to learn and use a new system were brought up in more than one interview. Managers who have been in the organization for too long often expect the new technological solutions to do the same as the previous ones did. As a consequence, systems are not implemented in all planned areas, which creates inefficiencies and duplication of work since redundant systems continue to be used in parallel. Also, due to internal resistance, the new system is often not implemented in all organizational departments, generating double work because concurrent systems are kept in place.*

The Energy Management Agency was a recently formed body, and they were planning to use an integrated finance management system almost from the start. Their offices were in a modern office building in the city centre, and all facilities worked well. However, the agency was considerably understaffed. It was very hard to schedule a project meeting or find anyone available in an almost empty office space. *Again, this was an example of the lack of human resources that was referred during the interviews as a frequent issue for ICT projects.*

The agency project manager had not been formally designated, so any decision was very difficult to obtain. The coordination of the project activities resented the lack of authority on the customer organization side.

The initial phase of requirements gathering was therefore a lot longer than planned, and the subsequent stage of solution design was accomplished based mostly on business best practices and addressing generic legal and statutory requirements.

The Electoral Committee Commission was also located in the capital city centre, in a small, refurbished palace. Access to their premises was, contrary to the previous cases, of a difficult nature due to intense traffic and also strict security measures for visitors.

The project team was placed in a small room, not far from the office of the human resources team. The team members main activity was to process the Commission's monthly payroll, entirely through a manual method. Internet access was very slow, and the team only had remote access to a vanilla Human Resources Management System (HRMS). No system test instance was available created specifically for the Electoral Commission.

The project scope went beyond the support of payroll processing by the use of an information system. It also included integrated Career and Recruitment Management. However, the Human Resources team did not have the necessary functional knowledge to support the implementation of those new areas. *The importance of determining a realistic project scope was stressed during the interviews, as well as the detailed knowledge of the processes being replaced, and the new process being implemented. Also, it was referred that to increase the chances of project success, it is important to not change too much at the same time.*

The team of external consultants were requested to compensate for that gap, by proposing best practice processes for those new HR areas, to be presented and discussed with the Commission administration. This was not part of the project scope and had a significant impact in the project

duration. *This increased the risks, mentioned repeatedly in the interviews, of bad quality of input from the organization, or deficient ability from the project team to interpret it.*

Available data was also scarce. The project team was provided with little else than a list of civil servants employed by the Commission, including their jobs, positions, and elements for compensation and benefits for each position.

3.2.1. Project Management

The first project perspective worth bringing forward from the case studies are the project planning and management practices. In none of the projects developed in the above-mentioned institutions was a detailed project plan created, that would include a comprehensive list of tasks with time estimates or resource assignments.

There was a designated project manager in each of the projects, but he or she would have minimal involvement accompanying the implementation activities or making decisions that would impact the quality of the solution or the forecasted calendars. It was very difficult to maintain regular project meetings, either formal or informal. This absence of an effective project management framework usually left the IT consultants to make project decisions on their own to solve the most urgent issues. No formal scope control was enforced, making scope creep a frequent subject of discussion with the users, taking precious time, and delaying project activities. *This was also extensively brought up during the interviews: if users are given the possibility of providing detail input of what the new system should be like and the right people are empowered, they make decisions to adapt best practice, uniform and standard processes and procedures.*

Since people at the highest level in the organizations were not sufficiently involved, project tasks were not regarded as a priority by users or their direct managers, and they were easily diverted to other activities, causing significant delays in project execution. In one of the projects, that was financed by a group of international donors, it was possible to schedule only two status meetings, which in any case were insufficient given the almost nine months of the project length. *As mentioned during the interviews, this was due both to lack of sufficient personnel to assign to the project, but also due to the resistance of top organization management.*

Ultimately, there was no formal acceptance of project deliverables, increasing the risk of the ensuing activities, and hindering the agreement on the completeness of the solution being taken

in. As there was no formal acceptance of the new system, it was not properly handed over to the implementing organizations, and their members did not gain ownership of the solution, neither of its adoption, dissemination, acceptance, identification of future needs or adoption of legislative and statutory updates. *This lack of user onboarding and absence of key user empowerment was extensively identified during the interviews. Also, from an organizational perspective more recently arrived managers would be further inclined to advocate for the new system, which in its turn supports different levels of responsibility and a uniformization of processes.*

Absence of proper ownership at organization level contributed significantly to the progressive abandon of system use, as well as the return to old practices and habits, eroding the advantages brought up by the new system and the positive changes in economy, efficiency, control, and quality of service provided by the organizations.

If project management was inadequate and below the minimum threshold for successful project executions, the resources available to the project were unfortunately also greatly lacking. This was the case of both human and technical resources.

3.2.2. Human Resources

The projects in study had blended teams comprised of organization users, organization management, external consultants, and a mix of inhouse and external technical maintenance staff.

Users were requested to describe their existing tasks and responsibilities, to receive system training and ultimately to participate in acceptance testing as a pre-condition for the go-live stage.

All activities users were supposed to perform in the system during and after the project were significantly impaired by a widespread low digital literacy. Basic operations like using MS Windows navigation through a computer mouse were unfamiliar to a considerable proportion of people, some of them having only used character mode systems to date. Mobile phones were popular among the general population which provided familiarity with icons, but only a small number of households had a personal computer. *Once again, this corresponds to the lack of IT skills among the users identified in the interviews, as one of the frequent impairments of ICT projects success.*

If user system training and operation were challenging activities on their own, they were made more difficult due to the high level of employee nonattendance. Some of the training had to be deferred or repeated, and user testing was severely delayed.

Integrated organization wide systems require a user to complete his or her part of the process, until it moves on to the next step and the next user. This is part of the system in-built functionality, but also universally agreed best practice. On this subject, see for example the studies “Empowering benefits of ERP systems implementation”, published in 2018 (Rouhani & Mehri, 2018), or “Relationships among ERP post-implementation success constructs” (Ifinedo et al., 2010). *This is once again, the issue of insufficient personnel on the organizations implementing IT systems, identified by most of the professionals interviewed during this work.*

Since user absences were frequent, the process steps had to be deferred until users returned to work. Substitute users could perhaps have been assigned to project tasks, but often they were difficult to find and make available, due to the shortage of middle managers. Feeble middle management levels were a common aspect of the three case studies. However, this was not detected in the existing literature or the during the in-depth interviews. It appears to be a specific characteristic of some sub-Saharan countries’ public administrations.

The organizations where these projects were developed had typically one finance or human resources director, and one accounting or personnel manager. All employees in the department would report to the manager, and the manager to the respective director. This structure presented practical issues to the project, since managers were busy most of the time with their daily responsibilities and has little time to dedicate to review and approve project deliverables, to manage user availability or to evaluate and agree on project scope and requirement updates.

Again, the lack of an adequate middle management construct contributed to project delays, lengthy discussions about requirements and to scope slide, with a direct impact on time and cost.

However, other professionals were also in short supply, in particular those with IT skills. Application and database servers were purchased to install inhouse the software applications object of the projects. These servers require maintenance, as well as the network required for general access within the organization. Similarly, management applications and databases need to be installed, maintained, patched regularly, and upgraded. This requires complex technical skills that are scarce in sub-Saharan countries, and they were hard to find with the accessibility

necessary for the project. It caused additional delays in the project activities and limited the range of areas that could access the system before and after the solution production phase.

3.2.3. Technical Resources

Electricians were also needed to expand the electric grid and sockets available in the buildings, and we had to wait sometimes for weeks for them to complete their work. The same happened with the technicians required to install network cables and extensions.

It was not only the time that elapsed to complete the electrical and network extension that had a negative impact on the readiness of the IT solution. In some cases, the final result was deficient, resulting in frequent power and connectivity issues.

Access speed to the new application was not ideal, either. Servers were sized at the minimum parameters possible to reduce total investment and ownership cost of the system. This had an obvious effect upon the implementation tasks, but above all on the user experience and daily job.

Modern ICT solutions rely on web browsers to launch applications screens accessible to the users. This requires personal computers with a certain level of hardware resources. These were, as well, not enough for the total employee universe. Users had to share computers, delaying, and making more problematic several of the processes supported by the new system. *Further to the lack of personnel and in particular the lack of personnel with IT skills discussed previously, this also configures an issue with the ICT procurement process discussed during the interviews. Inadequate systems procurement processes can cause significant problems to the project when they are too slow and bureaucratic, and as in this case, when the correct solution is not identified and procured, either the software systems or the appropriate hardware and network infrastructures.*

3.2.4. Solution Complexity

As mentioned above, in these projects the teams tried fitting integrated ERP solutions that encompassed multiple organizational areas or departments. These systems were created in their essence to streamline the internal processes of medium to large private and public organizations. They are an infrastructure for complex functional requirements, demanding legal and statutory rules, wide-ranging international audit norms and generally accepted accounting principles.

To support this diverse functionality, integrated software solutions possess a comprehensive set of parameters, configurable lists of values, and decision points of which processes and process steps are applicable. *It is relevant to mention that some of the interviews disclosed that years after the initial ERP project, migrations to new versions or new systems were smoother than the original projects, because the organizations were already used to an integrated application and therefore integrated processes.*

The three institutions under study had very few identified processes, and even fewer integrated ones. In addition, users had a low level of digital literacy and executed mostly simple operations without sufficient skills to perform more complex ones. This implied a significant amount of time in the project to simplify system options, processes, and procedures. *If users are given the possibility of providing detail input of what the new system should be like and the right people are empowered, they make decisions to adapt best practice, uniform and standard processes and procedures.*

Another important attribute of the IT solutions selected for these projects was their relatively modern technology, that include several components and layers, from database management to the user application and desktop tiers. We have seen previously that the most modern IT professionals tend to migrate from the lower to the higher income countries, and the projects in sub-Saharan Africa were no exception. Essential IT professionals were in short supply and difficult to involve during the implementation projects.

This question became more problematic after the systems went live, though, once the project teams were decommissioned. Database performance tend to deteriorate over time, when more and more data is stored, and database administrators need to intervene. Also, software as complex as the one used have occasionally errors (bugs) that need corrective pieces of code (patches) to be applied, again by very specialized database administrators.

But it was not only in terms of technical maintenance that the new systems faltered in their post go-live times. Functional maintenance is also required by the natural evolution of organizations and their external environments. For example, new tax rates are defined by governments, and they need to be crated in the financial systems. The time passes, and new calendar years and periods need to be created. The same is applicable, for example, to new payroll elements or deductions.

These types of definitions require more advanced users, well trained in the system and proactive. Unfortunately, the projects under analysis failed to produce a sufficient number of these key users, that would have been able to keep the systems going from an operational and administrative perspective years after their respective projects.

In some of the interviews, it was considered a critical factor for the success of IT projects, the establishment of a strong relationship between the project team and the business users, as well as adequate preparation and collaboration between the implementation team and the target organization. Unfortunately, that was not the case in any of the three project cases. Users were scarcely available for any project activities, and little time was left for developing trust and communication. There were no planning meetings with the organization managers, or kick-off sessions with the managers and users, where the project objectives, activities and calendar would be presented to those who would have to take part in the project from the organization side. Hence, no common goals were partaken between the teams.

3.3. Success Factors in Perspective

The following table resumes the ICT project success factors as they were identified in the present work. The first column is a count of the success factor occurrence in the generic ICT literature reviewed. The second column is the number of times the success factors are identified in the ICT for Public Administration in developing countries papers. The third column resumes the incidence of the success factors on the interviews, and the fourth, their occurrence in the case studies.

ICT Project Success Factors	Generic ICT Literature	ICT in Public Administration	Interviews	Case Studies	Total
Local ICT suppliers availability			2		3
Clear project business case	1	2		1	4
User involvement & support	2	3	4	3	12
Team competence & skills *	3	1	1	3	8
Country requirements		1			1
High priority of the project	1				1
Good dialogue team and users	1		3	2	6
Donor/recipient relationship		1			1
Agile methodology practices	2		1	1	4
Project Planning & Forecasting	1	2		3	6
Project Management	3	2		5	10
Data availability & quality		3		3	6
Change Management	2	1	2	2	7
Tools & Infrastructure	1			2	3
Process uniformization		4	1	3	8
National culture	1	1		1	3
Procurement process			1	2	3
Stakeholder/sponsors engagement	2	1	1	3	7
Scope Management	1	1	2	1	5
Audit & Risk Management	2				2
Short stage duration	2				2
Formal Roles	2			3	5
Benefits management	1			3	4
* this includes both client team and external provider skills					

Table 1. Public Administration ICT success factors (compiled by the author)

The objective of the above table is not to perform quantitative analysis. However, there are some aspects that look significant.

User involvement in the project, and the support and training they receive is the most frequently cited success factor for ICT projects. It seems pertinent that it was abundantly mentioned in the reviewed ICT literature and the interviews, and also identified as an issue in the cases studied.

The second most identified success factor is Project Management, including the aptitude and approach of the project manager, or sometimes even the mere existence of one. However, it was not brought up during the interviews, hinting that it was not critical in the projects the interviewed participated in, mostly in western European countries. This was, as discussed in the previous chapter, of the utmost importance in the three case studies.

Team competence and skills, including both the internal team knowledge and IT skills, as well as the dependence on external consultant's skills, was referenced extensively in the literature, the interviews, and was a significant problem in the three cases of Public Administration in Africa.

Process uniformization and standardization is mostly referenced in ICT in Public Administration in developing countries, and in the ICT in Public Administration cases. This appears to indicate that it is an issue for ICT projects in public organizations in developing countries, but not as much in Western countries.

Stakeholder and sponsor strong engagement, is also a success factor that crosses all sources of occurrences in the table. Lack of top management commitment to the projects appear to be a constant, although the reasons may be different in the developing nations from those in the Western countries.

There is a factor that is extensively noticed both in the ICT in Public administration in developing countries and in the case studies, but totally absent from the generic ICT literature and the interviews: local ICT suppliers' availability. This is naturally not an issue in the Western world, but it is critical in sub-Saharan Africa.

Global software and hardware providers are not directly present in those countries, with the usual exception of South Africa. All hardware system components have to be procured elsewhere, and there are no easily accessible spare parts. This makes ICT solutions, infrastructures, and support less available and more expensive. Unfortunately, this has not been compensated in the past by local manufacturers, due to the large investments and necessary accumulated know-how requirements.

The same applies to expert technical human resources. The number of skilled IT professionals in sub-Saharan Africa is extremely low, and those possessing the most wanted skills attempt to emigrate to richer countries with better job prospects.

CHAPTER 4

Conclusions

A significant number of African nations have put in place modernization programs of their public administration agencies over the last decades, focusing on the automation of their back-office activities using standard ERP solutions. These programs were financed mostly by international donors, as a tool to control budget expenditures, and have frequently failed.

Abundant literature is available with diversified analysis of public modernization programs using ICT tools in the developed world. Unfortunately, that is not the case for similar projects in the developing world, particularly in Africa. Nonetheless, several authors uphold that ICT's in general, and ERP systems in particular are fundamental for higher integration and better operational management of government organizations, especially wanting in the sub-Saharan countries' case.

The African continent has some of the lower levels of internet usage and IT literacy and skills among the developing countries. To aggravate this scenario, modern ICT solutions like ERP systems are technically complex and require resources with advanced IT skills, that are notoriously scarce in the African continent. There are not enough Universities to prepare technical professionals, and the few consulting companies with offices in the sub-Saharan countries do not recruit or train sufficient people.

Nevertheless, these have been the solutions of choice in most of the public administration modernization initiatives in the sub-Saharan region.

Local software and hardware providers are absent from most sub-Saharan countries, making any ICT initiative a highly costly and time-consuming endeavour. Even something taken for granted in other contexts, like network or electric appliances are often difficult to find in the necessary supply levels.

Likewise, it does not appear to have been taken into consideration by those who selected the solutions to adopt, that ERPs projects are a lot more comprehensive and complex than other ICT projects: they are not mere technology change initiatives, they represent a structural and processual change in the organization.

Therefore, it is relevant to get a better understanding of what did work well and did not work well in those projects, using the limited sources of information at hand. This study included three different source types: 1) the sparse literature available, 2) interviews with experienced IT professionals, and 3) case studies of comparable projects.

The most common and transversal factors for success of the ICT public administration modernization programs are those related to user involvement, training, and support during the entire project lifecycle. This was the case not only in developed countries, but also in sub-Saharan governments. Naturally associated with these are the team competences, both from the

organization members, but also from the program external consultants. Again, this is a significant factor in both developed and sub-Saharan countries.

More specific of the sub-Saharan region is the nonexistence of human resources to take part in the ERP projects. Government organizations are significantly understaffed, their absence rates are considerably high, and the time and effort staff agree to dedicate to the project are minimal. A culture of committed, disciplined, regular work required to progress project tasks is not common practice. Although it is not an issue only in the sub-Saharan government organizations, it was a lot more constant in the cases studied a pervasive resistance from the users to participate in the implementation or to adopt the new processes, procedures, or systems.

The presence, empowerment, and capabilities of the project managers also appears to be a lot more critical in sub-Saharan countries, signalling that it is well established reality in the developed countries, but not in the African ones.

The same can be inferred regarding the need for process re-engineering and uniformization. It is a common cause for unsuccess mostly in the developing countries' government modernization projects.

Finally, stakeholder actual support and engagement in the government ICT modernization initiatives are a critical issue in sub-Saharan countries. In none of the cases studied were the higher hierarchical levels involved in any way in the project, and when requests were made to facilitate the access to critical resources required, these requests were not addressed, compromising the sustainability of the programs. Not once in the cases analysed were the institutions' hierarchies willing to make everything in their power for the modernization initiatives to be successful.

CHAPTER 5

References

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