CHARACTERISCTICS OF EPC CONTRACTORS IN LARGE INFRASTRUCTURE PROJECTS PROCURED THROUGH PROJECT FINANCE FRAMEWORK IN SUB-SAHARAN AFRICA

by

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Submitted to the Institute for Graduate Studies in
Science and Engineering in partial fulfillment of
the requirements for the degree of
Master of Science

Graduate Program in Civil Engineering

Boğaziçi University

2019

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DATE OF APPROVAL: 16.07.2019

ACKNOWLEDGEMENTS

First of all, I want to thank God for the beautiful life, the strength, the support, for everyone and everything He set on my path so that I could achieve this work. I am totally grateful for this grace. To Him honor and glory forever.

This work would have not been possible without the consistent help and guidance of my beloved teacher, Assoc.Prof. Beliz Ozorhon. You have been so patient with me, guiding me step by step toward the accomplishment of this thesis. From the day, I started my master you have been so supportive, and you helped me grow. If I had to do it again, it can only be with you. Thank you so much for all.

I want to thank my parents Joseph Mundela Mbombo and Jeanne Mbiya Kabongo, who have unfailingly loved me, supported me, held my hand through thick and thin, counseled me, cared for me and sacrificed so much to see me thrive in life. I am indefinitely grateful to you and I truly hope that this achievement would make you proud.

My thoughts go to my late father-in-law, Dr. Arend de Jong, who not only accepted me as his own son but provided me with unfailing encouragement to finish this work. I wish you would be there to celebrate the accomplishment with me. May you rest in peace in God's hands.

I should confess that this accomplishment would not have been possible without the consistent, unconditional, incommensurable and flawless love and support of my best friend and wife, Adelheid M. Mundela- de Jong. The journey to this point was not always pleasant. You have been the strength I needed when I was weak, the hope when I despaired, the laughter when I cried and the compass when I was lost. Thank you so much for believing in me and making me a better man.

To my son, Juan-Mateo Mundela Mbombo, I am so grateful. You are not yet able to read what I am writing to you but know that your birth was such a catalyst in my life. You gave sense to my actions and determination to my steps.

I want to take this moment to also show my deepest gratitude to my dear sisters, Marie-Ange Mundela, Therese Mundela, Sandrine Mundela, Jenny Mundela and Grace Mundela. Thank you for your support, your advices, your prayers and your unfailing love. I am so proud to be your little brother.

To my brothers-in-arms, Pierre-Jean Allard, Adi Pasho, Herve Intumu, Ovic Mbi Mabiala, Louange Louange à l'Eternel, Amilcar Raul Cuco and Michel Foumangoye. I do not think I would have made it without your genuine friendship.

I remember when I started in the field of project finance with almost no knowledge about the topic, four men took me diligently into their schools. I would really like to thank Jean-François Marco, Olivier Bramaud-Grattau, David Delgado Romero and Tendai Kanyumbu for all your teaching and mentorship. The knowledge I acquired by your sides is priceless. Please see in this the expression of my gratitude.

I thank all people who have helped me, supported me, assisted me, prayed for me and made this achievement possible.

ABSTRACT

CHARACTERISCTICS OF EPC CONTRACTORS IN LARGE INFRASTRUCTURE PROJECTS PROCURED THROUGH PROJECT FINANCE FRAMEWORK IN SUB-SAHARAN AFRICA

After its success in developing countries, the project finance framework has been gradually introduced in Sub-Sahara Africa (SSA) where it has shown a rapid expansion over the last two decades, particularly to finance and construct large infrastructure projects (LIPs). Such expansion was pushed by African governments eager to close the infrastructure gap hindered by a lack of financing estimated at 93US$ billion each year. Most of these funds are provided on a limited or non-recourse basis which means that the project represents the main collateral for capital invested. Successful completion of projects is the only way for investors to claim their investments. Hence, the selection of a suitable contractor is of paramount importance to reach project completion. The aim of this research is to identify key characteristics of EPC contractors that ensure contractors? eligibility and competitiveness for LIPs in SSA procured through the project finance framework. The potential key attributes and criteria were first drawn from the risk allocation strategy and contractual setting inherent to the project finance framework. Moreover, the research included an assessment of the SSA region through a PEST analysis that aimed at assessing regional features that influence the selection of EPC contractors. A survey, comprising 33 statements each bearing a potential attribute identified in the literature review, was conducted with respondents selected from top development finance institutions, private equity firms and technical and legal advisory firms. Data collected were tested in accordance with the nonparametric Mann-Whitney U test. The results highlighted the existence of nine key characteristics lenders, investors and advisors looked after when selecting an EPC contractor.

ÖZET

SAHRA-ALTI AFRİKA'DA PROJE FİNANS ÇERÇEVESİNDEN SAĞLANAN BÜYÜK ALTYAPI PROJELERİNDE EPC YÜKLENİCİLERİN ÖZELLİKLERİ

Gelişmekte olan ülkelerdeki başarısından sonra, proje finansmanı çerçevesi, son 20 yılda özellikle büyük altyapı projelerini finanse etmek ve inşa etmek için hızlı bir genişleme gösteren Sahra Altı Afrika'da (SAA) yavaş yavaş tanıtılmaktadır. Bu genişleme, Afrika hükümetleri tarafından her yıl 93 milyar ABD doları olarak tahmin edilen finansman eksikliğinden kaynaklanan altyapı açığını kapatmak için teşvik edilmektedir. Bu finansmanların çoğu, sınırlı ya da geri dönüşsüz bir temele dayanmaktadır; bu, projenin yatırım yapılan sermaye için ana teminatı temsil ettiği anlamına gelmektedir. Projenin başarılı bir şekilde tamamlanması, yatırımcıların yatırımlarını talep etmelerinin tek yoludur. Dolayısıyla, uygun bir müteahhit seçimi, projenin başarıyla tamamlaması için büyük önem taşımaktadır. u araştırmanın amacı, proje finansmanı çerçevesi ile tedarik edilen SSA'daki büyük altyapı projeleri (LIPs) için yüklenicinin uygunluğunu ve rekabetçiliğini sağlayan EPC müteahhitlerinin temel özelliklerini belirlemektir. Potansiyel hayati nitelikler ve kriterler ilk olarak proje finansmanı çerçevesine özgü risk tahsis stratejisi ve sözleşmeden alınmıştır. Ayrıca, araştırma, bir EPC yüklenicisinin seçimini etkileyen bölgesel özellikleri değerlendirmeyi amaçlayan bir PEST analizi ile SAA bölgesinin değerlendirilmesini de içermektedir. Her biri literatür taramasında tanımlanmış potansiyel bir özniteliğe sahip 33 ifadeden oluşan bir anket, üst düzey kalkınma finans kurumları, özel sermaye şirketleri ve teknik ve yasal danışmanlık firmalarından seçilen katılımcılarla yapılmıştır. Toplanan veriler parametrik olmayan Mann-Whitney U testine göre test edilmiştir. Sonuçlar, bir EPC yüklenicisini seçerken borç veren, yatırımcı ve danışmanın baktığı dokuz temel özelliğin varlığına dikkat çekmektedir.

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LIST OF ACRONYMS/ABBREVIATIONS

AfDB	African Development Bank
BO	Build-Operate
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
BOT	Build- Operate-Transfer
CICID	Interministerial Committee for International Cooperation and Development
CSF	Critical Success Factors
DB	Design-Build
DBA	Design-Bid-Award
DBSA	Development Bank of Southern Africa
DELG	Department of the Environment and Local Government, Ministry of Finance of the Czech Republic
DFIs	Development Finance Institutions
E&S	Environmental and Social
EBIT	Earnings Before Interest and Tax
EBRD	European Bank for Reconstruction and Development
ECA	Export Credit Agencies
EFCA	European Federation of Engineering Consultancy Associations
EFI	Economic Freedom Index
EPC	Engineering-Procurement-Construction
EPs	Equator Principles
FEED	Front-End-Engineering and Design
FMO	Nederlandse Financierings-Maatschappij voor Ontwik kelingslanden
GNI	Gross National Income
HDI	Human Development Index
IBRD	International Bank for Reconstruction and Development
ICA	Infrastructure Consortium for Africa

IDI	ICT Development Index
IFC	International Finance Corporation
IFIs	International Finance Institutions
IMF	International Monetary Fund
ITU	International Telecommunication Union
KYC	Know-Your-Client
LDs	Liquidated Damages
LIPs	Large Infrastructure Projects
MIGA	Multilateral Investment Guarantee Agency
O&M	Operation and Maintenance
PPP	Public-Private Partnership
PRI	Political Risk Insurance
PFI	Private Finance Initiative
PS	Performance Standards
QHSE	Quality, Health, Safety and Environment
R&D	Research and Development
RoE	Return on equity
SPV	Special Purpose Vehicle
SSA	Sub-Saharan Africa
SWAP	Share of Working-Age Population
UN	United Nations
WGI	World Governance Index

1. INTRODUCTION

1.1. Introductory Section

In recent decades, project finance has known a rapid expansion in Sub-Saharan African countries through private public partnerships providing an alternative solution to public financing in order to bridge the infrastructure gap in the region. In fact, researches have long considered that the economic development of Sub-Saharan Africa has been impeded by the lack of adequate supply of infrastructure services (Calderón and Servén, 2008). Limao and Venables (2000) have advocated for instance that the absence of sufficient transport infrastructure resulted in high transport costs that hinders intra and inter-regional trade. Besides, governments continue to face challenges to finance large infrastructures because the construction and operation of such projects weight heavily on public budgets. Even a more gradual approach to catch-up on infrastructure supply would still be an issue as it would require considerable fiscal resources over several years, while competing with other pressing expenditure needs (i.e. education and health) (Calderón and Servén, 2008).

In effect, Gutman *et al.* (2015) reported that the International Monetary Fund (IMF) has estimated at US$ 93 billion the financing gap required each year to endow Sub-Saharan Africa with its much-needed infrastructure which will enable it to achieve a sustainable human and economic growth. Most of these capitals are expected to be provided by the private sector, including multilateral agencies, bilateral agencies, commercial banks, industrial developers and private equity funds. These investors are often requested to rely only upon the project success for the repayment of their capital. Hence, the project itself becomes the main collateral for capital invested. In this context, the successful construction of large infrastructures, i.e. within a definite timeframe, budget and at the level of performance expected, is vital to guarantee the project operation and the capital repayment as well as the return on investment.

Ika's (2012) research on roots of project failure in Africa has shown that many projects failed in SSA due to contractors' inability to adequately manage construction risks, in particular the supply chain, regulatory framework, cost overrun and interface management. He found that contractors' inability was justified by either structural contextual, institutional/sustainability, or managerial/organizational issues. Therefore, to ensure a successful project completion, EPC contractors are required to have certain abilities or characteristics suitable to project finance procurement.

Thus, this research focuses on identify those key characteristics expected from EPC contractors in the project finance framework considering the Sub-Saharan African environment. It investigates the risk allocation among the key stakeholders in the project finance framework and identifies those risks that constructors are often expected to manage and mitigate. In addition, a scrutiny of EPC contracts has been conducted based on previous researches to identify the key provisions included in EPC contracts for project finance transactions. Each key provision embodies a prerequisite by which EPC contractors should abide to be eligible in such transaction. Each identified prerequisite has been tested against expert opinions through a questionnaire survey targeting development finance institutions, private equity companies and legal and engineering firms working in the Sub-Saharan African market.

Moreover, the research includes an assessment of the SSA region through a PEST analysis that aims at revealing the complexity and particularity of the region which need to be considered by each stakeholder involved in a project finance transaction in order to anticipate the risks and ensure proper mitigation measures.

The thesis contains five chapters organized in such a way to help the reader understand the basic concept of project finance and following the steps taken to determine the key characteristics of EPC contractors in large infrastructure projects developed in Sub-Saharan Africa. Chapter 2 focuses on defining large infrastructure projects, describing project finance framework and identifying a list of prerequisites for EPC contractors based on the literature review. Chapter 3 explains the methodology used in this research while chapter 4 presents and discusses the results. The research ends

with a 5th chapter which includes a conclusion and further recommendations for this research topic.

1.2. Background of the Research

For decades researchers have studied the construction industry and its impacts on regional development. For instance, Zawdie and Langford (2000) investigated the infrastructure deficit in Africa, and the extent to which sustainable infrastructure development could be enhanced through capacity building especially for indigenous construction firms. Their research points out that investment efforts in sustainable infrastructure tend to fail because in many Sub-Saharan African countries, the construction industry has not evolved sufficiently over the years to respond to the emerging needs of local economies. Consequently, the fragility of infrastructure in this region is largely caused by "a systemic deficit in construction capacity" (Zawdie and Langford, 2000). The research also revealed that in many of the Sub-Saharan African countries, the inability of contractors to cope with the level of construction activity and risks related to large infrastructures is considered to be one of the major causes of project failure. In fact, the authors further argued that most of the local construction firms in SSA are small, relatively inexperienced and lack the managerial and technical capability to handle large construction projects. This incapacity of local contractors led to increased participation of international contractors (with more experienced staff, robust track records and high creditworthiness) in the SSA market.

In a similar way, Masrom *et al.* (2015) explored the potential success criteria to gauge overall performance of large infrastructure implementation particularly in developing countries with a focus on the Malaysian industry. Their findings show that, in developing countries, factors causing infrastructure projects to fail can be clustered in five categories including (i) project-related factors (type of project, nature of project, complexity of project and size of project, etc.), (ii) project procedures (procurement method and tendering method), (iii) project management factors (communication, control mechanisms, feedback capabilities, troubleshooting, coordination effectiveness, decision making effectiveness, monitoring, project organization structure,

plan and schedule, related previous management experience), (iv) human- related factors (manager, client, designer, contractor, consultants, subcontractor, suppliers and manufacturers) and (v) external factors (economic environment, social environment, political environment, physical environment, industrial relation environment and level of technology advanced).

Moreover, the literature contains also many research papers aiming at identifying frameworks for the selection of contractors and subcontractors in the construction industry to help companies minimizing their exposure to unfit candidates. For instance, Abbasianjahromi *et al.* (2011) developed a model for subcontractor selection based on the fuzzy preference selection index. The authors suggest the use of preference selection index method as substitute to weighting attributes which are often considered to be challenging and time-consuming. Similarly, Mbachu (2008) investigated the selection of contractors and subcontractors in the South Africa market by applying a multi-attribute technique for data analysis. His findings suggested that the quality record was the most influential criterion for contractor and sub-contractor's prequalification while tender price was the most important factor influencing the award.

Also, Huang (2011) analyzed the different theoretical methods used for contractor evaluation, including the Prequalification Method, TOPSIS and SAW-G Grey Techniques, Cost Consideration Framework, Construction Management at Risk Method and Multi Criteria Evaluation Models, and draw from these methods the criteria for contractors' selection. He found that the key criteria for contractor selection were imbedded in the reliability and competence of the contractors. He further argued that a good record reduced the construction costs and helped supporting the desired attitude toward quality and productivity.

1.3. Problem Determination

Many scholars have rightly identified the need to define a systematic approach in selecting contractors and subcontractors in the construction industry. The works of Masrom *et al.* (2015), Huang (2011) and Mbachu (2008) are good starting points to

begin understanding the complexity that have to be surmounted in order to achieve project success. However, they, as many other authors, fail to take into account the specificities of each procurement process, especially when it comes to project financing. In fact, the selection of contractors in a public procured large infrastructure projects does not follow the same criteria as tendering in the project finance framework (Yescombe, 2002; Gatti, 2008). This phenomenon is mainly explained by the fact that risks are not perceived and dealt with the same way in public procured projects as they are in private ones. Since the integrity of a project financed infrastructure depends on the ability of each participant to properly manage the risks that are allocated to them, the selection of a suitable contractor is not just a mere formality to kick-off the project but it is the prime criteria for successful development of large infrastructure projects, because adequate contractor evaluations conducted before selection has the capacity to significantly reduce the construction risks (Huang, 2011).

1.4. Problem Statement

As demand for infrastructure is increasing in Sub-Saharan Africa, the use of project finance as a way to procure large infrastructure projects is also expected to continue growing. Consequently, contractors in SSA are also expected to be ready for such procurement transition. Yet, many contractors fail to understand that project finance transactions come with a series of prerequisites that define the eligibility of each key participant in the project. To a certain extent, this situation is comprehensible because most of the literature on project finance focuses on the framework as a whole, instead of analyzing the criteria of eligibility of stakeholders. Some researchers, such as Yescombe (2002), Merna *et al.* (2010), Vinter (1998), Fight (2006) and Gatti (2008), attempted to explain the type of contractual settings and provisions required in project finance including those for EPC contracts. Ultimately, the characteristics of EPC contractors matching the contracting and risk allocation strategy demanded in the project finance framework for large infrastructure projects (LIPs) have not been explored.

1.5. Related Studies

There is an extensive literature about project finance for LIPs that emerge in the 1990s and 2000s after the success of the Private Finance Initiative (PFI) in developed countries. Many researchers have endeavored to present in a comprehensive manner the key specificities of project finance including the contracting strategy and other factors affecting the outcome of project finance transactions (Gatti (2008), Vinter (1998), Menheere and Pollalis (1996), Khan and Parra (2003), Flight (2006) and Yescombe (2002), Reismann and Minderhout (2001), Finnerty (2007) and others).

In addition to project finance literature, scholars have also endeavored to identify the main factors causing large infrastructure projects to succeed or fail in developing countries (Ika, 2012; Huang, 2011).

1.6. Aim and Objectives of the Research

The aim of this research is to identify key characteristics of EPC contractors that ensure contractor eligibility and competitiveness for project financed LIPs in SSA. The potential pivotal attributes and criteria are first drawn from the risk allocation strategy and contractual provisions customary for project finance transactions and described in the project finance literature. They were then assessed against experts' opinions through a questionnaire survey in order to confirm their applicability in the current project finance market in SSA.

To reach this objective, the research first provides a comprehensive definition of LIPs that drives out two common features of this type of projects, i.e. complexity and capital intensiveness. Then, it presents a description of the main properties of project finance, their interdependency and the extent they are related to the selection of EPC contractors.

Figure 1.1 summarizes the approach developed to identify the key characteristics in this research. In fact, the literature review suggested that project finance, as a

mean to bridge the financing and infrastructure gap, depends on three key factors: procurement process, risk allocation and contracting strategy. These three factors are all interdependent and are all subject to exogenous factors inherent to project environments which have been identified through a PEST analysis. Furthermore, the specific contractual provisions and contracting strategies determined in the literature review suggested that contracts in project finance are designed by and for a certain type of stakeholders. Hence, through the opinions of top project finance actors, a set of key characteristics has been determined for EPC contractors. This last step represents the core objective of this study which was performed by collecting data from experts working international finance institutions, private equity companies and advisory firms. In addition, the potential key characteristics were evaluation with respect to critical success factors of constructors identified in the literature review, the extent to which they are consistent with previous studies and their sensitiveness with respect to the SSA region.

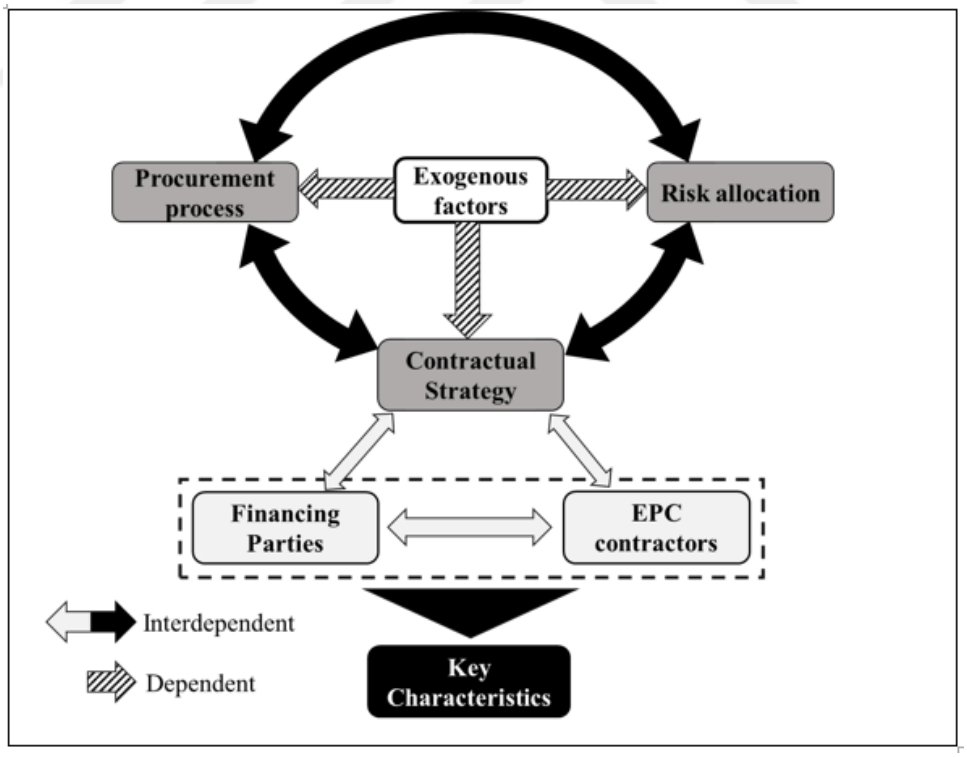


Figure 1.1. Framework for selecting EPC key characteristics.

1.7. Research Methodology

A questionnaire was sent to top financing institutions and advisory firms to evaluate whether the identified characteristics was consistent with current market conditions for project finance in SSA. The capital providers' responses were tested against advisors' ones using the nonparametric Mann-Whitney U test in SPSS to assess the extent to which a characteristic was broadly accepted among experts in the market. In addition, a PEST analysis was conveyed to assess the key factors inherent to the SSA region using international organizations' database including the World Bank, the International Monetary Fund, the United Nation and the Heritage Foundation.

1.8. Research Limitation

This thesis includes a set of limitations the reader should be aware of while perusing its content. The first limitation is related to the size of the population considered in this research and the corresponding data collected. In effect, the study only focuses on the top players in the project finance market in SSA, in particular development finance institutions, private equity firms, legal and technical advisory firms. Commercial banks and government bodies' opinions have not been taken into consideration. Their opinions might not necessarily be the same as those of institutions selected for the research population. The second limitation consists in the exhaustiveness of the identified characteristics. This research aims at providing a set of minimum prerequisites for EPC contractors but does not intent to identify every single characteristic and the way to acquire them. At last, the research does not investigate any commercial consideration (i.e. price) or cultural proximity which can be governing parameters in awarding contracts.

1.9. Organization of the Thesis

This research is organized in five Chapters. The following Chapter 2 will focus on defining LIPs and presenting the key features of the project finance framework for LIPs. This section describes (i) different procurement processes generally encountered

in project finance transaction, (ii) the common risk identified and their allocation, and (iii) the EPC contracting strategy. Chapter 3 describes the methodology used to conduct the present research, including the PEST analysis and the survey design. Chapter 4 aims at presenting the research results and discuss the findings. At last, Chapter 5 concludes this research and provides some recommendations for further researches on this topic.

2. PROJECT FINANCE FRAMEWORK FOR LIPs

2.1. Large Infrastructure Projects (LIPs)

The term "*infrastructure*" often echoes other terms such as construction, services, job creation, economy and welfare. In fact, the OXFORD Dictionary of Construction, Surveying and Civil Engineering (Gorse *et al.*, 2012) defines the word "*infrastructure*" as "*the physical public systems, services, and facilities of a country that are necessary for society and economic activity. These include buildings, roads, bridges, and utilities (electricity, gas, water, sewers, and telecommunications).*" This definition suggests that infrastructure projects are strategic projects with lasting and high scale impacts on the environment in which they are constructed. This statement holds true especially for large infrastructure projects which are in essence the backbone of a nation. They indeed are often set to provide basic services like transportation, communication, sewage, water and power systems. Masrom *et al.* (2015) argued that LIPs were capital intensive projects vital to a country's economic development and prosperity. In addition, the author considers that LIPs are also highly complex projects that include countless construction risks, specific technology and numerous resources. Dunoviüa *et al.* (2014) observed similar patterns for LIPs. He claimed that Mega-infrastructure projects were mainly characterized by uncertainty, complexity, political-sensitivity and involving numerous parties. Two main aspects of LIPs emerge from the literation review: Complexity and Capital intensity.

2.1.1. Complexity

The concept of complexity for large infrastructure projects is best understood through the work of Terry Williams. In his book, Williams (2002) explained that project complexity consisted of *structural and organizational complexity* and *uncertainty*. By structural complexity, he meant the variety of units such as the number of hierarchical levels, number of formal organizational units, division of tasks, number of specializations, etc. and the degree to which they are all interdependent (Indepen-

dency refers to the relation between activities, teams, technology, or input elements). William (2002) observed that for projects developed under design-and-build scheme (i.e. BOT, BOOT, etc.), the major source of structural complexity was the scope of work. Dunoviüa *et al.* (2014) reported that many complex project failures were caused by the inability of the project manager, team members, client, sponsor or associated stakeholders, to comprehend the level of complexity they were faced with. They realize the project's complexity far too late to effectively address it. Moreover, Salman *et al.* (2007) also suggested that the key to LIPs' successful implementation resides in an in-depth analysis of all aspects related to the projects' economic, environmental, social, political, legal, and financial feasibilities.

In addition to structural complexity, William (2002) argued that there was another type of complexity related to "*the instability of the assumptions upon which the activities are based*", referred to as "uncertainty". He further divided the concept of uncertainty into two distinct categories: the *uncertainty of objectives* (the degree of clarity in defining the objectives) and the uncertainty of method (the degree of clarity in the methodology to be used for achieving the objectives). Remington and Pollack (2007), in their book "*Tools for Complex Projects*", refers to the uncertainty of objective as "*Directional Complexities*" which consists of vague meanings and hidden interests that results in ambiguity and multiple interpretations of objectives and political and cultural relations. Furthermore, they claimed that there is also a "*temporal complexity*" which relates to the variability of systems (i.e. projects' components) over time. In effect, temporal complexity is related to a change of environment or strategic directions which are independent of the project team. Since LIPs often required several years for constructions, the temporal complexity, as described by Remington and Pollack (2007) suggests that evolutions of project environment and technology per se could also impede the project completion regardless of how good the contractor's organizational structure is.

Williams (2002), Remington and Pollack (2007) and Masrom *et al.* (2007) have respectively emphasized on the source and importance of complexity which is often the cause of LIPs' failure. This is even more relevant for LIPs developed under the project

finance scheme which, by definition, are complex projects with complex contractual structure linking various interdependent stakeholders and tasks that must interact harmoniously. Such complexity undoubtedly results in high costs and demand for careful risks allocation among project's stakeholders.

2.1.2. Capital intensiveness

Salman *et al.* (2007) observed that the procurement process for public facilities by private sector was very "*complex, risky, sophisticated, and ultimately expensive*". Thus, he advocated that LIPs feasibility studies needed to be carefully designed and confirmed before any undertaking. Masrom *et al.* (2015) also observed that large projects were so capital intensive and that the likelihood of investment losses were exacerbated by the high inter-dependency of tasks.

Even though many other scholars recognize the capital-intensiveness of LIPs, previous researches do not define a specific capital size of LIPs. Some scholars such as Dunoviüa *et al.* (2014), while analyzing LIPs in Croatia, considered a threshold of EUR 50 million. According to the Inframation database (2019), the average greenfield LIP size in Sub-Saharan Africa (reaching financial close) under the project finance scheme was estimated at EUR c.222 million between 2010 and 2018, see Table 3.5.2. Nevertheless, to be more inclusive this research considers LIPs with capital value greater than EUR 100 million. Most of the LIPs falling in this category are highways, airports, power plants (hydro, gas, etc.), railways and ports. These LIPs may be funded publicly, privately or through public-private partnerships.

Table 2.1. Projects closed in SSA between 2010 and 2018 (Inframation, 2019).

Sector	**Number of projects**	**Average project cost (EUR million)**
Environment	3	160.5
Other	1	34.4
Power	21	270.7
Renewables	69	193.0
Social Infrastructure	8	61.2
Telecommunications	2	312.7
Transport	15	390.4
Total	**119**	**222,3**

In recent years, due to the complexity and the high costs involved in this sort of projects, governments have increasingly recourse to the private sector, to mobilize financing and provide expertise in developing, constructing and operating these projects. Therefore, the project financing framework constitutes a tool helping government to bridge the financing gap while ensuring maximum level of services required to operate those strategic assets.

2.2. Overview of Project Finance Framework

Project finance is not a practice reserved to infrastructure sector. It has been used in many other domains to finance industrial prospection and research and development (R&D) projects particularly in the mining and oil and gas sectors where it has known a great success. Historically, the use of project financing can be traced back to the 13th century with the Devon silver mine project developed by the English Crown with a loan secured from an Italian merchant bank named Frescobaldi (Merna *et al.*, 2010). The modern project finance is assumed to begin in the 1970s, with the successful development of the North Sea project in the oil and gas sector sponsored by British Petroleum. The sponsors succeeded to raise up to US$ c.950 million from more than

65 banks (Merna *et al.*, 2010).

Even though the underlying principles of project finance are unique, researchers and professionals had struggled to agree on one single definition of project finance. Wynant (1980) defined project finance as "*a financing of a major independent capital investment that the sponsoring company has segregated from its assets and general-purpose obligations*". Other authors such as Merna *et al.* (2010) defines project finance as the procurement scheme in which "F*inancing of a stand-alone project (or bundle of projects) is structured by using a group of agreements and contracts between lenders, project sponsors and other interested parties that create a form of economic unit; lenders and investors will look primarily to the economic unit to generate cash flow as the sole source of repayment of principal and interest and collateral*". These complementary definitions point out the two important aspects of project finance: project independence and non/limited recourse to sponsors. The latter is considered by a wide range of scholars as the main pillar of project finance.

2.3. Main Features of Project Finance

Project finance mainly differs from other means of financing like corporate finance or public financing in terms of structure and risk allocation. In fact, the identified risks in a specific project determine the number and type of stakeholders required in order to properly mitigate the risks. Stakeholders will then allocate the risks through a set of carefully designed contractual arrangements. This entire structure is inched on the project company's ability to (i) enter into sound contractual agreements with subcontractors and insurance companies, (ii) protect sponsors and lenders interests and (iii) perform in accordance with the business model. Thus, this section highlights some of the key features found in project finance transactions.

2.3.1. Independent Entity

Sponsors achieve project independence from their core business by creating an ad hoc company called the special purpose vehicle (SPV) or project company. The

SPV sole purpose of existence is the execution of the project. Therefore, after the project construction and operation is completed, sponsors either liquidate the project company or define a new operational purpose. The project company is an entity legally distinct from the sponsors' corporations, but it remains under their control through the shareholding. The SPV enters into agreements with the public authorities, loan providers, Engineering - Procurement - Construction contractors, Operation and Maintenance contractors, etc. This specific legal structure allows project developers to fund raise on a non-recourse or limited recourse basis (Gatti, 2008).

2.3.2. Non-Recourse or Limited Recourse

The ability of the borrower (i.e. the SPV) to repay the loan on a non-recourse or limited recourse basis is one of the key differences between corporate finance and project finance. A financing is said to be *nonrecourse* when lenders are repaid only from the cash flow generated by the project or, in the event of complete failure, from the value of the project's assets (Vinter, 1998). A recourse is limited when lenders have a definite and restricted pledge to the assets of a SPV shareholder (Menheere and Pollalis, 1996). In corporate finance, lenders' loans are backed by the entire balance sheet of the sponsoring companies. This means in case of project's failure, lenders have their security and collateral over the entire assets of the sponsors and therefore have a significant level of comfort in being repaid, provided strong sponsors' balance sheet (Merna *et al.*, 2010). On the contrary, in project finance, the borrower (SPV) has no operating history. Since the newly incorporated company does not have any credit rating or operating histories, it is important for lenders to focus on the specific project's economics such as future annual cash flows and debt service ratios. Vinter (1998) recognized that non-recourse project financing made it possible for many LIPs to be constructed since lenders relied mainly on the forecasted revenues to repay the loan and on the project's assets as collateral rather than the sponsors' credit worthiness. On the other hand, in corporate finance, any assets of the borrower such as accounts receivable, inventory, land and/or buildings related or not to the project are all considered as collateral (Gatiti, 2008). Therefore, since the main collateral is the physical facility (land, building, railway, highway, etc.) in project financing, it is of paramount

importance for lenders and sponsors to select a well able contractor to ensure fair value of the asset in order to prevent any investment loss due to poor construction.

2.3.3. Risk Allocation

LIPs procured through project finance are generally highly risky for the lenders, the sponsors and the granting authorities due to their high level of complexity. The way risks are allocated among the parties involved in these LIPs is of keen importance to ensure the project success. This allocation is achieved and codified in a tailored contractual arrangement between the project company and the other participants (Khan and Parra, 2003). For instance, construction risks are commonly addressed via a fixed-price, turnkey contracts including bonus-malus mechanism (Fight, 2006). Political risks, on the other hand, are in most cases allocated to the granting authority (Yescombe, 2002). The risk allocation is further discussed in Section 2.7.

2.3.4. Contractual Structure

Project finance procurement is also known for the complexity of its contractual structure. Those contracts are indispensable tools for credit support in project financing. In effect, Merna *et al.* (2010) claimed that the contractual arrangement in a project finance setting determines how the risks are structured among parties, in order to provide security over the forecasted cash flow. Figure 2.1 describes for instance a typical contractual structure for project finance in the energy sector. The contractual architecture is intrinsically linked to the project risks and the transaction type (i.e. Greenfield, brownfield, refinancing, concession, availability, etc.) contemplated for a given project. The more stakeholders are involved in the project, the more complex the contractual structure will be.

In the following Sections some of the key stakeholders presented in Figure 2.1 will be discussed in more detail.

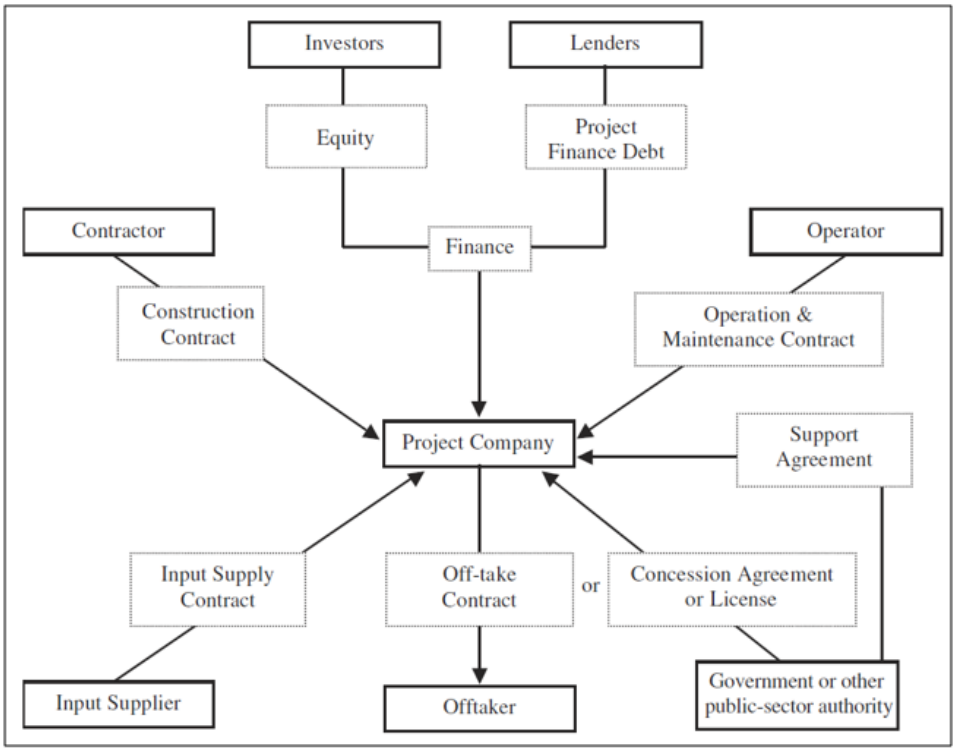


Figure 2.1. Project finance structure (Yescombe, 2002).

2.3.5. Robust Cash Flow

As mentioned in previous Sections, the main lenders' collateral in a project finance transaction is the project assets and the cash-flow. Consequently, the SPV must be capable of generating sufficient and robust cash to repay the debt and also ensure the expected return on investment. Lenders and sponsors in every project finance do extensive due diligences (financial, legal, tax and accounting, revenues, traffic, insurance, etc.) on the project environment and economics to identify all possible risks or potential events susceptible to affect the cash flow (Gatti, 2008). Due to the high level of indebtedness, LIPs in project finance tend naturally to require long-term contract to permit the SPV to repay the loan and ensure a descent return on investment for sponsors.

2.4. Types of Project Procurement and Degree of Interfaces

There are different ways for the public sector to assigne projects to private developers. The obligations transferred to the private sector define the different varieties of project procurement available for LIPs. These obligations mainly consist in designing, planning, constructing, operating or a combination of them. The choice of the procurement process, however, depends on the duration of project, costs and the level of risk the granting authorities wish to retain. Menheere and Pollalis (1996) present no less than six types of procurement processes among which design-bid-award (DBA), Design-build (DB), build-operate (BO), build-operate-transfer (BOT), build-own-operate (BOO) and build-own-operate-transfer (BOOT), see Figure 2.2.

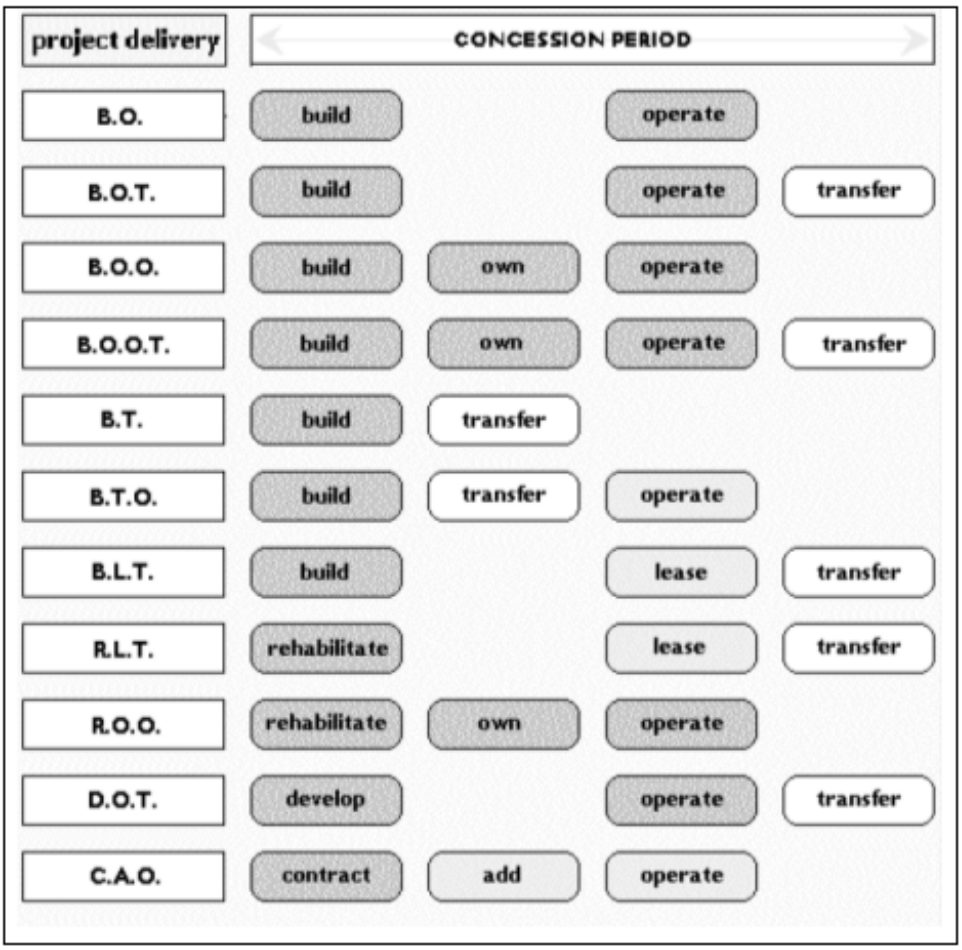


Figure 2.2. Concession procurement processes (Menheere and Pollalis, 1996).

Each one differs from the other either by its scope, the number of interfaces to be managed by the granting authority and the project's ownership. For instance, in a design-bid-award process, each scope (or phase) is executed by a different stakeholder. In other words, four potential contracts - for the development (feasibility stage), the design, the construction (including the procurement) and the operation - are entered into with different parties. In this case, the public authority retains ownership of the project and a significant level of interface risks between the different scopes. This can be very costly in a LIP development. For this reason, the public authority often seeks to reduce its risk exposition by limiting the number of interfaces between contracting parties. Such transfer of risks can be observed in the design-build procurement, for example, where there is only one contractor for both design and construction (see Figure 2.3) In this procurement process, the public sector reduces its exposition with respect to design and construction but remains the owner of the asset. On the other hand, in a BOOT or BOO procurement, the public authority transfers all project specific risks (financing, interface, design, construction and operation risks) to the project company including the project ownership for a limited period (Yescombe, 2002).

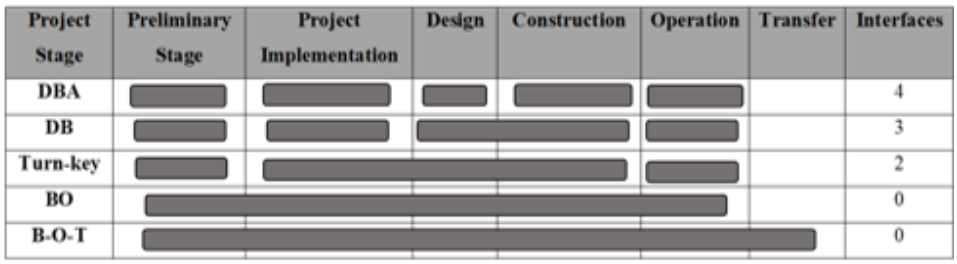


Figure 2.3. Project procurement and interfaces (Menheere and Pollalis, 1996) DBA stands for design-bid-award (DBA), DB stands for Design-build, BO stands for build-operate and B-O-T stands for build-operate-transfer.

2.5. Stakeholders and Contractual Structure

There are several parties involved in a LIP development. Each key stakeholder is bound to the SPV by a tailored contract designed to allocate the role and risks during the life of the project Five major participants (excluding the SPV) are identified in most

LIPs procured through project finance as shown in Figure 2.4 below. The SPV is the core legal entity in charge of carrying out the project while the concession agreement constitutes the prime contract upon which depend all other contractual bonds.

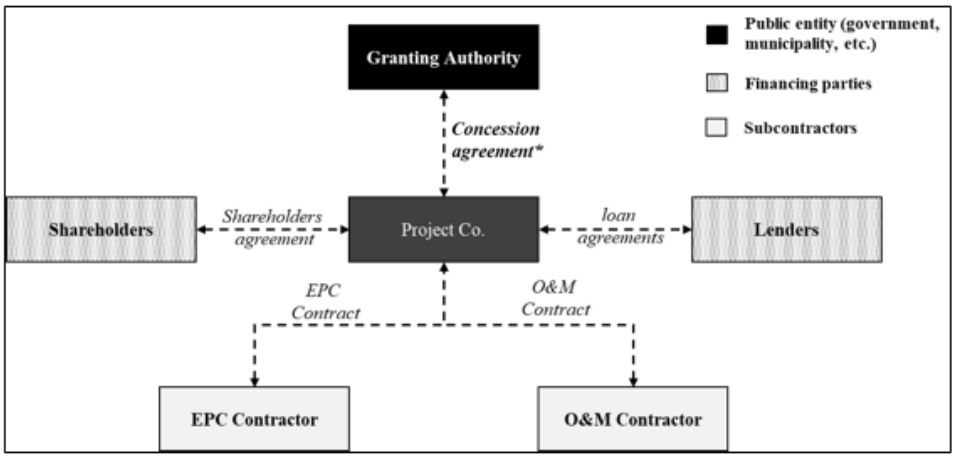


Figure 2.4. Key stakeholders and contracts in project finance (Adapted from Yescombe (2002)).

These contracts are strongly related to each other and eventually impact either the design, the construction or the operation of the facility. Each party sees itself allocated a set of risks and obligations holding it accountable for the project success. It is, therefore, crucial to assess the suitability of each stakeholder and design contracting strategy with clear obligations (EFCA, 2001).

2.5.1. Public Authority and Concession Agreement

Every LIP procured through a Public-Private Partnership (PPP) scheme, by definition, is conceded by a public authority whether through an international or unsolicited bid process. The public authority is often a local government and, in most cases, participates indirectly in the projects with a mere influential role (approval of the project, control of the state entity in charge of operating and environmental licenses, tax holidays, supplying guarantees, controlling industry regulations or policies, etc.) (Comer, 1996). The concession agreement defines the rights and obligations between the grantor (i.e. the public entity) and the grantee (i.e. the project company). It iden-

tifies and allocates the risks associated with the project - construction risks, operation risks, maintenance risks, financing obligations and revenue risks and packages (Merna *et al.*, 2010).

Based on revenues risks, whether they are transferred to the SPV or retained by the public authority, PPP agreements in LIPs can be categorized as availability contracts (i.e. revenue risk for the public authorities) or demand-risk contracts (i.e. revenue risk for the SPV). In an availability contract, the project company is paid for making the facility "available" for end-users whether there is a high or low demand for the service. However, in a demand-risk contract, the SPV collects its revenues directly from the end-users, and as such it is completely dependent on demand for the service (DELG, 2000). From an investor perspective, the latter is riskier than the former, hence requires more complex guarantee mechanism and financing structure.

According to Yescombe (2002), the main issues addressed in concession contracts are:

(i) Concession period;
(ii) Financial ceiling of development costs;
(iii) Financial ceiling of usage costs;
(iv) Construction process and period;
(v) Method of operating the project;
(vi) Contract termination;
(vii) Transfer condition;
(viii) Force majeure;
(ix) Third party liability; and
(x) Obligation and rights.

2.5.2. Sponsors and Shareholders Agreement

Sponsors are private or public corporations having a stake in the project, especially through the project company. There are also cases where the grantor or its

affiliate retains a minority shareholder in the project company (Yescombe, 2002). Sponsors are often composed of a single company or a consortium depending on the size of the project and risk appetite of each participant. They generally organize themselves in consortia to deal with corporate disadvantages by combining their strength in order to win a bid. According to Comer (1996), there are three main categories of sponsors:

(i) Industrial sponsors (including contractors), whose core business is directly linked to the project
(ii) Public sponsors
(iii) Investors (private equity firms, banks, pension funds, insurance companies, etc.)

Gatti (2008) claimed that there is an additional benefit when contractors are also shareholders in the SPV because their profit also depends on the project's successful completion. Indeed, in such scenario, constructors are highly motivated to finish the construction on time, within budget, and in accordance with the performance specifications set down in the contract. In fact, on top on their construction margin, they are also entitled to receive dividends.

The shareholders agreement is the contract signed between the SPV and the sponsors. The latter purchases shares capital and/or provide debt (also known as shareholders' loan or junior debt) but retain legally independent from the SPV. Their financing participation is generally determined by debt/equity ratio required by the lenders or by a provision of the concession agreement (Khan and Parra, 2003).

2.5.3. EPC Contractors and EPC Contract

In LIPs procured through project finance, the SPV delegates the engineering, procurement and construction obligation from the concession agreement to an EPC contractor (individual construction companies or a joint venture of specialized construction and service companies) with which it enters into an EPC contract. The contractor is then responsible for constructing the project in accordance with the technical specifications outlined in the concession agreement. The EPC contractor will then, to

the extent possible, sub-contract local firms for local components of the project (Rossi and Stepic, 2015). This contractual arrangement is further discussed in Section 2.8.

2.5.4. O&M Provider and O&M Contract

The Operation and Maintenance contractors (O&M contractors) are responsible for operating and maintaining the assets at maximum efficiency level. Depending on the level of sophistication required to operate the project, the O&M contractor might be a multinational, a local company or a joint venture (Comer, 1996). It is not uncommon to have also a tripartite interface agreement signed between the SPV, the EPC contractor and the O&M contractor to reduce the SPV's risk exposure related to interface between EPC and O&M scopes.

The SPV and the O&M contractor enter into an O&M contract by which, the SPV passes down all operation and maintenance obligations under the concession agreement to the O&M provider.

2.5.5. Lenders and Loan Agreement

A lender is any internationally recognized financial institution. The common lenders involved in LIP deals are:

- Commercial banks: As opposed to investment banks, commercial banks are financial institutions which offer services like deposits, account (current and saving) management, loans and other financial products to people or corporations in a given country and regulated by the central bank.
- Multilateral and bilateral agencies: they comprise development finance institutions (DFIs) and International Finance Institutions (IFIs). The common DFIs and IFIs operating in SSA include institutions such as International Finance Corporation (IFC), the Development bank of Southern Africa (DBSA), the African Development bank (AfDB) and Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (FMO). They are the major loan providing parties in SSA

(Inframatoin, 2019). In addition, these institutions often play a facilitating role for projects by implementing programs to improve the regulatory frameworks for broader participation by foreign companies and the local private sector (Yescombe 2002).

- Export credit agencies (ECAs): These institutions are involved to the extent that the project requires importation of goods and materials. ECAs in most case provide loan guarantees or funding to projects for an amount that does not exceed the value of exports goods used in the project (Gatti, 2008).

Yescombe (2002) reports that lenders are preferably selected from financing institutions working in the project country (local banks or foreign banks with local subsidiary) because (i) they have the best understanding of local conditions, and (ii) they can provide funding in local currency hence mitigating foreign exchange risks. In addition, commercial banks constitute the largest proportion of financing for project finance in developed market (Rossi and Stepic, 2015). However, in most developing countries (including sub-Saharan countries) this approach is generally not possible. Local financings are hindered by either the absence of a domestic market for long-term loans or the lack of experience in project finance displayed by domestic banks. For this reason, in developing markets, the majority of LIPs are constructed with foreign direct capital from private investors and banks.

Lenders sign with the SPV loan agreements under which they commit to provide financing under certain terms as defined in the loan documentation (including ethic codes, action plans, reporting, audits, minimum performance indicators, cover ratios, etc.). Before joining any LIP, lenders normally engage in long due diligence processes to assess the viability of the project (including a thorough assessment of the Engineering-Procurement-Construction contractor) (Vinter, 1998). These due diligences vary according to the type of project, but they usually consist of traffic studies, legal, environmental, tax and accounting, financial and technical assessment.

Bearing in mind that construction period is the most critical phase of the project (because the asset is not completed yet and the cash repaying the debt is not generated

yet), lenders attached a keen importance to the quality of the contractor and the security package put in place (Fight, 2006). A typical loan agreement includes step in right, event of default, convents, financial ratio, loan amount, right of obligation of parties, etc. (Gatti, 2008). To ensure that they will be reimbursed the loan and the project will generate enough cash to repay the loan, lenders also sign direct agreements with the granting authority, the EPC contractor and the O&M contractor. These direct agreements give the lenders the right to step in and take over the project by replace either the SPV, the EPC contractor or O&M contractor in case of poor performance or default.

2.6. The Benefits of Project Financing

Considering the high costs involved in structuring project finance transactions, in comparison to other project procurement process, one could actually wonder "*why using project financing?*". There is no singular answer to this question since the project finance framework involves numerous stakeholders with different agendas. To better understand the advantage of project finance, it is worthwhile approaching this question from grantor and grantee's perspective.

2.6.1. The public sector (Grantor)

Project finance mainly benefits to the public sector in four different ways: risk transfer, additional financing, knowledge transfer and cost control.

(i) Risk transfer: In project finance the design, finance, construction and operation obligations (and related risks) under BOT, BOO, and BOOT contractual structures are transferred to the private sector.

(ii) Additional financing: the public sector does not participate (or does so very marginally) in the construction and operation costs. This enables the public sector to alleviate government budget and allocate corresponding funds to other projects (Vinter, 1998).

(iii) Knowledge transfer: The public sector also benefits from the knowledge sharing

between international experts and local professional since the LIPs are often multidisciplinary projects which involve specialized knowledge.

(iv) Cost control: Project financing allows the granting authorities to have better control on cost through definite payment mechanisms in concession contracts including penalties for poor performance of the private sector (Khan and Parra, 2003). According to Remington and Pollack (2007), even though the scope, time and cost of each element can be estimated with a high degree of accuracy, the countless number of interdependent elements suggests that a single change in terms of either scope, schedule, cost or quality may set off a chain reaction involving the other interrelated elements. Such chain reaction represents a colossal financial risk that the public sector can transfer to the private sector under a BOT, BOOT or any similar scheme.

2.6.2. The Private Sector (Grantee)

The principal reasons sponsors elect to engage into a project finance framework comprise high leverage, tax benefits, off-balance-sheet financing, risk limitation and risk spreading (Yescombe, 2002).

(i) High leverage: In fact, most of the LIPs developed under a project finance scheme are characterized by high leverage. According to Flight (2006), debts in project financing are provided with leverage that could reach up to 85% in developing countries. High leverage for long-term project has the potential to generate also higher rate of return for an investor, as can be seen in Table 2.2).

(ii) Tax benefits: With a high leverage, come also high interest amounts that are in many jurisdictions tax deductible, whereas dividends to shareholders are not. This phenomenon improves sponsor's dividend profile and enhance return.

(iii) Off-balance-sheet financing: as described earlier, project finance enables sponsors to keep the debt off the consolidated balance sheet.

(iv) Risk limitation: Debt raised in the project financing is often raised on a non-recourse or limited recourse basis. It means that investors do not normally guarantee the repayment of the debt in full hence limiting their exposure to the amount

of the equity investment. v) Risk spreading (joint ventures): As mentioned by Finnerty (2007),

(v) LIPs in project finance require many disciplines to be brought together even at sponsors levels. Consequently, some investors undertake to share the risk in a joint-venture. This enables the risk to be spread between investors and limits each investor's risk exposure.

Table 2.2. Impact of high leverage on RoE (Adapted from Fight (2006)).

		Low leverage	**High leverage**	**Description**
(a)	Project costs (m£)	100	100	
(b)	Leverage (%)	60%	80%	
(c)	Equity (m£)	40	20	(a)x[(1-(b)]
(d)	Debt (m£)	60	80	(a)x(b)
(e)	EBIT (m£)	10	10	
(f)	Debt's Interest rate (% p.a.)	5%	5%	
(g)	Interest due (m£)	3,0	4	(f)x(d)
(h)	Taxes rate (%)	15%	15%	
(i)	Taxes payable - (m£)	1,1	0,9	[(e)-(g)]x(h)
(j)	Earnings (m£)	6,0	5,1	(e)-(g)-(i)
(k)	**RoE (%)**	**15%**	**26%**	**(j)/(d)**

2.7. Risk Allocation in Project Finance

Risks are inherent to every LIP whether in SSA or in any other part of the world. Jaafari (1990) defined risk as the potential or actual adverse events that could jeopardize the project performance resulting in partial or complete failure of the project. Gatti (2008) believed that "*risk is a crucial factor in project finance since it is responsible for unexpected changes in the ability of the project to repay costs, debt service, and dividends to shareholders*". If potential risks are not identified and properly mitigated, they will undoubtedly cause a cash shortfall. With insufficient cash to pay creditors, the project will be technically in default.

In project finance, risks are shared among all parties involved in the project. Given that they cannot rely on the SPV credit worth, lenders pursue a risk-averse credit policy and ensure that any potential risk is well mitigated before it could affect project's sustainability and loan repayment (Vasilescu *et al.*, 2009). Therefore, potential risks and their mitigants need to be identified upfront by project stakeholders (Vinter, 1998).

According to Gatti (2008), the SPV deals with risks in three different manners: (i) either it retains the risk, or (ii) it transfers the risk to one of the key counterparties or (iii) it transfers the risk to insurance companies. Project risk profiles evolve according to each development phase (whether it is under construction or under operation). The main risks faced with in developing LIPs include construction, revenue, financial, political and operating risks (Fisher and Babbar, 1996).

2.7.1. Construction Risks

Construction risks consist of all risks emanating from design changes, supply chains, quality of materials, weather conditions, unforeseen ground conditions, unavailability of materials and labor grievance causing delays and cost overruns. In almost every concession agreement, the SPV takes primary responsibility for cost overruns and delays during the construction period and transfer them to an EPC contractor through a fixed price contract (Finnerty, 2007).

2.7.2. Revenue Risks

Based on the agreed payment mechanism, revenue risks can involve either payment default or payment delays. In either case, in most of LIPs and especially in developing countries, the sponsors and lenders require a guarantee from the government to secure revenues should the granting authority fail to honor a payment obligation (Fight, 2006).

2.7.3. Financial Risks

Financial risks are of three kinds: Funding, currency and interest risks (Fisher and Babbar, 1996):

(i) Funding risks are related to the unavailability of capital necessary for the project. Usually lenders address these risks by a serie of due diligence on sponsors' financial strength (Yescombe, 2002). During drawdown period, they either require the shareholders to inject their total equity before any loan is drawn (this is also known as upfront equity injection) or require a collateral such as liquid financial instrument during the drawdown period which can be used at any time by lenders should the sponsors fail to provide their share of capital.

(ii) Currency risks are of two kinds in project financing of LIPs. The first risk is the currency control risk imposed by governments to limit access to foreign currency. This risk is either dealt with in the concession agreement or by means of swap instruments (Khan and Parra, 2003). The second risk is exchange rate fluctuation which can cause contract value depletion or cash shortfalls when debt service or dividend are to be paid to foreign investors in a foreign currency.

(iii) Interest rate fluctuations oppose considerable risks for highly leveraged projects. To mitigate these risks the SPV could either find long-term financing at fixed rates or enter into interest rate swaps to hedge against interest rate fluctuations (Khan and Parra, 2003).

2.7.4. Political and Country Risks

The political and country risks are the consequence of environment changes in terms of political landscape, tax policies, laws and regulatory frameworks, civil unrest, guerrilla sabotage of projects, work stoppages, any form of political force majeure, exchange controls, monetary policy, inflationary conditions, expropriation, foreign currency convertibility and transferability, etc. (Vinter, 1998) These risks are usually addressed in the concession agreement and allocated to the granting authorities. Furthermore, in developing countries (especially in SSA), it is not uncommon to have

sponsors covered by political risk insurance (PRI) such as the Multilateral Investment Guarantee Agency (MIGA) (Coles, 2000). Also, the presence of multilateral institutions and export credit agencies contributes in reducing political risks hazard.

2.7.5. Operating Risk

They consist of all risks occurring in the life of the project from its commissioning until the end of the concession contract and are related to management and maintenance of the assets. Just as construction risks, operation risks are dealt with through contracts with appropriate penalties and remediation measures (Vasilescu *et al.*, 2009).

There are other residual risks not listed above which have to be addressed by the SPV only. These risks are generally mitigated using insurance policies. According to the Infrastructure Consortium for Africa (ICA) Report (2014), investors consider that most risks hindering project development in SSA are mainly country related risks such as bureaucracy complexity, political uncertainties, lack of transparency and institutional incapacity (Figure 2.5).

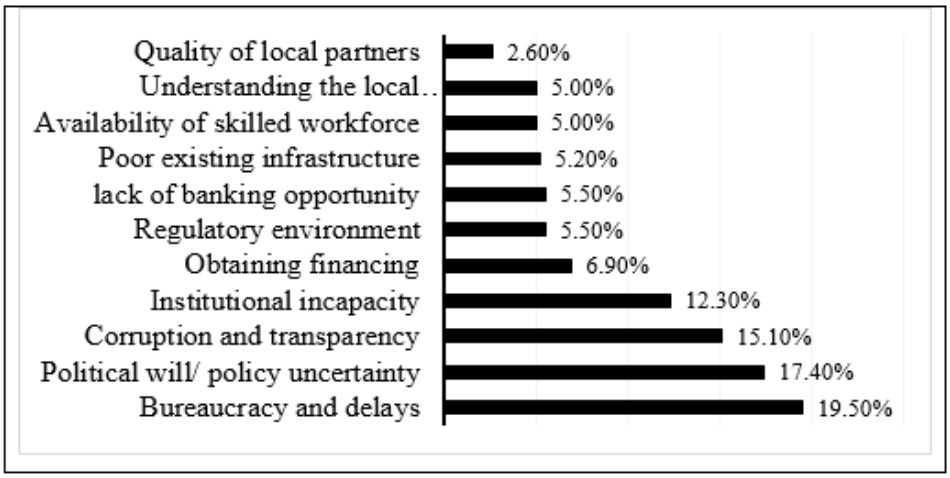


Figure 2.5. Challenges faced by investors in African LIPs (ICA, 2014).

Similarly, the report suggests that investors are also exposed to higher financial risks and cost of financing (Figure 2.5).

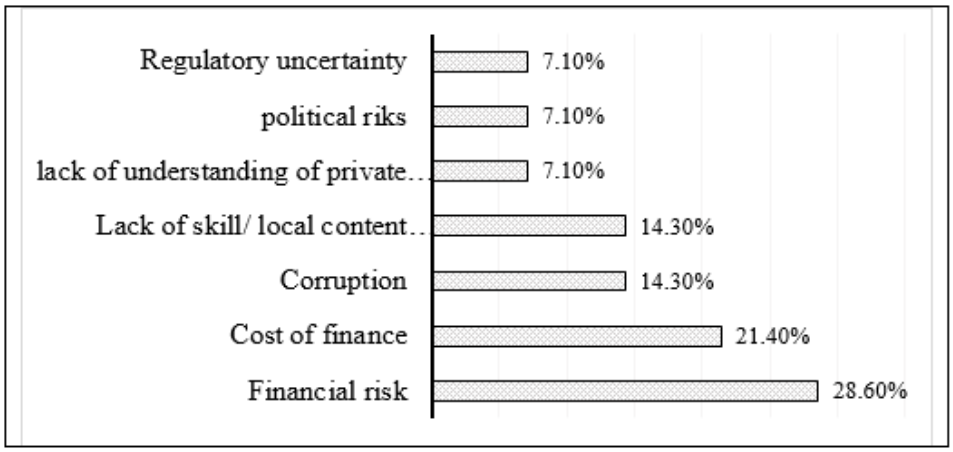


Figure 2.6. Investment risks in SSA (ICA, 2014).

2.7.6. Advisors

Considering the complexity in financing LIPs, sponsors and lenders have recourse to various external advisors, each to cover a specific aspect of the project during sponsors' or lenders' appraisal phase. In addition, having advisors with a good track record increases project's credibility (Yescombe, 2002). Advisors involved in LIPs generally include legal, technical advisors, insurance, tax and account advisors, traffic advisors, financial advisors and auditors (Coles, 2000). Lenders appoint their own external advisors, mainly to check the work accomplished by sponsors and their external advisors.

Legal advisors are somehow the architects of the contractual structures in project finance deals. In effect, Finnerty (2007) considers that legal advisors play a key role in project finance because so much of project finance is about structuring contracts. In addition, Gatti (2008) asserted that legal counsels' responsibility does not end with drafting project contracts, but they must also ensure that all contracts interact in such a way compatible with project finance requirements. When acting on lenders' behalf, the legal advisor carries out due diligence on all relevant project contracts and assist the lenders in negotiating the financing documentation. Besides the legal advisor, the technical advisor is also of prime importance for the lenders. In fact, Yescombe (2002) observed that while performing a technical due diligence for the lenders, the technical advisor (LTA) assessed technical and contractual matters including suitability of

project site, project technology and design, experience and suitability of the EPC Contractor, technical aspects of the EPC Contract, construction costs and contingencies, construction schedule and construction and operation permitting.

During project construction, the LTA monitors the progress of the project and review information provided by the project company, the owner's engineer, and the EPC Contractor. It then submits regular reports to the lenders, highlighting any particular issues that could impact the positive outcome of the project. In addition to monitoring activities, the LTA is also required to assess the validity of EPC contractors' invoices and confirm the attainment of predefined milestones and performance level before lenders could disburse to pay the EPC invoices (Fight, 2006).

2.8. EPC Contracts and Contractors

As described in the literature review above, project financing for LIPs is rooted in a mosaic of contractual arrangements that define not only the relationship between the stakeholders but also impose a certain profile for participants. Hence, in order to find the key characteristics of EPC contractors in a project finance, it is important to understand the key requirements and risks allocation set in EPC contracts.

2.8.1. Contract Strategy

The contract strategy is at the inception of all risk allocation strategy within the EPC context. It determines the way in which the delivery systems are packaged and paid for by the owners (sponsors and lenders). The owner's sole recourse in project finance is the enforceability of contractual setting or risks allocation. There are two types of EPC contracts that have been used in LIPs in recent years: the cost-plus contract (or cost-reimbursable contract) and the lump-sum turnkey contract (Galloway, 2009). The main difference between these two contracting strategies is the allocation of cost escalation risks between the owner and contractor. Remington and Pollack (2007) acknowledge that escalation risks can substantially affect the construction cost, especially in LIPs which are often long-term projects subject to great variability and

uncertainty.

In cost-plus contracting, the contractor can claim for its costs as they are actually incurred with a total escalation risk transferred to the owner (Galloway, 2009). These costs include labor, materials, equipment, subcontractors, and overhead. Therefore, the contractor does not take the risk on resource and material price. In fact, its margin (often presented as a percentage of the overall cost) comes in addition to costs. The contractor's margin in this case is split into a base portion and an additional fee at risk which will still be due to the contractor, if it meets or exceeds the original specifications. This type of contract is mainly EPC contractor friendly and does not completely fit the project finance constraints because the owners bear a significantly higher cost, schedule and management risk than in a lump-sum contract (Chen, 1993). Similarly, Yescombe (2002) explained that fixed-price, date-certain, turnkey EPC Contracts transfer a significant amount of responsibility and risk to the EPC Contractor. Therefore, contract prices tend to be higher than those defined on a cost-plus basis, simply because EPC Contractors incorporate more contingencies into the contract costings.

In fact, in lump-sum turnkey contracting, the prices of goods and services provided by the EPC contractors are fixed. In this type of contracting, any unforeseen costs which are not strictly addressed in the contract are likely to be assumed by the contractor (Galloway, 2009). Finnerty (2007) further asserted that, while entering into an EPC lump-sum contract, EPC contractors acknowledge that they have the obligation to provide the project scope and quality that meets the owner's (i) technical specifications and functionality, (ii) required scheduled and (iii) quality expectation, all for a fixed cost. Nevertheless, Khan and Parra (2003) observed that lump-sum/fixed price contracting are increasingly challenging for EPC contractors because projects are more and more sophisticated with higher risk profiles, higher standard in terms of sustainability and responsible development, all coupled with contractual guarantee provisions.

To face the increase financial risk, Galloway (2009) observed that fixed price in EPC contracts for LIPs include worst-case and best-case scenarios based on risk ex-

posure. The worse-case scenario includes a buffer in the form of a contingency which can represent up to 15% of the estimated price. On the other hand, in the best-case scenario, i.e. under complete control of project risks, such contingency will ultimately transform into additional margin for the EPC provider. Loots and Henchie (2007) claimed that in large infrastructure projects, particularly those in project finance, financing parties tend to impose fixed price, lump-sum turnkey contracts to get a degree of certainty as to time and costs required for the project. The authors also reported that banks tend to avoid LIPs in which identified EPC contractors have no track record of success.

2.8.2. Risk Allocation in EPC Contracts

In EPC contracts, the EPC contractors are in charge of the engineering and design of the project, the procurement of all materials and equipment and the project fabrication or construction. The risk allocation during construction, as shown in Figure 2.7, is operated at two levels in project finance:

(i) Between the granting authority and the SPV; and
(ii) Between the SPV and the EPC contractor

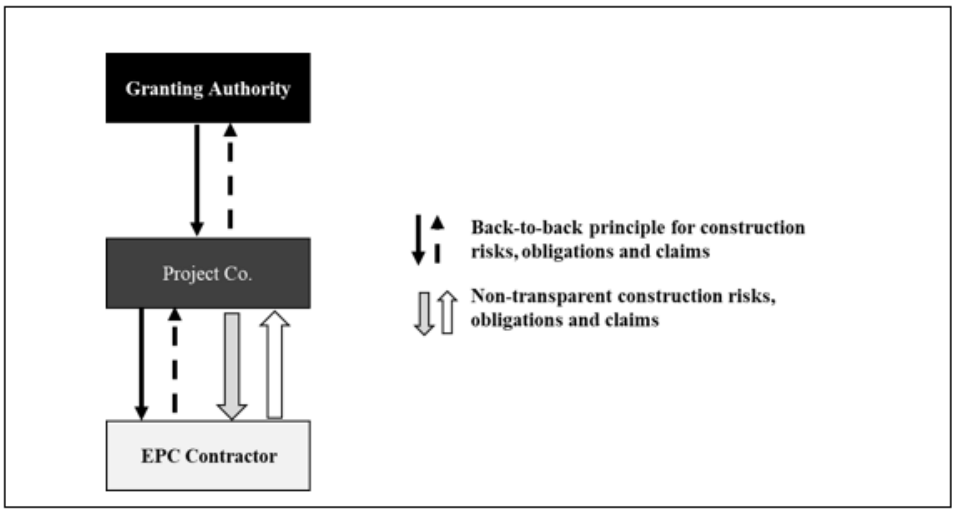


Figure 2.7. Construction risk flow from grantor to EPC contractor.

2.8.2.1. Between the Granting Authority and the SPV. As discussed in Section 2.5.1, the risk allocation between the grantor and the project company is detailed in the concession agreement, to which the EPC contractor is not a party. However, in some transactions, the EPC contractor participate in the shareholding of the SPV to ensure a proper risk allocation between the SPV and the public authority regarding construction risks (Fight, 2006). Construction risks that are allocated to the SPV are ultimately transferred to the EPC contractor in accordance with the back-to-back principle (Vinter, 1998). In their research paper, Ke *et al.* (2010) suggested that risks related to the environment of the project (macro-economic, political, etc.) are allocated to the public sector while the project specific risks are to be borne by the private sector. They have identified seven common risks that are generally allocated to the public sector and 22 risks (meso and micro risks) which are commonly assigned to the private sector (Table 2.8.2.2).

2.8.2.2. Between the SPV and the EPC Contractor. Risk allocation between the SPV and the EPC contractor are addressed within the EPC contract. They often vary according to the project environment and technology, but the allocation strategy tends to remain the same across projects. Sadeghi *et al.* (2016) explained that there are 26 recurring risks during construction to be allocated between project companies and the EPC contractors which can be categorized in two groups: External and internal risks (see Table 2.4).

Table 2.3. Constructions risks in the concession agreement (Ke *et al.*, 2010).

Risk factors	**Group**	**Subgroup**
Expropriation or nationalization of assets	Macro	Political
Unstable goverment	Macro	Political
Delay in Project approvals and permits	Meso	Design
Poor public decision-making process	Macro	Political
Legislation change	Macro	Legal
Strong political opposition/hostility	Macro	Political
Level of public opposition to Project	Macro	Social
Lack of tradition of private provision of public services	Macro	Social
Change in tax regulation	Macro	Legal
Land acquisition (site availability)	Meso	Project selection

Table 2.3. Constructions risks in the concession agreement (Ke *et al.*, 2010) (cont.).

Risk factors	**Group**	**Subgroup**
Late design changes	Meso	Construction
Level of demand for Project	Meso	Project selection
Inflation rate volatility	Macro	Macroeconomic
Force majeure	Macro	Natural
Excessive contract variation	Meso	Construction
Differences in working method and know-how between partners	Micro	Relationship
Inadequate distribution of responsibilities and risk	Micro	Relationship
Inadequate distribution of authority in partnership	Micro	Relationship
Lack of commitment from either partner	Micro	Relationship
Third party tort liability	Micro	Third Party
Inadequate experiences in PPP/PFI	Micro	Relationship
Poor financial market	Macro	Macroeconomic
Influential economic events	Macro	Macroeconomic
Organization and coordination risk	Micro	Relationship
Residual risk	Meso	Residual risk
Industrial regulation change	Macro	Legal
Environment	Macro	Natural
Interest rate volatility	Macro	Macroeconomic
Operational revenue below expectation	Meso	Operation
High finance cost	Meso	Project finance
Geotechnical conditions	Macro	Project finance
Staff crises	Micro	Natural
Availability of finance	Meso	Operation
Financial attraction of Project to investors	Meso	Operation
Weather	Macro	Operation
Operation cost overrun	Meso	Construction
Low operating productivity	Meso	Design
Maintenance costs higher than expected	Meso	Operation
Insolvency/default of subcontractors/suppliers	Meso	Construction
Design deficiency	Meso	Design
Maintenance more frequent than expected	Meso	Operation
Construction cost overrun	Meso	Construction
Unproven engineering techniques	Meso	Design
Poor quality of workmanship	Meso	Construction
Labor/material availability	Meso	Construction
Construction time delay	Meso	Construction

Table 2.4. Recurring risks addressed in EPC contracts (Sadeghi *et al.*, 2016).

	Risk Groups	**Risk Factor**
External Risks	Economic	1 Inflation or sudden and unforessen fluctation of price 2 Currenct Exchange rate fluctation 3 Sudden rise in equipment and materials because of economic sanction
	Legal-Political	4 Modification of goverment policies 5 Changes in laws and regulations (pollution, safety, etc.
	Natural-Phtsical	6 Force majeure (Earthquake, fire, flood) 7 Unforeseen physical conditins (Geotechnical, environment, pollution)
	Third Party	8 Bureaucratic problems (delays or rigidity in obtaining approvals and permits) 9 Poor communiciation between JV partners
Internal Risks	Contract and scope	10 Inadequate specification and detailing 11 Vagueness of contract clauses and documents 12 Inadequate conceptual design 13 Unfamiliarity with EPC contract conditions for claims and litigations 14 Incomplete and unclear Scope definition due to insufficient feasibility study
	Design	15 Errors and omissions in contract's design 16 Contractor doesn't meet owner's demands (desing changes) 17 Too many change orders by owner
	Owner	18 Financial problem sor bankruptcy like lack of/delayed payments 19 Owner default or delay in delivering construction site or jobsite requirements 20 Owner Delay in approvals/change orders
	Construction	21 Lack of proper construction techniques / defective work 22 Insufficiency of contractor management skills and experience 23 Inadequate quality of work to scoop or profit 24 Default/,ncapability of sub-contractors or suppliers 25 Disturbance/shortage in availability of labor. Material and equipment 26 Different site conditions

External risks result from conditions that are out of control of the private sector and include economic risks (e.g. inflation and exchange rate), legal-political risks (e.g.

change in law or force majeure), natural risks and third-party risks. The external risks are dealt with by inserting in the EPC contract a back-to-back provision with respect to the concession agreement (see Figure 2.7). In other words, both the EPC contractor's and SPV's claims related to external risks are made against the granting authority to the extent applicable in the concession agreement. On the contrary, internal risks are those related to actions or inactions of the EPC contractor and/or the SPV. They include, for instance, design and construction defaults risks, owner's bankruptcy risks or contractors' inexperience.

Furthermore, in terms of external risks, the results obtained by Sadeghi *et al.* (2016) suggested that Economic and third-party risks remained at SPV level, while Natural-Physical Risks were allocated to insurance companies. On the other hand, they suggested that Political-Legal Risks were addressed on case-by-case basis through contract provisions.

As for internal risks, the author advocated that Scope and Contract Risks were best managed through experienced advisory firms at an early stage. Similarly, Design Risks ought to be allocated to EPC contractors by incorporating all design provisions in the contract (i.e. Front-End-Engineering and Design (FEED) approach). For Construction Risks, the authors stressed that the most appropriate mitigation strategy was the selection of a competent and experienced contractor and the appointment of a professional project manager. Lastly, to mitigate Owner Risks, they recommended that project stakeholders including the EPC contractor should investigate on owner's financial strength before committing to the project.

In case the aforementioned risks should occur without any proper mitigation measure, at best the project will incur costs overrun and at worse, the project will default. In fact, the risk that construction costs may overrun the budget uncontrollably is considered as the most important risk for funders during construction phase. As a result, funders tend to select EPC contractor with substantial financial strength which have both the capacity to control their costs and to inject funds in the project to protect the interests of lenders and owners (Yescombe, 2002). Funders also seek to

mitigate completion delay risks with the selection of a capable EPC contractor. In fact, construction delays have the potential to affect the project revenue schedule to cover debt service and O&M expenses. Such delay will then result in higher financing costs (Fight, 2006).

The project risk profile for both lenders and sponsors increase throughout engineering and construction and tend to decrease during operation (Figure 2.8). Thus, the investment risk reaches its highest point toward the end of construction when funders have deployed their total capital but still there is no certainty that the project will perform and operate as anticipated. Furthermore, lenders in project financing are concerned with the design, engineering and construction risks because repayment of their loan mainly depends on the successful completion of the construction (Rossi and Stepic, 2015).

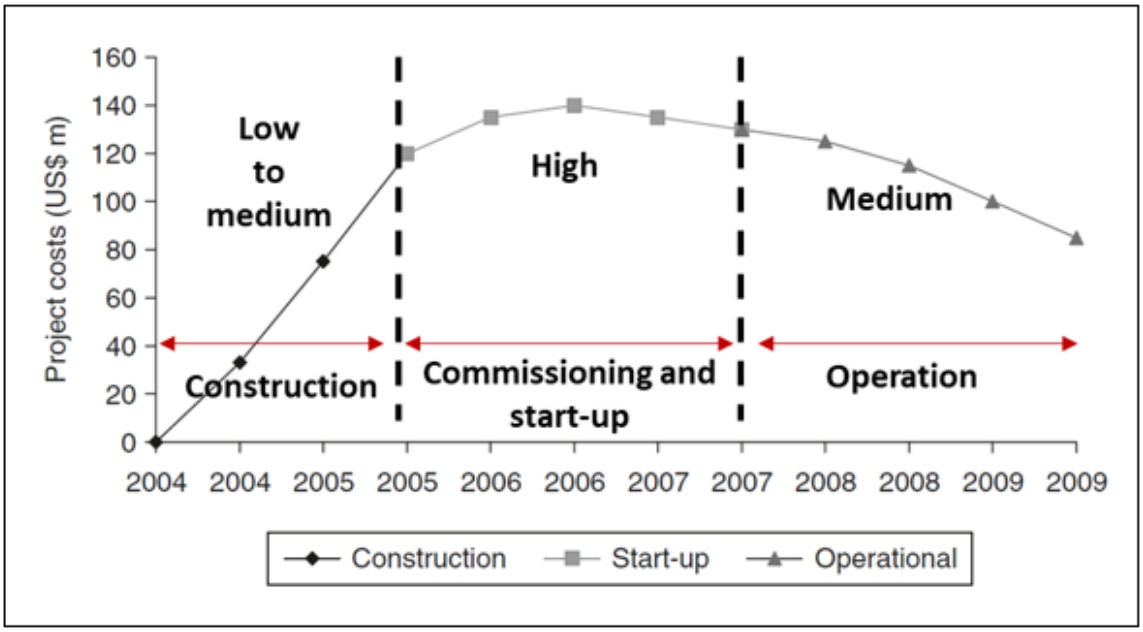


Figure 2.8. Risk phases and project costs (adapted from Fight (2006)).

2.9. Key Features of EPC Contracts

Loots and Henchie (2007) defined the EPC contract as "*a design and construct contract where a single contractor takes responsibility for all elements of design (engi-*

neering), construction and procurement". Delegating design and construction management to a single organization enable the project company to avoid many of the conflicts and interface risks between designers and constructors (Hendrickson, 1998). The EPC contractor has in turn many contracting strategies to deal with these risks and quite often has recourse to sub-contractors to execute part of its scope to the extent allowed in the EPC contract (Yescombe, 2002). For instance, Baram (2005) argues that it is not compulsory to have an in-house design firm to execute EPC contract. In fact, regarding engineering and design risks, the author considers that there are three risk management strategies that EPC contractors can implement: (i) retaining the risks with an in-house design capacity, (ii) sub-contracting a design/engineering firm or (iii) by partnering with a design/engineering firm.

Considering the scale of LIPs and risks during construction, EPC contracts became the preferred contracting strategy for projects' owners to ensure successful projects completion with minimum risk expose. Ke *et al.* (2015) had observed that "*at present, the Engineering, Procurement and Construction (EPC) general contracting mode is one of the mainstream modes in the international project contract*". In addition, Ravanshadnia *et al.* (2010) argues that owners are attracted to EPC delivery systems because they tend to speed up project completion, reduce project cost, simplify contracts, increase constructability and create a single point of responsibility. Similarly, Ravanshadnia (2010) stated that contractors were attracted to EPC delivery systems because of their flexibility and profitability potential. Chen (1993) remarked that funders tend to use EPC contracts because it also offers low financial risk and higher return to contractor when performing well.

However, Hendrickson (1998) advocated that owners contracting a design / construction firm must ensure that the quality of the constructed asset does not suffer from the desire to reduce time or costs. As a result, owners must be relatively sophisticated in negotiating realistic and cost-effective construction contracts. Echoing Hendrickson's (1998) statement, Chen (1993) suggested prerequisites that both owners and EPC providers have to address before entering into an EPC contract. These prerequisites include:

- Defining a clear scope of work;
- Identifying a clear EPC contractor's scope limit;
- Highlighting the owner's responsibility;
- Pointing out project specific issues;
- Defining the equipment and construction standards;
- Resolving site preparation;
- Approving a list of suppliers;
- Developing warranties and guarantees criteria;
- Determining the level of control on lump-sum;
- Defining preference for reporting (frequency and formatting);
- Ensuring a competitive bidding environment; and
- Defining interface limits with other contractors.

In project finance, lenders' consent is indispensable to enter any contract that has an impact on the loan reimbursement. Every key contract, and especially the EPC contracts, are neatly scrutinized by lenders before giving their consent to proceed to the project company.

Vinter (1998) and Yescombe (2002) have respectively observed in their books that banks expect EPC contracts to include specific terms and conditions before financing the project. According to their findings, EPC contracts should at least address the following:

- EPC/Turnkey contract with clear scope of work
- Design and construction should fall under the responsibility of a single contractor.
- Lump-sum and fixed price contract, with limited or no ability to change the price and detailed payment schedule
- Completion to occur within a fixed period (i.e. certain commencement and finish dates)
- Limited force majeure events
- Liquidated damages payable if completion is not achieved by a fixed date and those liquidated damages should adequately cover interest payable on the loan

- No (or minimum) limits on the contractor's liability.
- Contractor completion guarantees and defect liabilities
- Constructor's penalties
- Project company's responsibility and risks
- Security package
- Dispute resolution

As suggests the list of prerequisites described above, lenders are very cautious when selecting the EPC contractor. In effect, such requirements cannot be met by just any contractor, considering LIPs' complexity. Flight (2006) emphasized that "*The contractor's experience, reputation and reliability should provide an indicator of the possibility of achieving timely completion of the project at the stated price*". In addition, funders generally require liquidated damages and guarantees from the EPC contractor to ensure that the project completions will occur according to the terms set within the EPC contract.

Liquidated damages (LDs) are lump sums agreed between the projects stakeholders (SPV, lenders and EPC contractors) to cover the project company's financial losses resulting from late construction completion or performance default (Vinter, 1998). LDs are not construed as a penalty per se, but as a fair compensation for the loss suffered. LDs include:

- Delay LDs: they are calculated on a daily basis and should at the minimum be sufficient to cover the project company's debt interest costs and fixed SPV overheads and any delay penalties payable to granting authorities. In general, the total amount of delays LD represents is 15-20% of construction costs (Fight, 2006).
- Performance LDs: they are appropriate where the project involves some form of process plant (e.g., a power station, refinery or petrochemical plant). These LDs are calculated based on the projected revenue loss and/or increase in operating costs resulting from construction default (Yescombe, 2002).

In the EPC contract, the EPC contractor agrees with the SPV to provide certain securities (warranties and guarantees) as collateral against its contractual obligations. They often include:

- Retainage: The SPV retains an amount of 5-15% from each contract payment until total and satisfactory project completion. Alternatively, the EPC contractor could also provide a retention bond for the same amount (Fight, 2006).
- Performance bond: Usually provided in a letter of credit, it is requested from the EPC provider as a security for general performance under the contract (including LDs payment obligations). For example, in coal-fired power generation projects, the performance bonds are estimated at around 35-40% of contract value (Khan and Parra, 2003).
- Advance payment guarantee: when payments are made to commence the work and place equipment order, the EPC contractor is asked to provide an advance payment guarantee, which will be repaid pro rata in case of early termination.
- Warranties: these performance warranties furnished by the EPC Contractor against failure of equipment post construction. They are valid for several years post construction. The validity period depends on what the SPV and the EPC contract consider reasonable based on the context.

According to Gatti (2008), these contractual obligations are to be secured by first demand bank letters of credit or insurance company bonds that allows the SPV to make an immediate drawing of cash rather than having to go through a dispute procedure or legal actions before receiving the proceeds. In addition, Baram (2005) also claimed that EPC contractors should be capable to provide performance guarantees to ensure that the scope of work and functionality are meant as described in the contract. Therefore, security packages are the first instruments at the owner's disposal to enforce contractual provisions and obtain the project according to the scope of work without engaging additional costs.

2.10. Characteristics of EPC Contractors

Project finance framework, as presented above, is a contract-based system in which, key stakeholders are judged based on their ability to manage risks and enter into sound contractual arrangements to secure project successful completion. Each stakeholder guarantees the fulfillment of its obligations and remains liable and accountable for project failure due to a risk it had agreed to take responsibility for.

Hence, for LIPs sourced via project finance, the EPC contractors' characteristics are derived from the expected risk allocation and contractual prerequisites that project owners define in EPC contracts. The literature review suggests that key stakeholders (lenders, investors, advisors, public authorities, etc.) in project finance expect from EPC contractors to:

- Have sufficient experience in the project environment and project technology in order to identify and mitigate the related risks (Sections 2.7.6, 2.8.2 and 2.9)
- Have strong financial capability to enter into a large-scale EPC fixed-price contract (Section 2.8.2)
- Be familiar with the EPC contracting strategy (Sections 2.8.1and 2.9)
- Have a strong organizational structure to handle LIPs' complexity (Sections 2.1.1 and 2.9)
- Be in capacity to provide warrantees and guarantees (Sections 2.8.1 and 2.9)
- Have a good track record in project completion (Section 2.82.8.1)

The question that remains yet unanswered is to what extent these characteristics apply to the EPC contractors for LIPs developed in SSA. Since the project finance framework is very environment sensible, it is anticipated that lenders and investors would require certain eligibility criteria for EPC contractors to guarantee the project successful completion considering the Sub-Saharan African context. The purpose of this research is then to identify the minimum set of characteristics - a sort of checklist - each EPC contractor should abide by in order to be qualitatively eligible for large infrastructure projects financed through project finance scheme in Sub-Saharan Africa.

3. RESEARCH METHODOLOGY

The objective of this research was to identify the attributes or characteristics pertaining to EPC contractors which have the potential to make a significant different for bidders in LIPs procurement through project finance in SSA. A survey which consisted in a questionnaire of 33 statements based on potential attributes identified in the literature review was designed for top financing institutions and advisory firms with the objective to assess whether, in their opinion, identified characteristics was consistent with current market conditions for project finance in SSA. The respondents were organized in two groups, i.e. capital providers and advisors and their responses were then compared using the nonparametric Mann-Whitney U test in SPSS to assess the extent to which a characteristic was broadly accepted among experts in the market. In addition, a PEST analysis was conveyed to assess the key exogenous factors inherent to the SSA region using international organization database including the World Bank, the IMF, the United Nation and the Heritage Foundation. Finally, the responses were also evaluating with respect to critical success factors (CSF) for contractors determined in the literature.

3.1. Defining the Key Characteristics of EPC Contractors

As explained in Chapter 2, the project finance framework involves many stakeholders to which a group of risks are allocated according to their capacity to manage them. Since LIPs are capital intensive, sponsors and lenders are the most financially exposed parties in case of project failing during construction. Thus, the research focused on harvesting financing parties' opinions on key characteristics of EPC contractors. It excludes EPC contractors because they are the subject of the experiment. Including their opinions would have probably biased the results because their interests and the funders' ones are not completely aligned. For the purpose of this research, the term "financing parties" includes investors, lenders and advisors working on their behalf. This research also excludes other industrial partners to avoid any potential conflict of interest which might again biased the results. In other words, only sponsors whose

interests rely solely on the robustness of the transaction in the long-term were involved in this study. Besides, industrial sponsors who have an interest in the project company are often doing so to protect their interest in a given service agreement signed with the project company (Yescombe, 2002).

In order to collect financing parties' opinion on the key characteristics of EPC contractors in SSA, a survey was designed targeting decision-makers including senior associates, senior lawyers and directors working in 10 top institutions involved in the project finance industry in SSA as recorded in the Inframation database. These group of institutions includes a private equity firm, finance institutions and advisory firms. The survey consisted of 33 statements with each statement bearing a feature of EPC contractors to be assessed by respondents. The evaluation consisted on a 5-point Likert scale comprising responses from "Strongly Disagree" to "Strongly Agree". The questionnaire intended to determine the extent to which each feature was relevant within the SSA context. The detailed questionnaire is presented in Appendix.

The statements were clustered in three groups based the assessment goal, as follows:

- Degree of Experience: these questions aim at evaluation the contractors' acquaintance with (i) the SSA region, (ii) technology involved in LIPs, (iii) industry best practices, (iv) EPC contracting strategy and (v) international financial institutions.
- Organizational Readiness: the goal of these questions is to assess the contractors' work ethic, controlling entity, methodology and strategy and the extent to which they are acceptable to the financing parties.
- Financial Capability: these questions gauge the contractors' financial strength, resilience and capacity with respect to liquidated damages.

Two complementary approaches were used in this research to estimate the number of experts per organization to which the survey was addressed. The first approach consisted in collecting data directly from identified firms either through the human resource

department or through direct enquiry with the related experts when a prior contact has been already established. This approach was initiated for all companies targeted in this survey. It permitted to obtain responses from nine out of the ten companies targeted. For the last targeted company (which did not provide the number of experts dedicated to SSA), an estimation of the top management size was performed using the Span of Control method. According to Meier and Bohte (2003), "*span of control is a tool that orders relationships between leaders and subordinates in organizations and influences management styles. Thus, span of control not only has implications understanding organizational design, but also for understanding behavior within organizations*". Many authors have attempted to define the optimal span of control but failed to agree on a single optimum ratio application to all organization. In effect, the span of control is defined as "the number of workers directly supervised by an administrator" (Bell, 1967). As such, it depends on various parameter includes the organization culture, the management tenure and individual experience. Bagautdinova and Validova (2014) claimed that the effective manager-to-subordinate ratio, or "individual management coefficient", must not exceed 1:9 to still ensure proper communication and preserve productivity. The Saratoga Institute Workforce Diagnostic System Benchmarking Report 2001 suggests that companies with staff number between 2000 and 5000 have a management ratio median of 9.29 (Davison, 2003).

In accordance with Bagautdinova and Validova (2014) and the Saratoga Institute's suggestion, the span of control consider in this research paper was 1 to 9, meaning one director or decision-making individual for nine subordinates.

The respondents were separated into two groups: the capital providers (comprising the financial institutions and equity firm) and the advisors. First, each group was analyzed separately; then, responses were compared between the groups by applying the non-parametric Mann-Whitney U test to assess for each statement whether responses were similar for both groups. Statements scoring mean values above 4.00 with p-values in the Mann-Whitney U test above significant level of 0.05 were retained as key characteristics of EPC contractors. A similar approach was used by Lu *et al.* (2008) while investigating the critical success factors for competitiveness of contractors

in China.

3.2. Research Population

3.2.1. Population Selection

Even though project finance has known a rapid expansion since the 1900s, it is still a very selective process with only a few actors involved. There are a limited number of financial institutions that can take the risk of future cash flow. Furthermore, participants in project finance often vary according to the jurisdiction in which the project is developed. In developed countries, for instance, Gatti (2008) has reported that most of the projects developed through PFI frameworks were financed mainly by commercial banks. However, in developing countries and especially in SSA, most commercial banks do not have sufficient capacity to offer loan with long maturity at an attractive cost. In addition, their participation is very limited in terms of geography. Only developed economies in SSA, like South Africa, enjoys an important participation of commercial banks as senior lenders in project financed transactions. Consequently, in most developing countries, multilateral and bilateral agencies play a significant role in financing LIPs under project finance scheme. They have the advantage of providing competitive financing and long maturity (which can often go over 15 years), and make projects affordable for countries especially in low-income countries. In fact, the Europe Investment Bank report (2016; 2018) claimed that IFIs remain the main source of long-term finance in SSA and act as catalyst for private sector capital. The remaining private capital are brought by sponsors which include industrial sponsors (like construction companies, fuel supply companies or services companies) and investors. Industrial sponsors' investments are motivated by the need to secure new short-terms or long-term contracts (Yescombe, 2002). In this case, industrial sponsors enjoy a twofold benefit that includes the margin in the service provided and the return on equity (dividend service, junior loan interests, etc.). However, investors base their entire investment decision solely on the cash flow profile expected from a particular project. On that basis, they share a common interest with the lenders. Because the project purpose is not aligned with their core business, these two financial parties (investors and lenders)

rely heavily on the expertise of advisors to deeply assess the risk and ensure a proper risk allocation for the successful development of the project.

This research, thus, focuses on multilateral and bilateral agencies as lenders, private equity firms as investors and their common technical and legal advisors to identity the key characteristics of EPC contractors in SSA. Since the quality of stakeholders also influence the selection of the EPC contractor, and contracts setting, this research aimed at collecting responses from top development finance institutions, equity firms, technical advisory firms and legal advisory firms all acting in SSA (Table 4.9). To take into account the level of acquaintance with the project finance framework, participants have been selected mainly on the basis of the number of projects (especially greenfield projects) they have developed in SSA and as recorded on the inframation database. The list of DFIs participating in this research includes the Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (FMO), International Finance Corporation (IFC), African Development bank (AfDB), *"Promotion et Participation pour la Coopération Economique"* (Proparco) and Development Bank of Southern Africa (DBSA). For equity firms, both the number of deals and the fund size has been considered in selecting top firms. The fund size is as important as the deal count because it translates the level of confidence investors' have in a given fund manager and type of project considered in the investment portfolio. Thus, experts from Meridiam Infrastructure Africa Fund were selected to participate in the survey for private equity firms. In addition, the legal advisory firms considered for this research were Norton Rose Fulbright, Allen & Overy and Linklaters. Finally, the technical advisory firm considered in this research were Mott Macdonald, Arup and WSP. But only Mott Macdonald experts had confirmed their participation to the survey. In total, ten companies (five DFIs, one private equity fund, three legal firms and one technical firm) participated in the research.

After selecting and establishing contacts with the participating companies, the survey was sent to decision making bodies including directors, partners and associates. Selecting only decision makers was motivated by the need to collect the responses from agents whose opinions determined the outcome of the EPC tender process and

ultimately the project feasibility considering the interest pursue by each respective organization.

Table 3.1. List of targeted organizations by project count (Inframation, 2019)

Institutions	**Number of projects in the World**	**Number of projects in SSA**	**Total Project estimated value in SSA (mEUR)**
Development Finance Institutions			
AfDB	27	20	1.162
DBSA	17	16	1.087
FMO	79	27	742
IFC	135	22	979
Proparco	51	17	544
Investor			
Meridiam	65	4	-
Advisors			
Norton Rose Fulbright	820	20	7.646
Allen & Overy	741	12	4.515
Linklaters	452	10	6.284
Mott MacDonald	442	10	7.270

3.2.2. Organizations' Profile

As mentioned above, 10 companies among the top actors in project finance in SSA were selected to conduct this research. These companies included:

3.2.3. Finance Institutions

3.2.3.1. International Finance Corporation (IFC). The IFC is an international finance institution and a member of the World Bank group that act in developing countries with the objective to encourage private sector participation. The IFC provides different services including senior loan, advisory services and asset management services. The company counts 480 agents in the world of which 50% are located in the United States. The IFC counts more than 135 projects in the world for a total value of EUR 6613m

and 22 projects in SSA (for a value of EUR 979m) where it has participated as loan provider (IFC, 2018; Inframation, 2019). IFC was rated triple A by S&P in December 2018 (S&P, 2018). The IFC counts three hub offices in SSA in Cameroun, Senegal and South Africa.

3.2.3.2. Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden. FMO is the Dutch development bank, a bilateral agency, with 51% shares held by the Dutch State and 49% held by commercial banks, trade unions and other members of the Dutch private sector. FMO is rated triple A by both Fitch and Standard & Poor's (FMO, 2018). FMO counts 79 projects in the world and 27 projects in SSA with respective values of EUR 1983m and 742m. According to the Inframation database, FMO is the top DFIs in terms of deal count in SSA before IFC and Proparco. FMO can count on its 492 agents in the world with one permanent office in South Africa (FMO, 2018; Inframation, 2019).

3.2.3.3. Development Bank of Southern Africa (DBSA). The DBSA is a South African development finance institution entirely owned by the Government of South Africa. The DBSA is most active in the Southern African Development Community (SADC) with the objective to accelerate sustainable socio-economic development. The DBSA have 459 professionals mainly based in South Africa. Almost all DBSA projects are located in SSA with 16 out of 17 projects. The total investment value is estimated at EUR 1104m. Early 2019, Moody's confirms DBSA's rating at Baa3 (DBSA, 2018; Inframation, 2019).

3.2.3.4. Promotion et Participation pour la Coopération économique. Proparco is an S&P AA rated Development Financial Institution controlled by the French Development Agency (AFD) and private shareholders from OCDE countries. Proparco is active in Africa, Asia, Latin America, and the Middle East with over 200 agents. It has a portfolio that consists of 51 projects in the world including 17 projects in SSA. Proparco deployed about EUR 1430m worldwide with more than 35% in SSA (EUR 544m) (Proparco, 2018; Inframation, 2019).

3.2.3.5. African Development bank (AfDB). The AfDB is an S&P AAA rated multilateral development finance institution created in 1964 and composed of the African Development Bank, the African Development Fund and the Nigeria Trust Fund. Similarly, to IFC, the AfDB seek to encourage private capital in projects and programs that contribute to socio-economic development of African countries. The AfDB provides also capital to African governments to help them structuring key sectors such as agriculture, energy or transportation. The bank counts 1323 agents. It has successfully closed 27 projects worldwide (for a total value of 1878m) including 20 projects in SSA (for total value of EUR 1162m) (AfDB, 2018 and Inframation, 2019).

3.2.4. Private Equity Firms

3.2.4.1. Meridiam Infrastructure Africa Fund. Meridiam is a global and long-term investor and asset manager in infrastructure projects with 220 employees, EUR6.2 billion under management and more than 60 projects financed across Europe, America, Asia and Africa (Meridiam, 2019). Meridiam invested in SSA through its two dedicated vehicles, namely Meridiam Infrastructure Africa Fund (MIAF) and the Meridiam Infrastructure Africa Parallel Fund (MIAPF) (together referred to as Meridiam Infrastructure Africa Funds) which together are valuated at EUR 500m (Inframation, 2019). Meridiam closed four projects and has two offices in SSA.

3.2.5. Technical Advisor

3.2.5.1. Mott Macdonald. Mott MacDonald is a global engineering firm active in 150 countries in the world. The company counts more than 16,000 employees, delivering projects in Africa, Asia Pacific and Australasia, Europe, the Middle East, North and South America, and South Asia. It has participated in 442 closed transactions across the world of which 10 located in SSA. The company's consolidated gross revenue was reported reaching GBP 1,55 billion in 2017. The aggregate project value closed worldwide with Mott MacDonald's contribution is estimated at 169,862m including 7270m in SSA. (Mott Macdonald, 2018; Inframation, 2019).

3.2.6. Legal Advisor

3.2.6.1. Linklaters LLP. Linklaters is a global law firm headquartered in London with 5440 staff members (of which 490 partners) across the globe which provides legal services to private companies, financial institutions and government entities. The firm counts 30 offices in 20 countries. Linklaters has reportedly participated in 542 closing deals worldwide including 10 Greenfield projects in SSA. The total project value closed in SSA is estimated at EUR 6,284m against EUR 372,749m in the entire world (Linlaters, 2019; Inframation, 2019).

3.2.6.2. Allen and Overy (A&O). A&O is a global law firm with projects located in more than 100 countries worldwide. The firms have 44 offices globally including one in SSA. It provides its services through its 5500 employees (among which 550 partners). The firm participated in 741 financial closes worldwide and 12 in Sub-Saharan Africa. The aggregate value of closed projects is estimated at EUR 439,411m but only 4515m is reported from SSA. The company's total turnover was reported at GBP 1.5 billion in 2018 (A&O, 2019; Inframation, 2019).

3.2.6.3. Norton Rose Fulbright. Norton Rose Fulbright is another London based global legal firm with 50 offices worldwide and approximately 4,000 employees based in Europe, the United States, Canada, Latin America, Asia, Australia, the Middle East and Africa. The company's main offices in SSA are located in South Africa. Norton Rose Fulbright counts more than 820 transactions closed in the world valued at EUR 273,958m including 20 projects in SSA (EUR 7646m) (Norton Rose Fulbright, 2019; Inframation, 2019).

3.3. Data Collection

An online questionnaire was designed using the SurveyMonkey platform. Before sending the questionnaire, conference calls with key senior individuals within targeted organizations were set to discuss the purpose of the research and obtain clearance to

further reach out to other senior representatives within the company. The questionnaire was then sent to each respondent via a link embedded in a personified email. 249 experts received the questionnaire including 155 experts in advisory firms, 73 experts in DFIs and 21 experts in Meridiam. Except for FMO for which the targeted population was estimated based on the span of control approach, all other populations within each company was sized based on the discussions with managers in the project finance department.

The questionnaire was designed to allow respondents to provide their responses on an anonymous basis because the goal sought in this research was to assess experts' opinions based on the institutions type rather than each individual firm. Therefore, three groups were initially identified for this research among the financing parties: the lenders, equity providers and advisors. A total of 80 respondents have attempted to complete the research; however only 58 respondents fully completed the questionnaire. Hence, only the 58 fully completed questionnaires were considered for this research. This total is composed as follows: 7 questionnaires collected from lenders, 10 collected from the equity providers and 41 collected from advisors (Figure 3.2). This means 23% of the total targeted individuals duly participated to the survey.

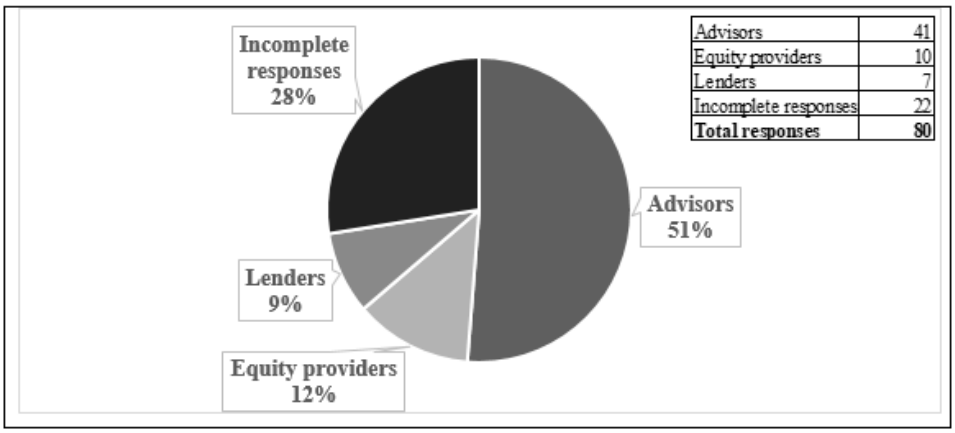


Figure 3.1. Responses summary.

3.3.1. Respondents' profile

Respondents were asked to indicate their position within the organization and the level of expertise in project finance with Sub-Saharan African projects. Depending on the organization type, five positions were identified with decision-making capabilities:

- Senior Associate
- Associate
- Investment Director
- Director
- Partner

Three senior associates and four investment directors were registered among lenders. Similarly, 10 investment directors from the equity provider group have participated to the survey. Finally, five associates, 10 senior associate, 12 directors and 14 partners formed the group of advisors.

Regarding the level of experience, respondents were asked to indicate whether they had less than five years, between five to 10 years or more than 10 years of experience in developing projects under the project finance scheme in SSA.

Based on responses collected, the majority of respondents have more than 10 years of experience dealing with the project finance scheme in SSA. In fact, 35 respondents claimed to have more than 10 years of experience dealing with projects under the project finance scheme in SSA. This cluster of experts is composed of seven lenders (that is the complete group of lenders), 10 equity providers (the complete group) and 18 advisors (including 12 partners, 4 directors and 2 senior associates).

The second most populated group in terms of years of experience contained 21 people and consisted of experts with experience ranging between 5 and 10 years in SSA. This group is composed of advisors only but with different seniority levels: eight directors, four associates, eight senior associates and one partner.

At last, only two respondents among advisors were registered having less than five your experience with projects in SSA.

3.4. Data Collection Limitation

Due to the limited number of actors in project finance in SSA, the data collection has been challenging. The general observation was that many firms, especially DFIs and equity firms, had a small dedicated team working on project finance for infrastructure in SSA. These teams were often supported by other stuff on demand basis. This tendency was less observed with advisory firms who actually deployed resources across the region. Also, the targeted profile for this research was hardly accessible. Many DFIs directors and equity providers were willing to participate to the survey but did not fully complete the survey or tried to provide answers after the survey deadline. This explains the relatively low participation of lenders and equity providers. Moreover, some organizations who were contacted for the research declined the invitation due to internal restrictions.

3.5. Questionnaire Survey

3.5.1. Questionnaire Structure

The questionnaire consisted of three Sections. The first Section aimed at collecting information about the respondents. It addressed the type of organization, the position within the organization and the number of years working in project finance in SSA. The second Section consisted of three questions related to SSA economic and political context. With these questions, respondents were forced to think vividly about the contextual challenges opposing a smooth implementation of the project finance framework in SSA. Also, this Section intended to recall the research environment and ensure that respondents would be mentally and emotionally involved when engaging with the last Section of the survey. The third and last Section included questions designed to define the characteristics of EPC contractors.

3.5.2. Questionnaire Design (Section 3 of the Questionnaire)

As described in Chapter 2, a successful implementation of the project finance framework relies on a balanced allocation of risks among stakeholders. The degree of risk is exacerbated by the complexity and numerous interdependent tasks inherent to large infrastructure projects.

Thus, each activity performed to construct a LIP has the potential to trigger a chain reaction that could delay or cause the entire project to fail with long-term consequences for the stakeholders involved. Masrom *et al.* (2015) suggested that there are five critical aspects of the project that can potentially cause project to fail, namely, (i) the project's scope, (ii) project procurement procedures, (iii) project management, (iv) stakeholder relation and (v) the project environment. Ke *et al.* (2010) emphasized on the nature of risks and observed that they are triggered by political factors (unstable government or institutions), social factors (public acceptance), legal factors (regulatory policies), natural factors (climate, geography and environment), organizational factors (poor collaboration), macroeconomic factors (inflation, interest rate volatility, etc.), design factors (implementation of new technology), financial factors (availability of finance) and construction factors (quality, schedule and labor). Similar categorizations of risks are found in many studies including Sadeghi *et al.* (2016), Ika (2012) and Gatti (2008).

Researches acknowledge that in project finance, the contractual setting constitutes the main response to these risks, and it is the ultimate mitigation instrument upon which each stakeholder rely upon to find sufficient confidence in order to engage in large infrastructure projects. Though, relying on contracts as mitigation presents some inconveniences because contracts are often developed after the stakeholders have been identified and enforced only after each stakeholder has accepted the risk allocated to it. Consequently, the contract does not allow stakeholders to find the level of confidence it need at project inception, i.e. before contracts are being drafted. This concerns especially the financing parties and the EPC contractor. For financing parties, the problem is that they do not know exactly to what extent they are exposed

before discussing with the EPC contractors. Similarly, EPC contractors do not exactly know to which extent they can reasonably fit in the project without engaging a great deal of resource to win the project.

The goal of this research was therefore to develop a front-end approach based on the intrinsic capabilities of EPC contractors to deliver projects in SSA under the project finance framework. Such an approach aims at assessing at an early stage the ability of EPC contractors to abide by the contractual provision. Therefore, the survey was designed to identify key characteristics of EPC contractors on which financing parties could rely on while assessing the project's constructability and contractors' reliability. Each statement was defined based on a risk factor and tangible indicators of risk control in order to objectivize the respondent's expectation in terms of risk mitigation (Figure 3.2).

There are 33 statements designed to define the EPC intrinsic characteristics and grouped in three main categories; namely the Degree of Experience (DE), the Organizational Readiness (OR) and Financial Capability (FC). The DE categories is subdivided into three subcategories including the technical and contextual experience (DE-TC), legal experience (DE-L), and environmental and social experience (DE-E&S) group. They consist of statements related to the contractor's know-how or experience in similar projects and environment in terms of technology, contract strategy, procurement process, regulatory system, industry best practices, stakeholder management, cost control, interface management environment and social and local labour and services.

The OR category comprises affirmations in relation to the contractors' work ethic, controlling entity, methodology and strategy. At last the FC categories consists of assertions purporting to assess the contractor's financial resilience and capacity with respect to liquidated damages. The statements of Section 3 of the questionnaire are summarized in Table 3.5.2 below.

The assessment of each characteristic was conducted using a 5-point Likert scale comprising five response levels which permit to gauge the level of agreeance with respect

to each statement. This approach was also used by Beach *et al.* (2005) in their paper to evaluate the partnership development in the construction industry in the UK. The same approach was used also by Sambasivan and Soon (2007) in their study about the cause and effect of delays in Malaysian construction industry. The Likert scale utilized in this research included the following responses:

(i) Strongly Disagree
(ii) Disagree
(iii) Neutral
(iv) Agree
(v) Strongly Agree

Table 3.2. Questionnaire design and categorization.

	Statements	Literature review	Potential risk factors	Tangible indicators of risk control	Characteristics	Categorization
	To ensure LIPs' successful construction, the contractor MUST:					
1	- have constructed at least ONE (1) LIP in the project country.	Ke *et al.* (2010) Sadeghi *et al.* (2016)	Local regulation and norms	Number of LIPs in the project country	Knowledgeability of local regulation, technical norms and labor for large infrastructure in the host country	DE - TC
2	- have previous experience in the project country regardless of the project size.	Ke *et al.* (2010) Sadeghi *et al.* (2016)	Political and economic context	Number of projects in the project country	Knowledgeability of political and economic context in the host country	DE - TC
3	- have at least FIVE (5) years of experience in Sub-Saharan Africa.	Ke *et al.* (2010) Sadeghi *et al.* (2016)	Emerging markets	Number of years working in SSA	Knowledgeability of procurement process in SSA	DE - TC
4	- have built at least ONE (1) LIP of similar technology in Sub-Saharan Africa.	Finnerty (2007)	Adequacy of construction techniques	Number of LIPs with similar technology in SSA	Mastery and replicability of construction techniques	DE - TC
5	- have at least TEN (10) years of experience in the LIP's industry.	Yescombe (2002)	Industry norms and practices	Number of years in the project's industry	Knowledgeability of industry norms and practices	DE - TC
6	- have constructed at least ONE (1) LIP as "main contractor?.	Flight (2006) William (2002)	Scope's complexity	Number of LIPs as "main contractor?	Large infrastructure management	DE - TC
7	- have participated into at least TWO (2) LIPs as "sub-contractor".	Flight (2006)	Inexperience in highly complex and risky projects	Number of LIPs as "sub-contractor"	Knowledgeability of large infrastructure complexity and risks	DE - TC
8	- be well acquainted with IFC performance standards.	Khan and Parra (2003)	Environmental and social impacts	Number of projects in line with IFC performance standards	Management of environmental and social impacts as per internationally accepted standard	DE - E&S

Table 3.2. Questionnaire design and categorization (cont.).

	Statements	**Literature review**	**Potential risk factors**	**Tangible indicators of risk control**	**Characteristics**	**Categorization**
	LIPs' successful development in Sub-Saharan Africa depends on:					
9	- contractors' good understanding of the Engineering-Procurement-Construction (EPC) tender process.	Loots and Henchie (2007) Ke *et al.* (2015) Ravanshadnia *et al.* (2010)	Contracting strategy	Number of participations in an Engineering-Procurement-Construction (EPC) tender process	Knowledgeability of Engineering-Procurement-Construction (EPC) tender process	DE - L
10	- contractors having a track record of LIPs in Sub-Saharan Africa which contain at least 50% of Local Content (labour, services, products...)	Ke *et al.* (2010) Sadeghi *et al.* (2016)	Local content	Portion of Local Content (labour, services, products...)	High contribution of Local Content	DE - TC
11	- contractors' ability to perform at least 50% of the construction works itself.	Yescombe (2002)	Technical capability	Portion of the construction works self-performed	In-house expertise and resources	DE - TC
12	- contractors having an in-house design capacity.	Baram (2005)	Degree of design interface	Existence of in-house design department	Absence of design interface	DE - TC
13	- contractors having a track record of at least 50% of its contracts completed within BUDGET.	Remington and Pollack (2007)	Cost control	Number of contracts completed within budget	Ability to management costs	DE - TC

Table 3.2. Questionnaire design and categorization (cont.).

	Statements	**Literature review**	**Potential risk factors**	**Tangible indicators of risk control**	**Characteristics**	**Categorization**
14	- contractors having a track record of at least 50% of its contracts completed within SCHEDULE.	Vinter (1998) Yescombe (2002)	Schedule extension	Number of contracts completed within schedule	Ability to management construction schedules	DE - TC
15	- contractors having a track record of at least 50% of its contracts completed within schedule AND budget.	Galloway (2009)	Cost and schedule overrun	Number of contracts completed within schedule and budget	Compatibility with fixed price and date certain contract	DE - TC
	To minimize default risks during construction, the contractor SHOULD...					
16	- have already participated into a project finance transaction involving at least ONE (1) of the international finance institutions or development banks.	Masrom *et al.* (2015) Gatti (2008)	Stakeholder relation	Number of projects with the international finance institutions	Knowledgeability of international finance institutions? procurement processes	DE - L
17	- have already delivered at least ONE (1) LIP under a turnkey contract.	Loots and Henchie (2007)	Contract price escalation	Number of LIPs under a turnkey contract	Knowledgeability of turnkey contracting strategy	DE - L
18	- be listed among the world's best contractors according to the ENR 250.	Yescombe (2002)	Bankruptcy or insolvency	Presence in the ENR 250 global contractors' list	Ability to generate high turnover	FC

Table 3.2. Questionnaire design and categorization (cont.).

	Statements	Literature review	Potential risk factors	Tangible indicators of risk control	Characteristics	Categorization
	A LIP in Sub-Saharan Africa is only bankable when the contractor...					
19	- holds shares in the project company.	Merna *et al.* (2010) Yescombe (2002)	Project company shareholdings	Direct or indirect participation in the project company shareholding	Participation in the project company	OR
20	- is able to provide a liquid performance bond obtained from a financial institution with a minimum rating of "BBB+".	Vinter (1998) Yescombe (2002) Gatti (2008)	Quality of liquid guarantee	Investment grade of the institution providing the guarantee.	Ability to provide high quality liquid guarantee	FC
21	- provides requisite security at the relevant corporate level (e.g. in the form of a Parent Company Guarantee)	Gatti (2008) Baram (2005)	Corporate liability	Parent Company Guarantee	Ability to provide corporate guarantee	FC
22	- has a Net Asset Value which is at least FIVE (5) times greater than the LIP cost.	Gatti (2008) Salman *et al.* (2007)	Financial health	Total amount of Net Asset Value	Ability to absorb the total construction liability	FC
23	- has Working Capital which could cover at least 25% of the LIP cost.	Remington and Pollack (2007)	Cash reserve	Total amount of Working Capital	Ability to withstand payment delays	FC
24	- provides a Performance Bond of at least 30% of the LIP cost.	Chen (1993)	Performance bond	Value of the guarantee	Minim value for liquid guarantee	FC

Table 3.2. Questionnaire design and categorization (cont.).

	Statements	**Literature review**	**Potential risk factors**	**Tangible indicators of risk control**	**Characteristics**	**Categorization**
	Investors or lenders will only finance a LIP , if the contractor...					
25	- has an office in the project country.	ICA (2014)	Local bureaucracy	Number of offices in the project country	Knowledgeability of bureaucracy in the host country	DE - L
26	- is not controlled by a governmental entity.	Gatti (2008)	Government control	Shares held by governmental entity	Absence of government control	OR
27	- is a public listed company.	Flight (2006)	Degree of transparency	Presence in the stock market	Periodic disclosure of company governance and performance	OR
28	- has NO political exposed person in its top management or among its shareholders.	Flight (2006)	Political conflict of interest	Number of political exposed person in the company	Absence of political exposed person	OR
29	- is NOT on any sanction list including but not limited to project country, European Union and the World Bank sanction lists.	Flight (2006)	Business integrity	Sanction list	Existence of anti-corruption procedure	OR

Table 3.2. Questionnaire design and categorization (cont.).

	Statements	**Literature review**	**Potential risk factors**	**Tangible indicators of risk control**	**Characteristics**	**Categorization**
	To ensure that LIPs are constructed in more responsible manner, your organization would rather select a contractor which...					
30	- is well acquainted with the Equator Principle.	Khan and Parra (2003)	Environment and social	Number of projects in line with the Equator Principle	Knowledgeability of environmental and social impacts as per internationally accepted standard	DE - E&S
31	- has an Environmental Management System or is certified ISO 14001.	Yescombe (2002)	Environment and social	Certification ISO 14001	Ability to manage environmental and social impacts	OR
32	- is certified ISO 9001.	William (2002) Hendrickson (1998)	Quality insurance	Certification ISO 9001	Robust activity management system	OR
33	- has safety procedure in place in line with the OHSAS 18001 or certified OHSAS 18001.	Yescombe (2002)	Health and safety	Certification OHSAS 18001	Ability to maintain a safe working environment	OR

3.6. General

3.6.1. Questionnaire design in SPSS

The 80 responses were collected using the SurveyMonkey platform and exported in Microsoft Excel to separate fully from partially completed questionnaires. The 58 fully completed questionnaires were subsequently exported for analysis in SPSS v.23. In SPSS, the statements were redacted to define variables for the data analysis. Table **??** lists each dependent variable that corresponds to each statement of the third Section of the survey.

Table 3.3. Variable definition for SPSS.

	Statements	**Variables code**	**Variables In letter**
1	**To ensure LIPs' successful construction, the contractor MUST:**		
1.1	- have constructed at least ONE (1) LIP in the project country.	EPC_Q_1	Project_Country
1.2	- have previous experience in the project country regardless of the project size.	EPC_Q_2	Project_Size
1.3	- have at least FIVE (5) years of experience in Sub-Saharan Africa.	EPC_Q_3	SS_Africa
1.4	- have built at least ONE (1) LIP of similar technology in Sub-Saharan Africa.	EPC_Q_4	Similar_Technology
1.5	- have at least TEN (10) years of experience in the LIP's industry.	EPC_Q_5	LIP_Industry
1.6	- have constructed at least ONE (1) LIP as "main contractor?.	EPC_Q_6	Main_Contractor
1.7	- have participated into at least TWO (2) LIPs as "sub-contractor".	EPC_Q_7	Sub-Contractor
1.8	- be well acquainted with IFC performance standards.	EPC_Q_8	IFC_PS
2	**LIPs' successful development in Sub-Saharan Africa depends on:**		
2.1	- Contractors' good understanding of the Engineering-Procurement-Construction (EPC) tender process.	EPC_Q_9	EPC_Tender
2.2	- Contractors having a track record of LIPs in ub-Saharan Africa which contain at least 50% of Local Content (labor, services, products...)	EPC_Q_10	Local_Content
2.3	- Contractors' ability to perform at least 50% of the construction works itself.	EPC_Q_11	Self_Performance

Table 3.3. Variable definition for SPSS (cont.).

	Statements	**Variables code**	**Variables In letter**
2.4	- Contractors having an in-house design capacity.	EPC_Q_12	In-House_Design
2.5	- Contractors having a track record of at least 50% of its contracts completed within BUDGET.	EPC_Q_13	Budget
2.6	- Contractors having a track record of at least 50% of its contracts completed within SCHEDULE.	EPC_Q_14	Schedule
2.7	- Contractors having a track record of at least 50% of its contracts completed within schedule AND budget.	EPC_Q_15	Budget_&_Schedule
3	**To minimize default risks during construction, the Contractor SHOULD...**		
3.1	- have already participated into a project finance transaction involving at least ONE (1) of the international finance institutions or development banks.	EPC_Q_16	IFIs_experience
3.2	- have already delivered at least ONE (1) LIP under a turnkey contract.	EPC_Q_17	Turnkey_contracting
3.3	- be listed among the world's best contractors according to the ENR 250.	EPC_Q_18	ENR_250
4	**A LIP in Sub-Saharan Africa is only bankable when the Contractor...**		
4.1	- holds shares in the project company.	EPC_Q_19	Shares_SPV
4.2	- is able to provide a liquid performance bond obtained from a financial institution with a minimum rating of "BBB+".	EPC_Q_20	Performance_Bond
4.3	- provides requisite security at the relevant corporate level (e.g. in the form of a Parent Company Guarantee)	EPC_Q_21	Corporate_Guarantee
4.4	- has a Net Asset Value which is at least FIVE (5) times greater than the LIP cost.	EPC_Q_22	Net_Asset_Value
4.5	- has Working Capital which could cover at least 25% of the LIP cost.	EPC_Q_23	Working_Capital
4.6	- provides a Performance Bond of at least 30% of the LIP cost.	EPC_Q_24	30%_performance_ Bond
5	**Investors or lenders will only finance a LIP, if the Contractor...**		
5.1	- has an office in the project country.	EPC_Q_25	Office_Country
5.2	- is not controlled by a governmental entity.	EPC_Q_26	Government_Control
5.3	- is a public listed company.	EPC_Q_27	Public_Listed
5.4	- has NO political exposed person in its top management or among its shareholders.	EPC_Q_28	Political_Person
5.5	- is NOT on any sanction list including but not limited to: project country, European Union and the World Bank sanction lists.	EPC_Q_29	Sanction_List
6	**To ensure that LIPs are constructed in more responsible manner, your organization would rather select a Contractor which...**		
6.1	- is well acquainted with the Equator Principle.	EPC_Q_30	Equator_P
6.2	- has an Environmental Management System or is certified ISO 14001.	EPC_Q_31	ISO_14001
6.3	- is certified ISO 9001.	EPC_Q_32	ISO_9001
6.4	- has safety procedure in place in line with the OHSAS 18001 or certified OHSAS 18001.	EPC_Q_33	OHSAS_18001

Respondents' profiles were also included in the analysis; nevertheless, only an assessment of responses based on the organization type has been conducted because a comparison of responses based on the year of experience was not relevant for the purpose of this research.

The following subSection presents the responses collected for each assertion including some statistic parameters such as the mean, the standard deviation and the skewness coefficient. The skewness in this research is particularly important because it defined degree of asymmetry of data hence the tendency of opinion within each group of respondents whether capital providers or advisors. In fact, Shanmugam and Chattamvelli (2015) defined the skewness as the "*numeric metric to concisely summarize the degree of asymmetry of a unimodal distribution that can be compared with other similar numbers*". The asymmetric referred to is an asymmetry around the mean.

The analysis was made in two steps. First, respondents were grouped in two based on the organization type: advisors and capital providers. The advisors group consisted of advisory firms. The capital providers group included financial institutions (lenders) and investor (private equity). Each statement was then assessed for each of these groups. Later, to assess whether these two groups had similar distributions, or in other words, if they had similar opinions about each statement, a Mann-Whitney U test for non-parametric test was conducted with a significant level of 0.05.

3.6.2. The Mann-Whitney U Test

The Mann-Whitney U test is one of the most commonly used nonparametric statistical tests in the field of behavioral sciences and was developed by Mann and Whitney in 1947. According to Smalheiser (2017), the Mann-Whitney U test represents the nonparametric counterpart of the sample t-test and provides the most accurate estimates of significance, especially when sample sizes under scrutiny are small or when the data are not normally distributed. Nachar (2008) emphasized on this assertion saying that the impendence of the Mann-Whitney U with respect to distribution and normality assumptions made it a very powerful statistic tool for semi-quantitative and

ordinal data. The author further asserted that non-parametric tests, like the Mann-Whitney u test, are necessary when the distributions are not symmetrical around the mean like in normal distributions. In addition, non-parametric tests are designed to be applied for real data which are often skewed, lumpy or having a few warts, outliers, and gaps scattered about (Smalheiser, 2017).

The Mann-Whitney U test involves a couple of assumptions that need to be met in order to obtain meaningful results. They consist of three types related to the study design (Laerd Statistics, 2019; Nachar, 2008):

(i) Random and dichotomous variable: The investigated groups should be randomly picked from the target population. The sample of independent variables drawn from the targeted population should consist of two categorical groups.
(ii) Independence: Each observation should correspond to a single participant. This means that there must be an independence within groups and mutual independence between groups.
(iii) Ordinality: Data should have an ordinal, relative or absolute scale type. Examples of ordinal data include a collected from a Likert scale items (5-points, 7-points, etc.)

All three conditions were satisfied for the data collected in this survey. Furthermore, the Mann-Whitney U test is used to interpret whether there are differences in distributions or differences in medians of two groups. Whenever two distributions present different shapes, the Mann-Whitney U test determines if there is a significant difference in the two groups' distributions. Nevertheless, when the two distributions are of similar shape, the test then determines whether there is a significant difference in the medians of the two groups (Laerd Statistics, 2019). In a two-tailed test, the Mann-Whitney U test null hypothesis (H0) stipulates that the two independent groups coming from the same population are homogeneous and have the same distribution. In this case, the alternative hypothesis (H1) against which the null hypothesis is tested stipulates that the groups of data distribution differ from each other (Nachar, 2008).

In this research, the null and alternative hypothesis were postulated as follows:

- H_0: The response distribution of capital providers is equal to the response distribution of advisors
- H_A: The response distribution of capital providers is not equal to the response distribution of advisors

3.7. Assessing Sub-Saharan Africa

The demand for public services in sub-Saharan Africa has steadily increased over the years caused by increasing demography and businesses. On the other hand, most governments in SSA struggle to finance and allocate the proper resources to provide these services vital to ensure people welfare and sustain their economic growth. As a result, many African governments have recourse to the private sector to supply the resources needed both to construct and operate public infrastructure. In SSA, PPP as procurement method became the main financing alternative to address the region's infrastructural deficit (Sanni and Hashim, 2014). Using project finance scheme to bridge the financing gap for LIPs in SSA requires countries or jurisdictions to be compatible with this framework. Salman *et al.* (2007) and Menheere and Pollalis (1996) have respectively observed in their researches that deep assessments of all aspects related to economic, social, political, legal, and financial feasibility of the project were prerequisites to any undertaking of LIPs under BOT scheme.

In this research, the political, economic, social and technological analysis of the SSA region was done using the PEST analysis. This analytic methodology was used by various scholars such as Ho (2014) who investigated on strategic analysis, Halik (2012) while reviewing the EBRD and IBRD methodology or Peng and Nunes (2009) which applied also the PEST analysis for information systems research.

In fact, the PEST analysis is one of the tools developed for organizations to evaluate external environments and identify significant environmental trends over the short-term and long-term (Trifu, 2012). Furthermore, it is also a powerful tool to

highlight the elements which are, as Fleisher and Bensoussan (2003) described, beyond the direct influence of an individual organization and could potential impact an organization business and/or an entire industry. PEST analysis consists of four macro-environment factors: political, economic, social and technological factors.

- Political factors represent government policies which influence markets or industries on a national, regional or international level. For example, political factors would involve tax policy, government stability and trading agreements, environmental regulations, security controls, war, terrorism, political trends and governmental leadership. The political assessment in this study was done using the Worldwide Governance Indicator (WGI) developed by the World Bank Group, as described in subsequent Sections. The WGI permits to assess quantitatively a country's political performance with respect to other countries. It combines the views of enterprises, citizens and experts in both industrial and developing countries collected from over 30 individual data sources (institutes, think tanks, non-governmental organizations, international organizations and private sector firms) (World Bank, 2019).
- Economic factors are those factors measuring countries, regions or communities' economic performance and highlighting the financial trends such as Gross Domestic Product (GDP), interest rate, exchange and inflation rate. To assess the SSA's economic outlook, SSA countries were first grouped based on their gross national income per capital (GNI), then both group performance and individual country performance were evaluated based on (i) their GDP, GDP growth rate and inflation rate collected from the IMF database and (ii) the Economic Freedom Index designed by the Heritage Foundation. In its capacity of financial regulator, the IMF monitors and keeps track of the global economy and the economies of member countries (IMF, 2019). Whereas, the Economic Freedom Index (EFI) is explored to capture the impact of social factors, government policies and human development on the countries' economic performance. In addition, the EFI enables a quantitative comparison of nations' economic policy and progress toward prosperity (Miller *et al.*, 2019).
- Social factors, on the other hand, consist of elements influencing communities'

lifestyle and human behaviors. They comprise factors such as demography, culture, ethnic structure, religion structure, inter-cultural relation, structure of family, ideological view, literacy, urbanization, income distribution, migration, etc. They were assessed using the United Nation Human Development Index (HDI). The use of HDI is justified by the need to assess the extent to which citizens are capable to drive countries' economic developments. Such capacity is estimated in terms of life expectancy, level of education and decent standard of living (UN, 2019).

- Technological factors, as asserted by Palmer and Hartley (2009), refers to the techniques and methods that influence the activities within an organization and accessible in a given market. It includes inventions, new discoveries, research, energy uses/sources/fuels, communications, rates of obsolescence, manufacturing advances, internet, transportation, bio-tech, genetics, waste removal/ recycling, etc. The ICT Development Index (IDI) was used as a metric in this research to evaluate the technological advance and accessibility in the SSA region. In fact, the IDI aims at (i) assessing the level and evolution over time of information and communication and technology developments for countries around the world, (ii) monitoring the progress in ICT development in both developed and developing countries, (iii) comparing the differences between countries in terms of their levels of ICT development, and (iv) evaluating the development potential of ICTs and the extent to which countries can make use of them to enhance growth and development in the context of available capabilities and skills (United nation, 2019).

3.8. Research Geography

This research focuses on countries located within the sub-Saharan region as defined by the United Nation statistic division (see Figure 3.2). The region is composed of 46 countries which are further clustered in sub-regions including Western Africa, Middle Africa, Southern Africa and Eastern Africa (see Table 4.9). The West Africa region consists of 16 countries namely Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal,

Sierra Leone and Togo. The Middle Africa region is composed of Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Sao Tome and Principe, Equatorial Guinea and Gabon. Southern Africa consists of Botswana, Lesotho, Namibia, South Africa and Swaziland. Eastern Africa counts as many countries as the Western Africa with 16 countries including Burundi, Comoros, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia¸ South Sudan, Uganda¸ United Republic of Tanzania and Zimbabwe (United nation, 2019). In spite of having a great human capital with a population estimated at 1.06 billion and being one of the world largest reserve of natural resources, SSA remains one of the worlds least developed region both in terms of economy and infrastructure (World Bank, 2017; CICID, 2005).



Figure 3.2. Sub-Saharan African countries (United Nation, 2019).

According to Foster and Briceno-Garmendia (2010) low income countries in SSA suffer the most of low paved-road density (31 km per 100 square kilometers of arable

land of road), low power generation capacity (37 megawatts per million population), low electricity coverage (16% of total population) and lack of other infrastructure required to sustain the regional development. Such lack of infrastructures and public services results in heightening costs of services. For instance, power tariffs in SSA were estimated between 0.02 and 0.46 US$ per kilowatt-hour whereas, in other developing regions, it was evaluated at a much lower level between 0.05 and 0.10 per kilowatt-hour. In similar a way, road freight tariffs were registered at values between 0.04 and 0.14 US$ per ton-kilometer, as opposed to other developing regions where it ranges between 0.01 and 0.04 US$ per ton-kilometer (Foster and Briceno-Garmendia, 2010). Many experts have argued that the lack of capital to finance key infrastructure was the bottle neck to SSA's infrastructure development. In fact, the SSA needs more than US$ 93 billion per year to fill its infrastructure gap. SSA is also one of the regions in the world where the private participation in infrastructure (PPI) is the highest with more than 50% of foreign direct investment dedicated to infrastructure development (Gutman *et al.*, 2015). Besides capital shortage, experts also believe that the lack of sound political reforms - capable of improving administrative procedure, increasing transparency and institutional capacity - hinders significantly the development of the region (ICA Report, 2014). These are all issues inherent to SSA making the selection of a right partner for project development more challenging, particularly for LIPs which require great amounts of capital and a set of resilient stakeholders to carry out the project successfully until its completion.

Table 3.4. Sub-Saharan African countries by sub-region (United Nation, 2019).

Eastern Africa	**Middle Africa**	**Western Africa**	**Southern Africa**
Burundi	Angola	Benin	Botswana
Comoros	Cameroon	Burkina Faso	Lesotho
Eritrea	Central African Republic	Cabo Verde	Namibia
Ethiopia	Chad	Cote d'Ivoire	South Africa
Kenya	Congo	Gambia	Swaziland
Madagascar	Democratic Republic of the Congo	Ghana	
Malawi	Equatorial Guinea	Guinea	
Mauritius	Gabon	Guinea-Bissau	
Mozambique	Sao Tome and Principe	Liberia	
Rwanda		Mali	
Seychelles		Mauritania	
South Sudan		Niger	
Uganda		Nigeria	
United Republic of Tanzania		Senegal	
Zambia		Sierra Leone	
Zimbabwe		Togo	

4. FINDINGS AND DISCUSSION

4.1. PEST Analysis for Sub-Saharan Africa

4.1.1. Political and Legal Environment

Over the past decades, governmental and non-governmental institutions have long endeavored to quantify states' performances through indicators which enable a qualitative evaluation of a country's political status with respect to other countries in the world. The governance indicator was developed by the World Bank Group to meet a similar objective and permit to conduct consistent assessment of governments' efficiency. The index of global governance or Worldwide Governance Indicators (WGIs) reflects and combines six key political characteristics, namely "*Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption*" (Kaufmann *et al.* 2010). The indicators range from -2.5 to 2.5, with -2.5 representing the worst and 2.5 the best governance.

- Control of Corruption (CC) assesses qualitatively the use of public power for private gain, both petty and grand forms of corruption, but also the concentration of the state power in hands of elites for private interests. The results of the World Bank analysis suggest that Equatorial Guinea (-1.84) is the country in SSA with the highest level of corruption followed by South Sudan (-1.61) and Guinea-Bissau (-1.51), as opposed to Cabo Verde (0.90), Rwanda (0.83) and Botswana (0.80) which are the least corrupted SSA countries. In addition, the data in Table 4.1.1 suggest that the SSA region is still struggling with illicit practices; scoring an average of -0.65.
- Government Effectiveness (GE) measures the quality of public and civil services, their degree of independence from political pressure, policy formulation and implementation, and the government's credibility in implementing such policies. It can be observed in Table 4.1.1 that Mauritius has the most effective government

in SSA with a WGI score of 1.13 followed by Seychelles (0.39) and South Africa (0.33). Government effectiveness remains modest with a score of only -0.79 on average.

- Political Stability and Absence of Violence (PV) quantify the likelihood of a government to be destabilized or overtaken by unconstitutional means (coups, act of terror, rebellion, etc.). It should be noted that the economic impact of political violence and armed conflict in the region has declined significantly over the past two decades, although security tensions still pose threats to growth in several countries (IMF, 2015). Based on WGIs, among Sub-Saharan countries, the most stable governmental bodies reside in Botswana (1.02), Mauritius (0.74) and Namibia (0.62). The region, however, registered an average PV index of -0.56.
- Regulatory Quality (RQ) is somehow similar to Government Effectiveness with a focus on private sector. In fact, it aims at measuring the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Once more, based on data displayed in Table 4.1.1, it can be said that Mauritius (1.00), Botswana (0.64) and South Africa (0.32) are the three most investor friendly jurisdictions. On the contrary, Eritrea (-2.12), Zimbabwe (-1.89) and South Sudan (-1.63) are countries with the least regulatory policies in favor of the private sector. The entire SSA region scored an average of -0.67. The RQ indicator by region can be seen in Figure 4.1.
- Rule of Law (RL) measures the extent to which rules of society are perceived to be enforced, including contract and property rights, by the courts. Mauritius (0.92) and Botswana (0.63) registered the best scores in the region. This infers that they have strong legal institutions capable of enforcing the law. The average regional RL indicator is still below zero with -0.64. Table 4.1.1 and Figure 4.1 show the RL countries' indicator in Sub-Saharan Africa.
- Voice and Accountability (VA) consists in assessing the extent to which a country's citizens participate in electing their government, enjoy freedom of expression, freedom of association and a free media. In Sub-Saharan Africa (SSA), Cabo verde (0.98), Mauritius (0.91) and South Africa (0.65) are the countries were citizens enjoy the most freedom of expression and where the democratic principle is

the most respected. As opposed to Eritrea (-2.04), Equatorial Guinea (-1.98) and South Soudan (-1.52) which are the countries with the least voice accountability registered in the region. The average VA indicator of SSA was estimated at -0.53.

Table 4.1. World Governance Indicators by country (World Bank, 2014).

	CC	**GE**	**PV**	**RQ**	**RL**	**VA**
Angola	-1,45	-1,15	-0,27	-0,96	-1,1	-1,14
Benin	-0,78	-0,5	0,05	-0,51	-0,55	0,23
Botswana	0,8	0,32	1,02	0,64	0,63	0,44
Burkina Faso	-0,53	-0,56	-0,79	-0,33	-0,53	-0,41
Burundi	-1,19	-1,09	-0,89	-0,77	-0,93	-1,02
Cabo Verde	0,9	-0,01	0,41	-0,01	0,57	0,98
Cameroon	-1,15	-0,74	-0,94	-0,94	-0,87	-1
Central African Republic	-1,15	-1,84	-2,67	-1,41	-1,73	-1,42
Chad	-1,23	-1,48	-1,53	-1,17	-1,12	-1,33
Comoros	-0,53	-1,67	-0,19	-1,14	-0,94	-0,33
Congo, Dem. Rep.	-1,29	-1,59	-2,27	-1,34	-1,43	-1,31
Congo, Rep.	-1,22	-1,15	-0,29	-1,18	-1,07	-1,08
Cote d'Ivoire	-0,41	-0,78	-1,01	-0,62	-0,61	-0,52
Equatorial Guinea	-1,84	-1,45	-0,39	-1,46	-1,4	-1,98
Eritrea	-0,86	-1,62	-0,76	-2,12	-1,46	-2,04
Ethiopia	-0,43	-0,47	-1,24	-0,98	-0,42	-1,26
Gabon	-0,64	-0,66	0,2	-0,73	-0,5	-0,91
Gambia, The	-0,68	-0,61	-0,1	-0,49	-0,63	-1,25
Ghana	-0,21	-0,27	-0,13	-0,04	0,02	0,49
Guinea	-1,07	-1,21	-0,93	-1,1	-1,38	-0,89
Guinea-Bissau	-1,51	-1,55	-0,74	-1,27	-1,36	-1,04
Kenya	-0,94	-0,3	-1,27	-0,34	-0,45	-0,16
Lesotho	0,15	-0,51	-0,27	-0,43	-0,22	0,11
Liberia	-0,78	-1,37	-0,63	-0,84	-0,84	-0,29
Madagascar	-0,8	-1,28	-0,54	-0,72	-0,74	-0,53
Malawi	-0,76	-0,69	0,12	-0,69	-0,3	-0,12
Mali	-0,72	-1,12	-1,74	-0,56	-0,65	-0,2
Mauritania	-0,92	-1,05	-0,58	-0,7	-0,82	-0,91

Table 4.1. World Governance Indicators by country (World Bank, 2014) (cont.).

	CC	**GE**	**PV**	**RQ**	**RL**	**VA**
Mauritius	0,45	1,13	0,74	1	0,92	0,91
Mozambique	-0,7	-0,73	-0,35	-0,39	-0,84	-0,23
Namibia	0,23	0,1	0,62	0,03	0,14	0,54
Niger	-0,63	-0,74	-1,27	-0,66	-0,69	-0,25
Nigeria	-1,27	-1,19	-2,11	-0,82	-1,08	-0,65
Rwanda	0,83	0,02	-0,1	0,18	0,08	-1,13
Sao Tome and Principe	-0,16	-0,86	0,15	-0,73	-0,86	0,33
Senegal	0,02	-0,39	-0,13	-0,22	-0,1	0,25
Seychelles	0,37	0,39	0,42	-0,31	0,1	-0,01
Sierra Leone	-0,95	-1,22	-0,22	-0,81	-0,92	-0,31
South Africa	-0,11	0,33	-0,08	0,32	0,16	0,65
South Sudan	-1,61	-2,13	-2,54	-1,63	-1,8	-1,52
Swaziland	-0,36	-0,53	-0,52	-0,46	-0,28	-1,2
Togo	-0,92	-1,26	-0,16	-0,82	-0,87	-0,82
Uganda	-1,1	-0,4	-0,93	-0,36	-0,39	-0,56
United Rep. of Tanzania	-0,8	-0,64	-0,54	-0,34	-0,41	-0,17
Zambia	-0,41	-0,47	0,21	-0,52	-0,25	-0,14
Zimbabwe	-1,39	-1,18	-0,65	-1,89	-1,42	-1,28
Regional Average	**-0,65**	**-0,79**	**-0,56**	**-0,67**	**-0,64**	**-0,53**

Though the region political and business environment still need substantial improvement, it is worthwhile noting that countries in SSA have substantially enhanced their outlooks over the last decade. According to Doing Business Report (2019), "*Sub-Saharan Africa has been the region with the highest number of reforms each year since 2012*". In 2018, Doing Business recorded 107 legal and economic reforms across 40 countries in Sub-Saharan Africa which have benefited the region's private sector.

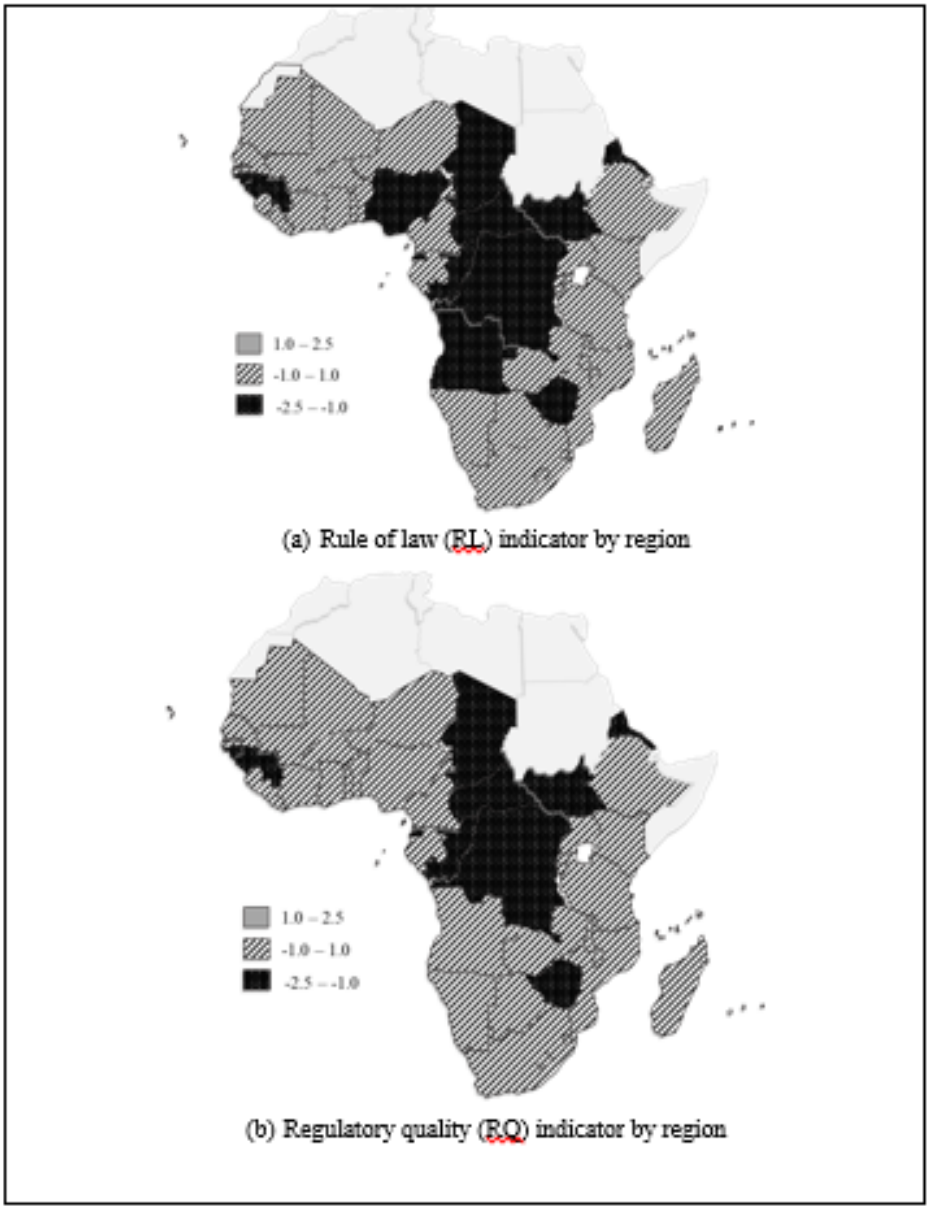


Figure 4.1. RL and RQ indicators (Adapted from World Bank (2014)).

4.1.2. Economic Assessment

Sub-Saharan Africa is a very diverse and immense region to be analyzed as a single group. Many analysts have found it useful to divide the region whether in terms of population, income levels, or composition of output. For instance, when analyzing the region in terms of income, one can adopt the World Bank classification where economies are divided into four income groups including high, upper-middle, lower-

middle and low-income. Income is then measured based on the gross national income (GNI) per capita (in U.S. dollars) (World Bank, 2019). The advantage of using GNI is that key economic and demographic indicators including income growth, inflation, exchange rates, and population change are captured in this indicator.

High income countries, as defined by the World Bank, are countries with a GNI per capita greater than 12,055 US dollars. There is one country in Sub-Saharan Africa that follows into this category, i.e. Seychelles with a GNI of US$ 14,170 in 2017. Upper-middle economies are those countries with GNIs per capita lying between 3,896 and 12,055 US dollars. This group counts 6 countries in 2017 namely South Africa (5,430 US$), Botswana (6,600 US$), Mauritius (9,790 US$), Namibia (4,700 US$), Gabon (7,180 US$) and Equatorial Guinea (8,250 US$). Similarly, lower-middle economies have their GNI per capita greater than 995 but still below 3,896 US dollars. This category registered up to 13 countries in 2017 including Angola, Cabo Verde, Cameroon, Republic of Congo, Côte d'Ivoire, Ghana, Kenya, Lesotho, Mauritania, Nigeria, Sao Tome and Principe, Swaziland and Zambia. The average GNI per capita for lower-middle economies in SSA is estimated at US$1,871 with a minimum in Mauritania (1,100 US$) and maximum in Angola (3,570 US$). At last, the low-income countries where the GNI per capita is below 995 US dollars. The majority of SSA countries are found in this category. The common pattern among these countries is the fact that their economic developments can be heavily affected by noneconomic events, such as the outbreak of civil conflict. In this group, one can find countries such as Burundi, Central African Republic, Comoros, Democratic Republic of the Congo, Eritrea, Guinea, Guinea-Bissau, Liberia, Togo or Zimbabwe. Table 4.1.2 lists the GNI of all SSA countries.

Table 4.2. Gross national income (GNI) per capita (in US$) (World Bank, 2017).

Categories	**Country Name**	**GNI (US$) in 2017**
High income	Seychelles	14 170
Low income	Benin	800
	Burkina Faso	590
	Burundi	280
	Central African Republic	390
	Chad	640
	Comoros	1 280
	Congo, Dem. Rep.	460
	Eritrea	N.D
	Ethiopia	740
	Gambia, The	680
	Guinea	790
	Guinea-Bissau	660
	Liberia	620
	Madagascar	400
	Malawi	320
	Mali	770
	Mozambique	420
	Niger	360
	Rwanda	720
	Senegal	1 240
	Sierra Leone	510
	South Sudan	N.D
	Tanzania	910
	Togo	610
	Uganda	600
	Zimbabwe	1 170
Low income Average		**665**
Lower middle income	Angola	3 570
	Cabo Verde	3 030
	Cameroon	1 370
	Congo, Rep.	1 430
	Cote d'Ivoire	1 580

Table 4.2. Gross national income (GNI) per capita (in US$) (World Bank, 2017) (cont.).

Categories	**Country Name**	**GNI (US$) in 2017**
	Ghana	1 880
	Kenya	1 460
	Lesotho	N.D
	Mauritania	1 100
	Nigeria	2 100
	Sao Tome and Principe	1 770
	Swaziland	N.D
	Zambia	1 290
Lower middle income average		**1 871**
Upper middle income	Botswana	6 730
	Equatorial Guinea	7 050
	Gabon	6 650
	Mauritius	10 130
	Namibia	4 570
	South Africa	5 430
Upper middle income average		**6 760**
Sub-Saharan Africa		**1 557**
Sub-Saharan Africa (excluding high income)		**1 556**
World		**10 338**

It is interesting to note that only Seychelles has enjoy an important economic evolution over the past decade. In fact, in 2008, Seychelles was categorized as upper-middle country with a GNI of 11,130 US$ and raised by c.30% over the years to reach 14,170 US$ in 2017. On the contrary during the same period, Guinea Equatorial has significantly underperformed moving from high income category with a GNI of 14,130 US$in 2008 to reach 7,050 US$ in 2017. The distribution of high income, upper-middle income, lower-middle income and low-income countries across SSA can be seen in Figure 4.2.

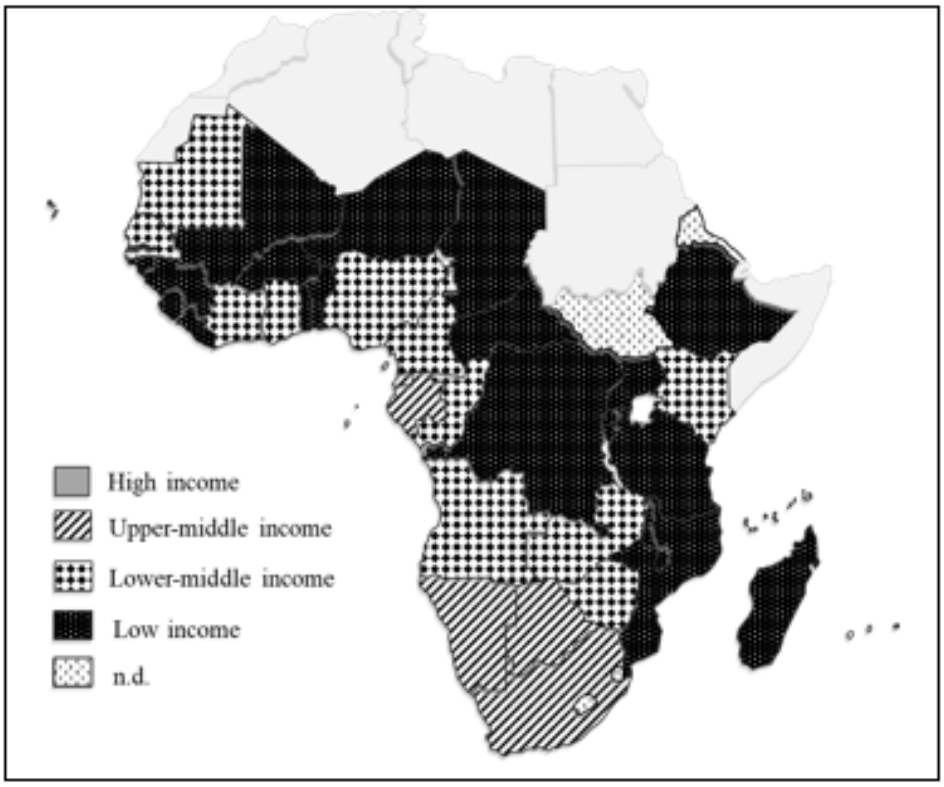


Figure 4.2. Clarification of SSA countries by GNI (Adapted from World Bank (2017)).

As presented in Table 4.3 below, GDP growth per annum is estimated to have risen by 3.33% in 2017 in SSA; 5.29% for high income, 2.39% for upper-middle-income countries, 3.22% for lower-middle countries and 3.52% for low-income countries. It is expected to reach 4.27% in the short-term (by 2021). This indicates that Sub-Saharan Africa is expected to remain among the fastest growing regions. In 2017, the five strongest economies of the region were Nigeria (US$ 376,361 Billion), South Africa (US$ 349,299 Billion), Angola (US$ 126,506 Billion) and Ethiopia (US$ 80,874 Billion) and Kenya (US$ 79,223 Billion). In the short-term, this tendency is expected to remain as such for at least the top three countries. Nevertheless, only Ethiopia has displayed tremendous economic expansion with double digit growth (10.9%) registered during the same year, making it the fastest growing economy in the region. In second and third position came Ghana and Guinea with respectively 8.44% and 8.25%.

On the other hand, many SSA countries suffer from a high inflation rate, which undermine their currency stability. In 2017, the cost of living had grown YOY at a rate

of 2.86% for Seychelles, 4.84% for upper-middle income economies, 6.68% for lower-middle income countries and 14.66% for low-income countries. It is worthwhile noting the inverse relationship between the economic categories and inflation rate. In fact, the figures show that the higher the class, the lower the inflation rate. This phenomenon could be explained by the fragility of state instructions and, in lower income countries, performance and weak currencies. In addition, the IMF data suggest that countries having their currency pegged to hard currency, such as those belonging to the West African Economic and Monetary Union (WAEMU), enjoy a more stable inflation rate than others (IMF, 2017).

Table 4.3. Economic indicators of SSA (IMF, 2017).

Countries	**GDP (Bn US$)**	**GDP growth Rate (%)**	**GDP per capita (US$)**	**Inflation (%)**
High income	**1,50**	**5,29**	**15 859,38**	**2,86**
Seychelles	1,50	5,29	15 859,38	2,86
Low income	**13,23**	**3,52**	**1 114,78**	**14,66**
Benin	9,25	5,61	831,10	0,14
Burkina Faso	12,57	6,42	654,87	0,35
Burundi	3,40	0,00	312,46	16,64
Central African Rep.	1,94	4,33	388,66	4,10
Chad	9,87	-3,14	810,16	-0,92
Comoros	0,65	2,71	787,90	1,00
Congo, Dem. Rep.	41,44	3,41	478,22	41,50
Eritrea	5,81	5,01	979,69	9,00
Ethiopia	4,42	1,61	3 850,55	6,22
Gambia, The	14,93	0,45	7 373,13	2,65
Guinea	47,02	8,44	1 662,59	12,37
Guinea-Bissau	10,25	8,25	790,32	8,91
Liberia	2,75	-1,56	1 360,56	5,33
Madagascar	3,29	2,47	694,17	12,44
Malawi	11,50	4,17	448,98	8,28
Mozambique	12,59	3,74	426,09	15,32
Niger	8,22	4,88	438,43	2,37
Rwanda	9,14	6,10	771,67	4,84

Table 4.3. Economic indicators of SSA (IMF, 2017) (cont.).

Countries	**GDP (Bn US$)**	**GDP growth Rate (%)**	**GDP per capita (US$)**	**Inflation (%)**
Mali	6,24	4,00	325,54	12,20
Senegal	21,11	7,15	1 331,28	1,32
Sierra Leone	3,61	3,67	487,61	18,22
South Sudan	3,06	-5,15	243,11	187,87
Tanzania	51,76	6,00	1 034,23	5,32
Togo	4,77	4,40	611,13	-0,75
Uganda	26,62	4,85	706,50	5,63
Zimbabwe	17,64	3,74	1 185,34	0,92
Lower-middle income	**59,36**	**3,22**	**1 847,87**	**6,68**
Angola	126,51	-2,50	4 465,73	29,84
Cabo Verde	1,78	4,01	3 300,99	0,78
Cameroon	34,99	3,55	1 441,38	0,64
Congo, Rep.	8,72	-3,11	2 005,34	0,45
Cote d'Ivoire	40,47	7,80	1 621,40	0,83
Ghana	1,48	4,56	704,70	8,05
Kenya	1,35	5,92	793,62	1,06
Lesotho	79,22	4,89	1 695,38	7,99
Mauritania	15,37	5,43	813,30	1,76
Nigeria	376,36	0,81	1 994,65	16,50
Sao Tome and Principe	0,39	3,88	1 846,72	5,69
Swaziland	n.d.	n.d.	n.d.	n.d.
Zambia	25,71	3,40	1 491,22	6,58
Upper-middle income	**81,10**	**2,39**	**7 591,50**	**4,84**
Botswana	17,38	2,36	7 584,50	3,30
Equatorial Guinea	12,49	-3,22	14 817,83	0,75
Gabon	80,87	10,86	872,84	9,92
Mauritius	13,33	3,81	10 504,47	3,67
Namibia	13,24	-0,77	5 589,46	6,15
South Africa	349,30	1,32	6 179,87	5,27

SSA's economy has known boom and bust due to both exogenous and endogenous circumstances. In 2014, Sub-Saharan Africa registered strong economic growth of 5% driven by strong investment in mining and infrastructure and by strong private consumption, mostly in low income countries (IMF, 2015). However, growth in oils exporter countries had slowdown in recent year because of lower global oil prices. In

fact, SSA has registered in 2016 its lowest growth in 20 years largely driven by external factors; decrease in oil prices affected large economies including Angola and Nigeria (Ernst & Young, 2017). In spite of a deceleration of its economic activities, SSA remains among the world's fastest-growing regions. The key factors behind SSA's attractiveness consist in a strong macroeconomic growth, improving business environment, rising consumer class, abundant natural resources, demographic dividend and infrastructure development (Chuhan-Pole *et al.*, 2014).

The Economic Freedom Index (EFI) is another well-known economic indicator of a country's economic status and trend. It is defined as the fundamental right of every human to control his or her own labor and property (Miller and Kim, 2015). Most of SSA economies are qualified as either "mostly unfree" or "repressed" with an overall regional index of 54.9 (on a scale of 100) in 2014. In 2018, the region continues to underperform due to repeated failures to implement sound policies changes to improve the business climate and rule of law. According to Miller *et al.* (2018), overdependence on exports and lack of economic diversification are among the greatest impediments to sustained increases in productivity and job creation. This has caused the SSA to fall steadily behind compared to the rest of the world.

Economic freedom is measured based on 12 quantitative and qualitative factors, grouped into four main pillars of economic freedom:

(i) Rule of Law: property rights, judicial effectiveness, government integrity;
(ii) Government Size: tax burden, fiscal health, government spending;
(iii) Regulatory Efficiency: business freedom, labor freedom, monetary freedom; and
(iv) Open Markets: trade freedom, investment freedom and financial freedom.

Each factor is graded on a scale of 0 to 100 and a country's overall score is obtained by averaging these ten economic freedoms factors equally weighted (Miller *et al.*, 2019).

In SSA the Economic Freedom Index hits 61.4 out of 100 for Seychelles, 59.5 on average for upper-middle income countries, 54.1 for lower-middle countries and 52.8 for low-income countries, see Table 4.4. Considering individual performances, Mauritius (73.0), Rwanda (71.1), Botswana (69.5), Cabo Verde (63.1) and Cote d'Ivoire (62.4) are the five most economically free countries in the region. In other words, they are the countries which are the most attractive for investors based on the strength of their rules of law, government policies, efficiency of their regulation policies and openness to intra and extra trade markets. In addition, based on the data provided by the Heritage Foundation, eastern and southern Africa appear to be favorable sub-regions for investment and unsurprisingly harbor. The majority of stable economies in SSA are also found in these sub-regions.

Table 4.4. Ranking of SSA countries by EFI (Miller *et al.*, 2019)

Countries	**Region Rank**	**World Rank**	**EFI score -2018**
High income			**61,4**
Seychelles	6	87	61,4
Low income			**52,8**
Benin	21	127	55,3
Burkina Faso	9	96	59,4
Burundi	39	162	48,9
Central African Republic	38	161	49,1
Chad	36	159	49,9
Comoros	20	124	55,4
Congo, Dem. Rep.	34	157	50,3
Eritrea	47	177	38,9
Ethiopia	26	137	53,6
Gambia, The	30	146	52,4
Guinea	19	120	55,7
Guinea-Bissau	25	135	54,0
Liberia	37	160	49,7

Table 4.4. Ranking of SSA countries by EFI (Miller *et al.*, 2019) (cont.).

Countries	**Region Rank**	**World Rank**	**EFI score -2018**
Madagascar	15	114	56,6
Malawi	32	153	51,4
Mali	12	103	58,1
Mozambique	40	163	48,6
Niger	31	151	51,6
Rwanda	2	32	71,1
Senegal	16	117	56,3
Sierra Leone	42	167	47,5
South Sudan	n.d.	n.d.	n.d.
Tanzania	7	94	60,2
Togo	35	158	50,3
Uganda	8	95	59,7
Zimbabwe	45	175	40,4
Lower middle income			**54,1**
Angola	33	156	50,6
Cabo Verde	4	73	63,1
Cameroon	29	145	52,4
Congo, Rep.	46	176	39,7
Cote d'Ivoire	5	78	62,4
Ghana	13	109	57,5
Kenya	22	130	55,1
Lesotho	28	142	53,1
Mauritania	18	119	55,7
Nigeria	14	111	57,3
Sao Tome and Principe	24	134	54,0
Swaziland	23	132	54,7
Zambia	27	138	53,6

Table 4.4. Ranking of SSA countries by EFI (Miller *et al.*, 2019) (cont.).

Countries	**Region Rank**	**World Rank**	**EFI score -2018**
Upper middle income			**59,5**
Botswana	3	36	69,5
Equatorial Guinea	44	174	41,0
Gabon	17	118	56,3
Mauritius	1	25	73,0
Namibia	10	99	58,7
South Africa	11	102	58,3

4.1.3. Social Assessment

While assessing countries' economy, GDP, debt and external aid, foreign direct investments or inflations are often sufficient quantifier to assess financial health, economic status and trends. Nonetheless, despite all possible reforms enforceable by a government, an economy can hardly improve if its citizens are not able to sustain its productivity and growth in the long run. The United Nations Development Programme (UNDP) developed the Human Development Index (HDI) in order to assess citizens' development state based on the access to education, income per capita and life expectancy (Tyler and Gopal, 2010).

The HDI captures, on a scale of 0 to 1, societies' economic progress and the extent to which income translates also into human development. The index takes into account education (adult literacy rate and combined gross enrollment ratio), health (life expectancy at birth) and economic growth (GDP per capita US$ purchasing power parity or "PPP"). The HDI results in grouping the world's countries in four categories; very high human development meaning an index above 0.8, high human development consisting of countries with HDI between 0.700 and 0.799, medium human development with HDI between 0.550 and 0.699 and low high human development for countries with HDI below 0.550 (Klugman, 2010).

Based on UNDP data, most of the Sub-Saharan countries belong to low human development category (see Figure 4.3). In other words, they suffer of low life expectancy (with an average of 62.3 years) and low literacy rate (with an average of10 years of expected schooling and a mean of 5.2 years of schooling) (United Nations, 2017).

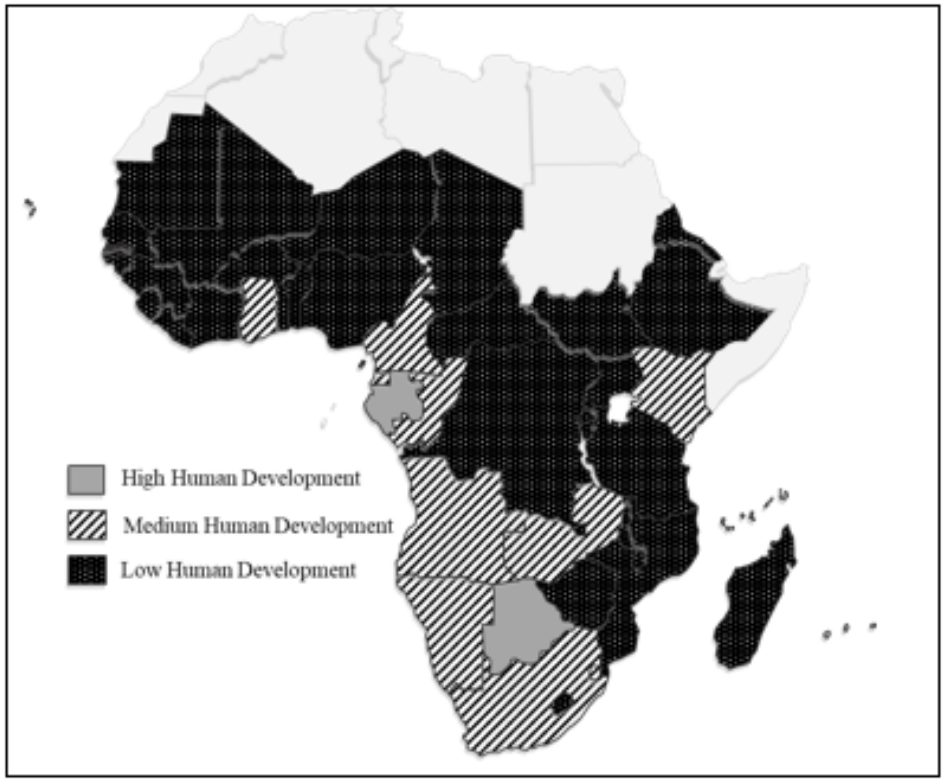


Figure 4.3. Human Development Index in SSA by category (Adapted from United Nation (2017)).

As shown in table 4.5, SSA counts four nations listed among High Human Developed countries worldwide. These countries are Seychelles (0.797), Mauritius (0.790), Botswana (0.717) and Gabon (0.702). In addition, 12 sub-Saharan countries - including South Africa (0.699), Cabo Verde (0.654), Namibia (0.647), Rep. Congo (0.606), Ghana (0.592), Equatorial Guinea (0.591), Kenya (0.590), Sao Tome and Principe (0.589), Swaziland (0.588), Zambia (0.588), Angola (0.581) and Cameroon (0.556) - are listed in the Medium Human Development category. They make up on average an HDI of 0.605. The remaining sub-Saharan countries (30 countries) are considered Low Human Developed countries with an average HDI of 0.467.

Table 4.5. Human Development Index for SSA (United Nation, 2017)

World HDI rank	Country	Human Development Index (HDI) Value 2017	Life Expectancy at birth (years) 2017	Expected years of schooling (years) 2017	Mean years of schooling (years) 2017	Gross national income (GNI) per capita (2011 PPP$) 2017
	VERY HIGH HUMAN DEVELOPMENT					
1	Norway	0,953	82,3	17,9	12,6	68 012
2	Switzerland	0,944	83,5	16,2	13,4	57 625
	HIGH HUMAN DEVELOPMENT					
62	Seychelles	0,797	73,7	14,8	9,5	26 077
65	Mauritius	0,790	74,9	15,1	9,3	20 189
101	Botswana	0,717	67,6	12,6	9,3	15 534
110	Gabon	0,702	66,5	12,8	8,2	16 431
	MEDIUM HUMAN DEVELOPMENT					
113	South Africa	0,699	63,4	13,3	10,1	11 923
125	Cabo Verde	0,654	73,0	12,6	6,1	5 983
129	Namibia	0,647	64,9	12,3	6,8	9 387
137	Congo	0,606	65,1	11,4	6,3	5 694
140	Ghana	0,592	63,0	11,6	7,1	4 096
141	Equatorial Guinea	0,591	57,9	9,3	5,5	19 513
142	Kenya	0,590	67,3	12,1	6,5	2 961
143	Sao Tome and Principe	0,589	66,8	12,5	6,3	2 941
144	Swaziland	0,588	58,3	11,2	6,5	7 620
144	Zambia	0,588	62,3	12,5	7,0	3 557
147	Angola	0,581	61,8	11,8	5,1	5 790
151	Cameroon	0,556	58,6	12,2	6,3	3 315
	LOW HUMAN DEVELOPMENT					
154	Tanzania	0,538	66,3	8,9	5,8	2 655
156	Zimbabwe	0,535	61,7	10,3	8,1	1 683
157	Nigeria	0,532	53,9	10,0	6,2	5 231
158	Rwanda	0,524	67,5	11,2	4,1	1 811
159	Lesotho	0,520	54,6	10,6	6,3	3 255
159	Mauritania	0,520	63,4	8,6	4,5	3 592
161	Madagascar	0,519	66,3	10,6	6,1	1 358
162	Uganda	0,516	60,2	11,6	6,1	1 658
163	Benin	0,515	61,2	12,6	3,6	2 061
164	Senegal	0,505	67,5	9,7	3,0	2 384
165	Comoros	0,503	63,9	11,2	4,8	1 399
165	Togo	0,503	60,5	12,4	4,8	1 453
170	Côte d'Ivoire	0,492	54,1	9,0	5,2	3 481
171	Malawi	0,477	63,7	10,8	4,5	1 064
173	Ethiopia	0,463	65,9	8,5	2,7	1 719
174	Gambia	0,460	61,4	9,2	3,5	1 516
175	Guinea	0,459	60,6	9,1	2,6	2 067
176	Congo (Dem. Rep.)	0,457	60,0	9,8	6,8	796
177	Guinea-Bissau	0,455	57,8	10,5	3,0	1 552
179	Eritrea	0,440	65,5	5,4	4,0	1 750
180	Mozambique	0,437	58,9	9,7	3,5	1 093
181	Liberia	0,435	63,0	10,0	4,7	667
182	Mali	0,427	58,5	7,7	2,3	1 953
183	Burkina Faso	0,423	60,8	8,5	1,5	1 650
184	Sierra Leone	0,419	52,2	9,8	3,5	1 240
185	Burundi	0,417	57,9	11,7	3,0	702
186	Chad	0,404	53,2	8,0	2,3	1 750
187	South Sudan	0,388	57,3	4,9	4,8	963
188	Central African Republic	0,367	52,9	7,2	4,3	663
189	Niger	0,354	60,4	5,4	2,0	906

Despite its current poor condition, Sub-Saharan Africa is still a land of great potential both in term of natural and human resource. Over the past decades, both regional government, bilateral, multilateral and non-governmental organizations have endeavored to reduce poverty across SSA countries. In effect, the estimated proportion of the region's population living in poverty. fell from 56.5% in 1990 to 47.5% in 2008 and continues to decrease (IMF, 2015). In addition, SSA has the world's fastest growing populations, estimated at 2.7% p.a, compared to 2% and 2.2% a year in Asia and Latin America respectively (Tyler and Gopal, 2010).

Life expectancy in SSA is one of the world's lowest. In fact, individuals in SSA are expected to live on average 60.7 years, which is 11.5 years below the world average (72.2 years) (United Nation, 2017). These low figures are mainly explained by the fact that populations in 14 SSA countries (10 countries in Western and Eastern Africa) have a life expectancy less than 60 years. However, life expectancy in the region is projected to gain about c.20 years by the end of the century, reaching 70 years in 2045-2050 and 78 years in 2095-2100, provided further continuous campaign on reduction of HIV and other infectious deceases (United Nations, 2015). The IMF estimates that the world's working age population, excluding that of Sub-Saharan Africa, will start to decline by 2050 and Sub-Saharan Africa's labor force will be increasingly important for the global economy. In recent year, most of Sub-Saharan Africa have undergone a demographic shift, due to a decline in infant mortality despite the moderate fertility rates. Such a phenomenon has led to an increase in the share of the working age population. This is also known as the demographic transition. It is a cycle driven by declining mortality and fertility rates, resulting in a change in the overall age structure of a population. It ultimately leads to an increase in Share of the Working Age Population (SWAP) - the share of the population aged 15-64 relative to the overall population and is the variable upon which depends the demographic dividend (IMF, 2015). As described in Figure 4.4, by 2035, the number of Sub-Saharan Africans reaching working age (15-64) is expected to exceed that of other regions in the world (IMF, 2012). This trend would have significant impact on both global and region economies.

[1]Measured based on a poverty line of US$1.25 a day in 2005 prices.

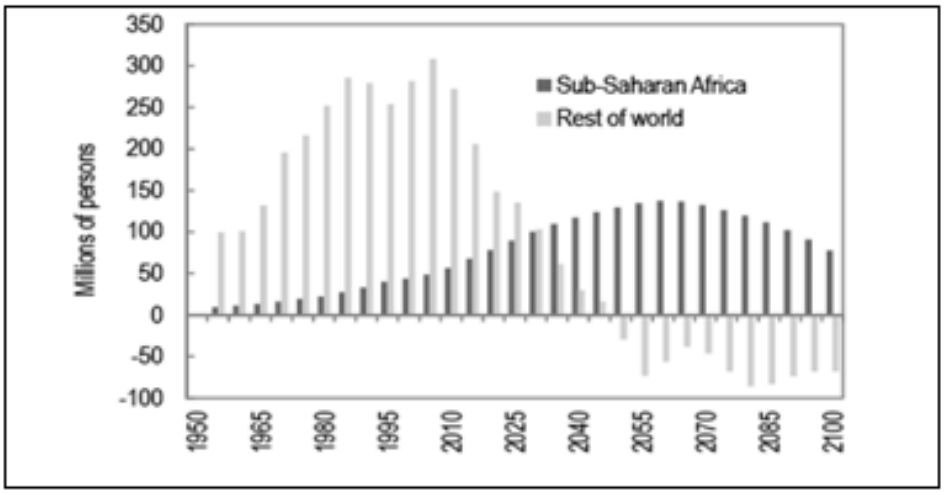


Figure 4.4. Change in working age population (IMF, 2012).

4.1.4. Technological Assessment

Nowadays creating new technology or having the ability to use or improve existing technology became an indispensable tool to foster sustainable growth of economy. Such creation or ability to create is mostly translated by an increase of national productivity. The use of new technology does not necessarily mean to be a pioneer in technological breakthrough. M. Desai *et al.* (2002) even argued that "*Not all countries need to be on the cutting age of global technological advance, but every country needs the capacity to understand and adapt global technologies for local needs*". Technology in a way constitutes the prerequisite for enhanced social, environmental and economic growth. In nowadays competitive business environment, technology became the bridge between sustainable return and productivity. According to Akinlo (2005), SSA is struggling to raise its productivity level because many countries within the region are not able to provide an adequate framework to support research and development activities since they lack (i) a risk capital market, (ii) an appropriate protection of intellectual property rights and (iii) research supportive activities. SSA encounters much more difficulties to provide the right environment. As mention previously, the majority of SSA countries are fragile economies that have weak legal frameworks and low literacy rate as captured by the HDI. Education plays an important role in the context of technology for it is the common denominator to both increased skills activities and Research and Development

(R&D) activities.

Given the bewildering advance of technology across the world, researchers and organizations have felt the need to standardize measures of countries' technological achievement. Quite a few indicators were devised but for simplicity sake, this research will focus only on the ICT Development Index (IDI).

The ICT Development Index was developed by ITU in 2008 to evaluate countries' technological development. The IDI combines 11 indicators into one benchmark (with scores ranging from 0.0 to 10.0) used to monitor countries' development in information and communication technology (ICT) over time (Gillward and Stork, 2008). Furthermore, the IDI also assesses the availability of ICT infrastructure, level of ICT use, and the skill ability to use ICTs (International Telecommunication Union, 2015). For SSA, the average IDI in 2010 was evaluated at 1.89 and has improved to reach a value of 2.53 in 2015. This suggests that the region has somehow invested in ICT infrastructure to increase the level and the skill to use ICT by 33% over five years. The most significant improvement was achieved by Ghana increasing its IDI value by 1.92. Among all SSA countries, only Mauritius displays an IDI value above the global average of 5.03. Nevertheless, three others (Seychelles, South Africa and Cape Verde) exceed the average value for developing countries set at 4.12 (International Telecommunication Union, 2015). The majority of SSA countries are ranked in the bottom quarter of the 2015 IDI (with 11 at the bottom least) which illustrate the important gap between SSA and other regions.

A. Nasir *et al.* (2011) stressed that the technology achievement of a county is a unit measuring the level of its technological readiness to engage in the global knowledge-based economy. The results displayed in Figure 4.5 suggest that the majority of countries in SSA are not only facing difficulty in using efficiently new or old technology but are also not ready to participate in the global knowledge based econ-

[2]Including and not limited to telephone subscriptions per 100 inhabitants; percentage of households with a computer; percentage of households with Internet access, adult literacy rate and Tertiary gross enrolment ratio.

omy. In effect, much has to be done in the region to at least attain the world average level. The majority of the countries in the region have to put twice as much effort or double their investment in the R&D sector to engage in the global knowledge-based economy.

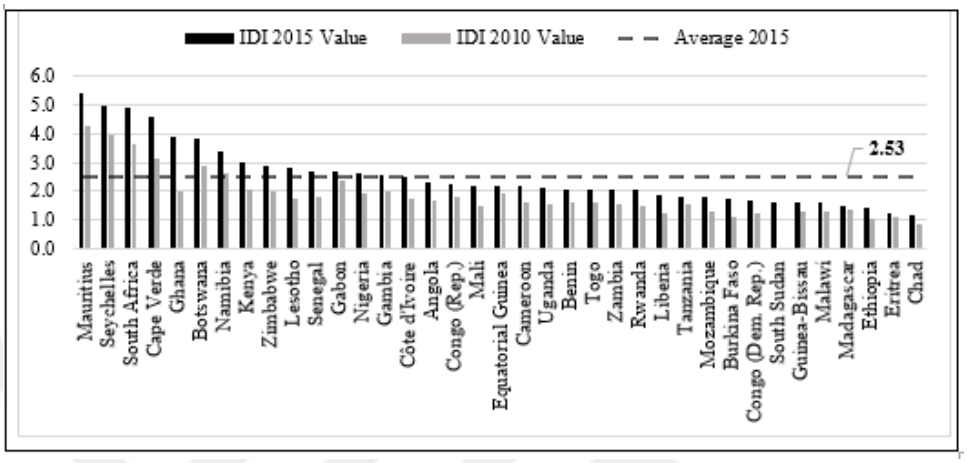


Figure 4.5. ICT Development Index (IDI) 2010-2015 (ITU, 2015).

4.2. Characteristics of EPC Contractors in SSA

4.2.1. Results and Findings

Results are presented in accordance with the categorization described above (Degree of Experience (DE), the Organizational Readiness (OR) and Financial Capability (FC)).

4.2.1.1. Category 1: Degree of Experience (DE). Technical and contextual experience (DE-TC) As observed in table 4.6, in the DE-TC subcategory, capital providers agreed or strongly agreed with statements "*Similar_ Technology*", "*Lip_ Industry*", "*Main_ Contractor*", "*Budget*", "*Schedule*" and "*Budget_ and _Schedule*". In fact, statement "*Similar_ Technology*" registered a mean of 4.18 with a standard deviation of 0.883. Considering that the mean is lying between value "4" and "5" with a negative skewness coefficient (-0.998), it showed that experts were mainly confident with this statement. In more details, when observing the frequency distribution, it was observed that 82%

of experts agreed (with 41% strongly agreeing) that the contractor with at least one LIP of similar technology in Sub-Saharan Africa had higher chances of being selected in a tender process in SSA. Statement "*Lip _Industry*" on the other hand registered a mean of 4.00 and standard deviation of 0.171. The results revealed that 52.9% of experts agreed with this statement while the remaining part of the experts had an evenly shared opinion between neutral (23.5%) and strongly agree (23.5%). Hence, a perfectly symmetric frequency distribution was obtained with a skewness coefficient of zero. This means that in general capital providers agreed with this statement, but the collected data were unable to tell whether the tendency is to strongly agree or agree. Regarding statement "*Main_Contractor*", the majority of capital providers (52.9%) strongly agreed that contractors should have delivered at least one project as a main contractor. This statement registered a mean of 4.35 with a standard deviation of 0.786. The -0.760-skewness coefficient confirmed the expert's tendency to strongly agree with the "*Main_Contractor*" statement. Similarly, 52.9% of experts responded "*Strongly Agree*" and 47.1% responded "Agree" for statement "*Budget*". It was noted that none of the capital providers had a neutral position or rejected the statement. In addition, a mean of 4.53 (with a 0.514 standard deviation) and a skewness coefficient of -0.13 were recorded.

Statement "Schedule" registered a concentration of responses between "Agree" and "Strongly Agree". In effect, the mean and standard deviation for this statement were recorded at 4.47 and 0.514 respectively. However, as opposed to statement "BUDGET", the distribution in this case was positively skewed (0.13) with "Agree" as modal response. For statement "*Budget_&_Schedule*", only 5.9% of capital providers disagreed with the fact that contractors should have a track record of at least 50% of its contracts completed within schedule and budget. The remaining 94% either agreed (47%) or "*strongly agreed*" with it. In fact, a mean of 4.35 and standard deviation of 0.786 were recorded in this instance. Despite the disagreement of some experts, the skewness coefficient remained highly negative (-1.636) describing a tendency toward a strong agreement.

On the other hand, there was a moderate agreement for statements "*Project_ Country*", "*Project_ Size*", "*SS_ Africa*", "*Sub_ Contractor*", "*Local_ Content*", "*Self_ Performance*" and "*In-House_ Design*". They had respective means of 3.24, 3.65, 3.47, 3.35, 3.65, 3.53 and 3.35. The responses for these statements are characterized by a spread around the neutral value, yet with a considerable number of experts agreeing with these statements. In fact, statements "*Project_Country*", "*Project_Size*", and "*Local_Content*" counted more than 50% of capital providers agreeing with these statements leading to a negative skewness coefficient of -0.531, -1.181 and -0.517 respectively. However, for statements "*Self_Performance*" and "*In-House_Design*" experts agreeing with this statement represented each 47.1% and 41.2%. In relation to statement "*SS_Africa*", 35% of this group of experts agreed while 23.5% disagreed. Regarding statement "*Sub_Contractor*", 47% of capital providers were neutral and 35.3% agreed.

Table 4.6. Descriptive statistics for the DE-TC subcategory The means highlighted in bolt indicates a significant agreement for the statement.

Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std Dev.	Skew. Coef.
To ensure LIPs' successful construction, the Contractor MUST:							
- have constructed at least ONE (1) LIP in the project country.	*"PROJECT_ COUNTRY"*	3.24	0.97	-0.531	3.17	0.738	0.106
- have previous experience in the project country regardless of the project size.	*"PROJECT_ SIZE"*	3.65	0.862	-1.181	3.78	0.936	-0.497
- have at least FIVE (5) years of experience in Sub-Saharan Africa.	*"SS_AFRICA?*	3.47	1.068	-0.088	3.85	0.76	-0.462
- have built at least ONE (1) LIP of similar technology in Sub-Saharan Africa.	*"SIMILAR_ TECHNOLOGY"*	**4.18**	0.883	-0.998	3.9	0.86	-0.301

Table 4.6. Descriptive statistics for the DE-TC subcategory The means highlighted in bolt indicates a significant agreement for the statement (cont.).

Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std Dev.	Skew. Coef.
- have at least TEN (10) years of experience in the LIP's industry.	*"LIP_ INDUSTRY"*	**4**	0.707	0	3.61	0.703	-0.184
- have constructed at least ONE (1) LIP as "main contractor".	*"MAIN_ CONTRACTOR"*	**4.35**	0.786	-0.76	**4.2**	0.679	-0.764
- have participated into at least TWO (2) LIPs as "sub-contractor".	*"SUB_ CONTRACTOR"*	3.35	0.786	0.115	3.34	0.575	-0.162
LIPs' successful development in Sub-Saharan Africa depends on:							
- Contractors having a track record of LIPs in Sub-Saharan Africa which contain at least 50% of Local Content (labour, services, products...)	*"LOCAL_ CONTENT"*	3.65	0.862	-0.517	3.49	0.84	-0.358
- Contractors' ability to perform at least 50% of the construction works itself.	*"SELF_PER FORMANCE"*	3.53	0.943	-0.349	3.07	0.905	0.063
- Contractors having an in-house design capacity.	*"IN-HOUSE_ DESIGN"*	3.35	0.862	-0.147	2.98	0.851	0.559
- Contractors having a track record of at least 50% of its contracts completed within BUDGET.	*"BUDGET"*	**4.53**	0.514	-0.13	3.76	0.663	-0.231

Table 4.6. Descriptive statistics for the DE-TC subcategory The means highlighted in bolt indicates a significant agreement for the statement (cont.).

Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std Dev.	Skew. Coef.
- Contractors having a track record of at least 50% of its contracts completed within SCHEDULE.	*"SCHEDULE"*	**4.47**	0.514	0.13	3.76	0.663	-0.773
- Contractors having a track record of at least 50% of its contracts completed within schedule AND budget.	*"BUDGET_ and_SCHEDUL E"*	**4.35**	0.786	-1.636	3.78	0.725	-0.464

4.2.1.2. Advisors' responses. In regard to the advisors, only one statement (i.e. statement "Main_ Contractor") scored a mean higher than 4.00 which indicated that the majority of advisors either agreed or strongly agreed with this statement (see table 4.6). There were 11 statements (statements "Project_ Country", "Project_ Size", "SS_ Africa", "Similar_ Technology", "Lip_ Industry", "Sub_ Contractor", "Local_ Content", "Self_ Performance", "Budget", "Schedule" and "Budget_ and _Schedule") with means between 3.00 and 4.00 suggesting a moderate agreement and one statement (statement "In-House_ Design") with a mean between 2.00 and 3.00 which the advisors seemed to disagree with. Regarding statement "Main_Contractor", it was observed that 58.5% of advisors agreed and 31.7% strongly agreed that contractors needed to account in their portfolio at least one LIP in which they acted as "main contractor". Advisors' responses collected for this statement scored a mean of 4.20 with a standard deviation of 0.679. In addition, the skewness coefficient was registered at -0.764, meaning that the response distribution was leaning toward a strong agreement. In the group of moderately agreed responses, the results showed that statement "Project_Country" registered a mean of 3.17 and a standard deviation of 0.738. For this statement, most advisors (51.2%) opted for a "neutral" position. Though 29.3% of them agree that contractors required to have at least one LIP project already built in

the project country. In addition, the skewness coefficient registered for this statement was positive with a value of 0.106. It indicated that the tendency was more toward a neutral position (value "3") rather than an agreeing position (value "4"). Statement "Project_Country", however, scored a mean of 3.78 and a standard deviation of 0.936 with a skewness coefficient of -0.497 indicating a tendency toward an agreement (value "4"). Similarly, statement "SS_Africa" presented an asymmetric distribution with a modal value (value "4") greater than the mean (3.85). In fact, for this statement 56.1% of advisors agreed with it and 17.1% of them strongly agreed with the same. Consequently, a -0.088 skewness was recorded suggesting a respondents" tendency to support this statement. Moreover, statements "Similar_Technology" and "Lip_Industry" scored also means above 3.50. Indeed, these two statements registered respectively means of 3.90 and 3.61 with associated standard deviation of 0.860 and 0.703. In addition, they both displayed an asymmetry with modal values on the right-hand side of the mean leading to negative skewness coefficients of -0.301 and -0.184 respectively. In a similar way, statements "Budget", "Schedule" and "Budget_&_Schedule" scored means greater than 3.50 which were registered at 3.76, 3.76 and 3.78 respectively. The corresponding standard deviations were also recorded with values of 0.663, 0.663 and 0.725 which indicated the low spread around the mean. Like statement "Lip_Industry", their distribution displayed a negative skew with respective skewness coefficient of -0.231, -0.773 and -0.464. On the other hand, statements "Sub_Contractor", "Local_Content", "Self_Performance" scored means below 3.50 with a high percentage of advisors responding neutral (56.1% for "Sub_Contractor", 43.9% for "Local_Content", 41.5% for "Self_Performance"). These responses registered respective means of 3.34, 3.49 and 3.07 with corresponding standard deviations of 0.575, 0.840 and 0.905. At last, it was observed that the advisors tended to disagree with statement "In-House_Design" (positive skewness with a coefficient of 0.851). In fact, 58.5% of advisors responded neutral, while the percentage of respondents disagreeing with the fact that contractor necessarily required an in-house design capacity was 24.4% (against 17.1% of agreeing). As a result, the statement scores a mean of 2.98 and a standard deviation of 0.851.

4.2.1.3. Mann-Whitney U test. According to the Mann-Whitney U test conducted with a significant value of 0.05, the statements "Budget", "Schedule" and "Budget_ and _Schedule" scored p-values below the significant level. All other statements of this category have registered a p-value above 0.05 suggesting an alignment of opinion between the capital providers and the advisors (Figure 4.6, Figure 4.7 and Figure 4.8). In fact statements "Project_ Country", "Project_ Size", "SS_Africa", "Similar_Technology", "Lip_Industry", "Main_Contractor", "Sub_ Contractor", "Local_ Content", "Self_ Performance" And "In-House_Design" registered respectively p-values of 0.585, 0.634, 0.190, 0.228, 0.074, 0.350, 0.992, 0.435, 0.087 and 0.089. These results suggested the null hypothesis could be retain, in other words, the corresponding distributions of capitals providers and those of advisors are similar. On the other hand, statements "Budget", "Schedule" and "Budget_&_Schedule" scored respectively p-values of 0.000, 0.000 and 0.004 meaning that advisors and capital providers did not perceived these statements the same way.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_1 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.585	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_2 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.634	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_3 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.190	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.6. Mann-Whitney U test results for the DE-TC subcategory.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_4 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.228	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_5 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.074	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_6 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.350	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_7 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.992	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

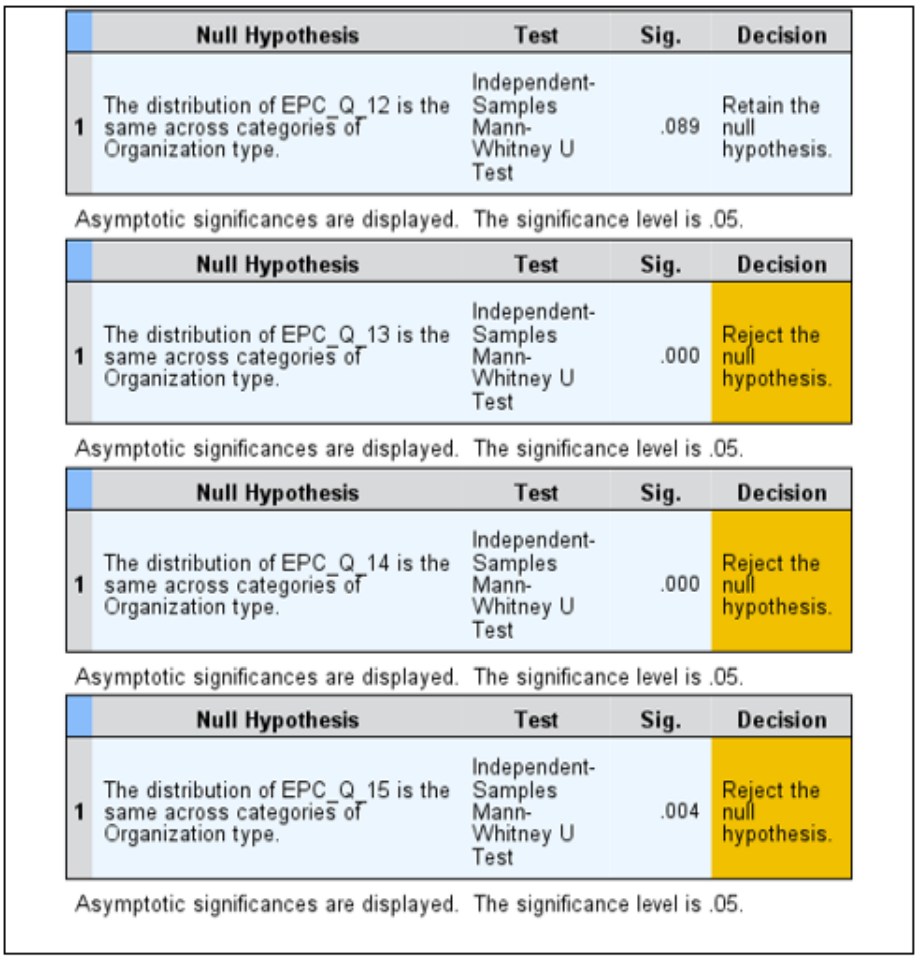
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_10 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.435	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_11 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.087	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.7. Mann-Whitney U test results for the DE-TC subcategory 1.



	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_12 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.089	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_13 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_14 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_15 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.004	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.8. Mann-Whitney U test results for the DE-TC subcategory 2.

4.2.1.4. Legal experience (DE-L) Capital Providers' Responses. In the category legal experience, statements "Epc_Tender", "Ifis_Experience" and "Turnkey_Contracting" have registered means above 4.00; in other words, the capital providers heavily agreed or strongly agreed with these statements (Table 4.7).

To start with the statement that registered the highest mean in this subcategory, i.e. statement "Turnkey_Contracting" with a score of 4.76 (and 0.437 standard deviation), it was observed that 76.5% of capital providers strongly agreed that contractors in SSA should have at least one turnkey contract completed to be eligible for their organizations. Unsurprisingly, the skewness coefficient recorded was negative (-1.372). Regarding statement "Epc_Tender", a mean of 4.35 and a standard deviation of 0.702

were recorded. It was also observed that 47.1% of experts strongly agreed with the statement, 41.2% agreed and 11.8% were neutral. The response distribution for this statement was also negatively skewed (-0.634). Finally, statement "Ifis_Experience" scored a mean of 4.12 and a standard deviation of 0.993, with a -1.129-skewness coefficient.

Regarding statement "Office_Country", most capital providers (47.1%) disagreed that contractors needed an established legal representation in the project country to be eligible. This statement scored a mean of 2.82 and a standard deviation of 0.883. The response distribution in this case was observed to be positively skewed with a skewness coefficient of 0.380.

Table 4.7. Descriptive statistics for the DE-L subcategory The means highlighted in bolt indicates a significant agreement for the statement.

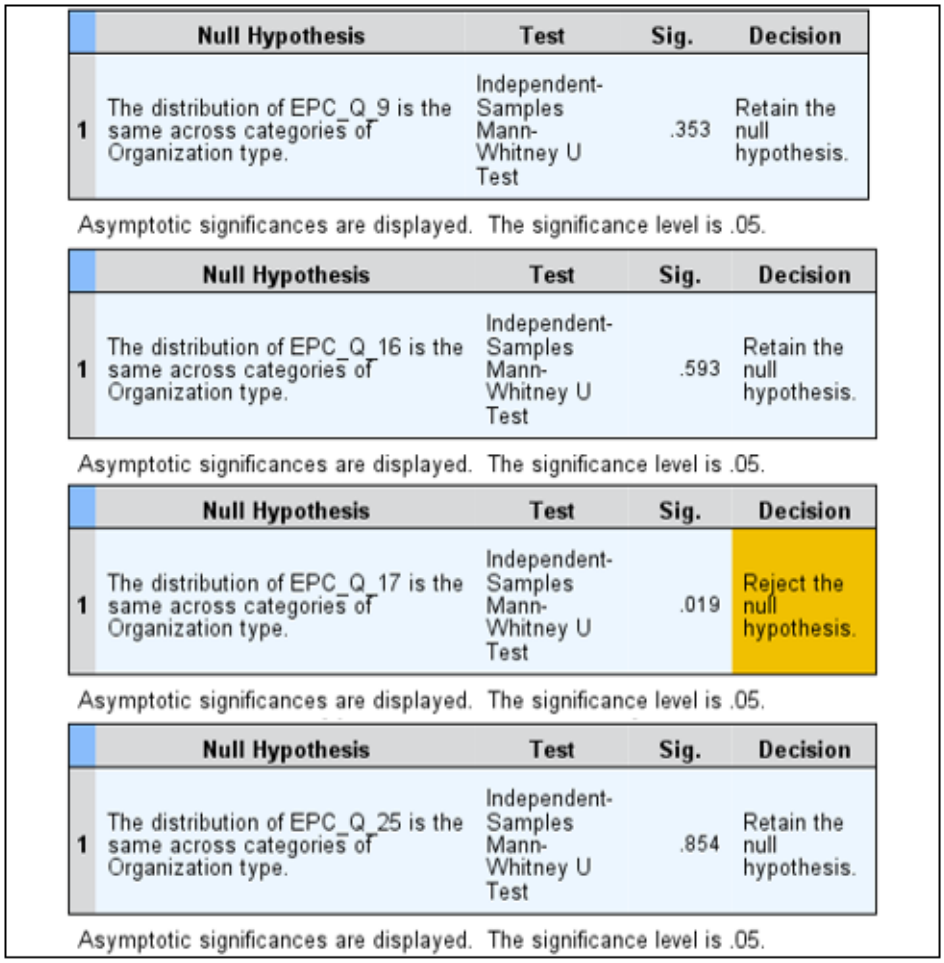
Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std Dev.	Skew. Coef.
LIPs' successful development in Sub-Saharan Africa depends on:							
- Contractors' good understanding of the Engineering-Procurement-Construction (EPC) tender process.	*"EPC_TENDER"*	**4.35**	0.702	-0.634	**4.17**	0.704	-0.705
- have already participated into a project finance transaction involving at least ONE (1) of the international finance institutions or development banks.	*"IFIS_ EXPERIENCE"*	**4.12**	0.993	-1.129	**4.1**	0.735	-0.951
- have already delivered at least ONE (1) LIP under a turnkey contract.	*"TURNKEY_ CONTRACTING"*	**4.76**	0.437	-1.372	**4.32**	0.722	-0.987
Investors or lenders will only finance a LIP, if the Contractor...							
- has an office in the project country.	*"OFFICE _COUNTRY"*	2.82	0.883	0.38	2.78	0.852	0.959

4.2.1.5. Advisors' responses. For the subcategory legal experience, a great portion of the advisors responded with either "Agree" or "Strongly agree" for statements ("Epc_Tender", "Ifis_Experience" and "Turnkey_Contracting", see in Table 4.8. These statements ("Epc_Tender", "Ifis_ Experience" and "Turnkey_Contracting") scored a mean above 4.00. In fact, statement "Epc_Tender" registered a mean of 4.17, a standard deviation of 0.704 and a skewness coefficient of -0.705. In addition, it was observed that 87.8 % of advisors agreed (with 31.7% strongly agreeing) that contractors needed to show some acquaintances with the Engineering-Procurement-Construction (EPC) tender process in order to be eligible. Statement "Ifis_Experience", on the other hand, registered a mean of 4.10 and standard deviation of 0.735. The results revealed that 61.0% of experts agreed and 26.8% strongly agreed with the statement. Hence, an asymmetric frequency distribution was obtained with a skewness coefficient of -0.951. With respect to statement "Turnkey_Contracting", 43.9% of advisors strongly agreed and 45.3% agreed that contractors needed to have delivered at least one project under a turnkey contract to be eligible for a LIP project in SSA under the project finance scheme. This statement registered a mean of 4.32 with a standard deviation of 0.722. The -0.987 -skewness coefficient confirmed the experts' tendency to strongly agree with this statement.

Nonetheless, the collected results showed that advisors mostly disagreed with statement "Office_Country" (positive skewness with a coefficient of 0.959). As a matter of fact, 43.9% of respondents disagreed (and an additional 39.0% held a neutral position) that contractors needed an established office in the project country to be eligible for LIP projects in SSA. As a result, the statement scores a mean of 2.78 and a standard deviation of 0.852 (Table 4.8). Mann-Whitney U test.

The results of the Mann-Whitney U test showed that statements "Shares_Spv", "Ifis_Experience" and "Office_Country" scored p-values of 0.353, 0.593 and 0.854 respectively (Figure 4.9). With p-values greater than 0.05, these results suggested that there is a similarity in responses distribution, hence an alignment between the two groups of respondents. However, statement "Turnkey_Contracting" registered a value of 0.019 which led to reject the null hypothesis. Thus, the two groups did not have a

similar opinion about this statement.



	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_9 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.353	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_16 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.593	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_17 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.019	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_25 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.854	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.9. Mann-Whitney U test results for the DE-L subcategory.

4.2.1.6. Environmental and social experience (DE-E&S) Capital providers' responses. The DE-E&S subcategory only consists of two statements, "Ifc_Ps" and "Equator_P", see Table 4.10. Both statements scored a mean above 4.00 for the capital providers. In fact, the statement "Ifc_Ps" registered a mean of 4.29 and a standard deviation of 0.649. For this statement 52.9% of capital providers strongly agreed while 29.4% did agree. The associated distribution was asymmetric with a negative skewness coefficient of -0.649. This showed that the capital providers had a tendency to strongly agree with the fact that contractors needed to be familiar with the IFC performance standards to be eligible by their organizations.

In a similar way, it was observed that capital providers required the contractors to be well acquainted with the Equator Principle. Indeed, a strong majority of capital providers (70.6%) strongly agreed with statement "Equator_P" and that led to a mean of 4.65 and a standard deviation of 0.606. The data distribution was again asymmetric and negatively skewed with a skewness coefficient of -1.596.

Table 4.8. Descriptive statistics for the DE-E&S subcategory The means highlighted in bolt indicates a significant agreement for the statement.

Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std Dev.	Skew. Coef.
To ensure LIPs' successful construction, the Contractor MUST:							
- be well acquainted with IFC performance standards.	*"IFC_PS"*	**4.29**	0.849	-0.649	**4.05**	0.669	-0.055
To ensure that LIPs are constructed in more responsible manner, your organization would rather select a Contractor which...							
- is well acquainted with the Equator Principle.	*"EQUATOR_P"*	**4.65**	0.606	-1.596	**4.1**	0.7	-0.136

4.2.1.7. Advisors' Responses. For statements related to the DE-E&S category, advisors' responses registered means above 4.00. In effect, statement "Ifc_Ps" and "Equator_P" both registered respectively means of 4.05 and 4.10 with corresponding standard deviations of 0.669 and 0.700 (Figure 4.10). In addition, their response distributions were asymmetric around their corresponding means with skewness coefficients of -0.055 and -0.136. These data suggested advisors agreed with both statements.

In the case of statement "Ifc_Ps", 56.1% of advisors agreed and 24.4% strongly agreed that contractors needed to show some degree of acquaintance with the IFC performance standard in order to be more eligible for LIP in SSA under the project finance scheme. Similarly, for statement "Equator_P", 51.2% of advisors agreed and 29.3% strongly agreed that contractors needed to be familiar with the Equator Principle

to be eligible. It is worthwhile noting that none of the respondents disagreed with either of these two statements.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_8 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.199	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_30 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.005	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.10. Mann-Whitney U test results for the DE-E&S subcategory.

4.2.2. Category 2: Organizational Readiness (OR)

4.2.2.1. Capital Providers' Responses. The results obtained for the category Organizational Readiness showed that there are six statements with means above 4.00, namely statements "Political_Person", "Sanction_List", "ISO_14001", "ISO_9001" and "Ohsas_18001", see table 4.12. In effect, statement "Political_Person" recorded a mean of 4.06 with a standard deviation of 1.197. For this statement, 52.9% of capital providers strongly agreed and 17.6% agreed. The -0.869-skewness coefficient suggested that there was a tendency among the capital providers to strongly agree with the absence of political exposed person in contractors" top management or shareholding as valid criteria for EPC selection.

Similarly, 88.2% of capital providers responding to statement "Sanction_List" strongly agreed with the statement. The mean and standard deviation were recorded at respective values of 4.76 and 0.752. The associated coefficient of skewness was recorded at -3.555. Statements "ISO_14001" and "ISO_9001" presented similar results with means at 4.53 and standard deviations of 0.514. They were both asymmetric with

skewness coefficient of -0.13.

In addition, 52.9% of capital providers strongly agreed that contractors should have safety procedures in place in line with the OHSAS 18001 or be certified OHSAS 18001 in order to be eligible. This statement ("Ohsas_18001") recorded a mean of 4.4 and a standard deviation of 0.712. The -0.826-skewness coefficient suggested in fact that the capital providers tended to strongly support this statement. On the other hand, capital providers moderately agreed with statement "Government_Control" which registered a mean of 3.41, a standard deviation of 1.372 and a skewness coefficient of -0.532.

The capital providers, however, disagreed with any obligation of the EPC contractors to hold shares in the project company ("Shares_Spv") or to be publicly listed ("Public_Listed") in order to be eligible. As a matter of fact, statement "Shares_Spv" and "Public_Listed" score respectively means of 2.53 and 2.65. Moreover, these statements registered positive skewness coefficient of 0.515 and 0.461 (Table 4.2.2.1).

Table 4.9. Descriptive statistics for the OR category The means highlighted in bolt indicates a significant agreement for the statement.

Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std	Skew. Coef.
A LIP in Sub-Saharan Africa is only bankable when the Contractor...							
- holds shares in the project company.	*"SHARES_SPV"*	2.53	1.125	0.515	2.63	0.994	0.492
- is not controlled by a governmental entity.	*"GOVERNMENT_CONTROL"*	3.41	1.372	-0.532	3.22	1.013	-0.011
- is a public listed company.	*"PUBLIC_LISTED"*	2.65	1.057	0.461	2.54	0.596	-0.147
- has NO political exposed person in its top management or among its shareholders.	*"POLITICAL_PERSON"*	**4.06**	1.197	-0.869	3.85	0.792	-0.361

Table 4.9. Descriptive statistics for the OR category The means highlighted in bolt indicates a significant agreement for the statement (cont.).

Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std	Skew. Coef.
- is NOT on any sanction list including but not limited to: project country, European Union and the World Bank sanction lists.	*"SANCTION_ LIST"*	**4.76**	0.752	-3.555	**4.66**	0.53	-1.216
To ensure that LIPs are constructed in more responsible manner, your your organization would rather select a Contractor which...							
- has an Environmental Management System or is certified ISO 14001	*"ISO_14001"*	**4.53**	0.514	-0.13	**4.05**	0.74	-0.078
- is certified ISO 9001	*"ISO_9001"*	**4.53**	0.514	-0.13	**4.12**	0.748	-0.205
- has safety procedure in place in line with the OHSAS 18001 or certified OHSAS 18001	*"OHSAS_18001"*	**4.41**	0.712	-0.826	**4.07**	0.787	-0.132

4.2.2.2. Advisors' Responses. With respect to the Organizational Readiness category, Statements "Sanction_ List", "ISO_ 14001", "ISO_ 9001" and "OHSAS_ 18001" showed a concentration of responses between "Agree" and "Strongly Agree" with means reported above 4.00 for the advisors, see Figure 4.10. In effect, the mean and standard deviation for statement "Sanction_ List" were recorded at 4.66 and 0.530 respectively. The response distributions in this case was again asymmetric with a skewness coefficient of -1.216. The drag toward the right of the mean was due high percentage of "Strongly agree" responses (68.3%) followed by 29.3% of "agree" responses. None of

the advisors was recorded in disagreement with the statement "Sanction_ List". In addition, statements "ISO_ 14001", "ISO_ 9001" and "OHSAS_ 18001" all scored means between 4.00 and 4.15. They respectively registered means of 4.05, 4.12 and 4.07, and corresponding standard deviation of 0.740, 0.748 and 0.787. Their response distribution charts showed an asymmetry with a skew spreading on the left side of each means. Thus, the registered skewness coefficients were respectively -0.078, -0.205 and -0.132. Again, these data suggested that an important number of responding advisors agreed or strongly agreed that the contractors should have an Environmental Management System, be certified ISO 14001 or ISO 9001, have safety procedure in place in line with the OHSAS 18001 or being certified OHSAS 18001 to increase their eligibility for LIP in SSA under project finance scheme.

On the other hand, the advisors moderately agreed with statements "Government_ Control" and "Political_ Person" which registered means of 3.22 and 3.85, with standard deviations of 1.013 and 0.792. Their skewness coefficients were also recorded below zero with values of -0.011 and -0.361, hence suggesting a slight tendency toward an agreement (table 2.12).

Finally, it was observed that the advisors also disagreed with any obligation of EPC contractors to hold shares in the project company ("Shares_ Spv") or to be publicly listed ("Public_ Listed") in order to be eligible. As a result, statements "Shares_ Spv" and "Public_ Listed" scored respective means of 2.63 and 2.54. Moreover, these statements registered skewness coefficient of 0.492 and -0.147. This meant that there was an inclination toward a disagreement for statement "Shares_ Spv" and a tendency to be neutral for statement "Public_ Listed".

4.2.2.3. Mann-Whitney U test. The Mann-Whitney U test conducted for the Organizational Readiness revealed that, except for statements "ISO_ 14001" which registered p-values of 0.023, all other statements within this category have registered a p-value above 0.05 which indicated that the capital providers' respective distributions were similar to those of the advisors. In effect, statements "Shares_ Spv", "Government_

Control", "Public_ Listed", "Political_ Person", "Sanction_ List", "ISO_ 9001" and "Ohsas_ 18001" registered respectively p-values of 0.724, 0.431, 0.829, 0.213, 0.059 and 0.131 (table 4.13). Based on the outcome of the Mann-Whitney U test, the corresponding distributions of the capitals providers and those of the advisors are similar for these statements. As opposed to statement "ISO_ 14001" for which the advisors and the capital providers did not share a similar opinion.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_19 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.724	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_26 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.431	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_27 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.829	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_28 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.213	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_29 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.155	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_31 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.023	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.11. Mann-Whitney U test results for the OR category.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_32 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.059	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_33 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.131	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.12. Mann-Whitney U test results for the OR category 1.

4.2.2.4. Category 3: Financial Capability (FC).

4.2.2.5. Capital Providers' Responses. As described in table 4.17, for the Financial Capability category two statement namely "Performance_ Bond" and "Corporate_ Guarantee" had responses mainly swaying between "Agree" and "Strongly Agree". Moreover, these two statements had similar scores with both means registered at 4.29 and standard deviation of 0.849. However, their skewness coefficients were also different (-1.344 for "Performance_ Bond" and -0.109 for "Corporate_ Guarantee"). This showed that the capital providers had the tendency to strongly agree that the EPC contractors were required to provide guarantee either corporate or from a financial institution to be eligible in SSA.

On the other hand, there was a moderate agreement for statements "ENR_ 250", "Net_ Asset_ Value", "Working_ Capital" and "30%_ Performance_ Bond". The means were respectively recorded at 3.65, 3.59, 3.65 and 3.71. Even though "ENR_ 250" and "Working_ Capital" had similar means, both distributions were different. In effect, statement "ENR_ 250" had 35.3% of capital providers responding "agree" while 52.9% of them responded the same for statement "Working_ CAPITAL". Yet, 29.4% responded "neutral" for statement "ENR_ 250" while 23.5% only responded "neutral"

for statement "Working_ Capital".

More generally for this category, it appeared that the capital providers did not consider being among the world's best contractors according to the ENR 250 nor having a Working Capital covering at least 25% of the LIP cost nor have a Net Asset Value which is at least five times greater than the LIP cost nor providing a Performance Bond of at least 30% of the LIP cost as indispensable to participate in project financed transaction in SSA.

Table 4.10. Descriptive statistics for the FC category The means highlighted in bolt indicates a significant agreement for the statement.

Statements	**Variables**	**Capital providers**			**Advisors**		
		Mean	Std Dev.	Skew. Coef.	Mean	Std Dev.	Skew. Coef.
To minimize default risks during construction, the Contractor SHOULD...							
- be listed among the world's best contractors according to the ENR 250.	*"ENR_250"*	3.65	1.115	-0.726	3.15	0.792	-0.272
A LIP in Sub-saharan Africa is only bankable when the Contractor...							
- is able to provide a liquid performance bond obtained from a financial institution with a minimum rating of "BBB+".	*"PERFORMANCE_BOND"*	**4.29**	0.849	-1.344	3.98	0.724	-0.378
- provides requisite security at the relevant corporate level (e.g. in the form of a Parent Company Guarantee)	*"CORPORATE_GUARANTEE"*	**4.29**	0.588	-0.109	**4.15**	0.654	-0.154
- has a Net Asset Value which is at least FIVE (5) times greater than the LIP cost.	*"NET_ASSET_VALUE"*	3.59	0.795	-0.749	3.44	0.634	0.549
- has Working Capital which could cover at least 25% of the LIP cost.	*"WORKING_CAPITAL"*	3.65	0.862	-0.517	3.59	0.774	0.211
- provides a Performance Bond of at least 30% of the LIP cost.	*"30%_PERFORMANCE_ BOND"*	3.71	0.772	-0.333	3.22	0.962	-0.29

4.2.2.6. Advisors' Responses. As presented in Table 4.10, only statement "Corporate_ Guarantee" scored a mean higher than 4.00 which indicated that the majority of advisors either agreed or strongly agreed with the statement. The remaining statements of

the FC category ("ENR_ 250", "Performance_ Bond", "Net_ Asset_ Value", "Working_ Capital" and "30%_ Performance_ Bond") displayed a moderate agreement with means between 3.00 and 4.00.

Regarding statement "Corporate_ Guarantee", it was observed that 56.1% of advisors agreed and 29.3% strongly agreed that the contractors needed to provide requisite security at the relevant corporate level to increase their eligibility for LIP in SSA. Thus, responses collected for this statement registered a mean of 4.15 with a standard deviation of 0.654. In addition, the skewness coefficient was registered at -0.154, meaning that the response distribution was leaning toward a strong agreement.

In the group of moderately agreed responses, the results showed that statement "ENR_ 250" registered a mean of 3.15 and a standard deviation of 0.792. For this statement, the majority of advisors (51.2%) indicated a "neutral" position. Though 29.3% of them agreed that the contractors needed to be listed among the world's best contractors according to the ENR 25. In addition, the skewness coefficient was negative with a value of -0.272 which indicated a tendency towards an agreement.

Statement "Performance_ Bond", however, scored a mean of 3.98 and a standard deviation of 0.724 with a skewness coefficient of -0.378 indicating also a tendency toward an agreement. Similarly, statement "Net_ Asset_ Value" presented an asymmetric distribution with a modal value smaller than the mean (3.44). In fact, for this statement 56.1% of advisors responded neutral while 36.6% of them agreed. Consequently, a positive skewness coefficient of 0.549 was recorded.

Statements "Working_ Capital" and "30%_ Performance_ Bond" scored means of 3.59 and 3.22 respectively, with associate standard deviation of 0.774 and 0.962. In addition, they both displayed an asymmetry with a positive skewness coefficient of 0.211 for statement "Working_ Capital" and negative skewness coefficient of -0.290 for statement "Working_ Capital".

4.2.2.7. Mann-Whitney U test. Based on the Mann-Whitney U test conducted for the statements in the Financial Capability, statements "Performance_ Bond", "Corporate_ Guarantee", "Net_ Asset_ Value", "Working_ Capital" and "30%_ Performance_ Bond" scored p-values above the significant level suggesting a similarity of distributions and an alignment of opinion between the capital providers and the advisors (table 4.15). However, it appeared that for statement "ENR_ 250", the p-value was outside the confident interval of 95%. Thus, the 0.046 p-value obtained for statement "ENR_ 250" suggested that the null hypothesis had to be rejected.

On the other hand, table 4.15 shows that p-values for Statements "Performance_ Bond", "Corporate_ Guarantee", "Net_ Asset_ Value", "Working_ Capital" and "30%_ Performance_ Bond" were respectively 0.083, 0.446, 0.278, 0.626 and 0.086. These results suggested the null hypothesis could be retain, in other words, the corresponding distributions of the capitals providers and those of the advisors were similar.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_18 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.046	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_20 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.083	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_21 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.446	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.13. Mann-Whitney U test results for the FC category.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_22 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.278	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_23 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.626	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of EPC_Q_24 is the same across categories of Organization type.	Independent-Samples Mann-Whitney U Test	.086	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.14. Mann-Whitney U test results for the FC category 1.

4.3. Discussions

4.3.1. PEST Analysis

The ultimate goal sought by lenders and investors in project finance is to ensure that projects succeed by reaching completion in accordance with the scope of work, the schedule and the budget agreed upon, and subsequently by operating at desirable performance regardless of the condition in which the project is developed. Success, however, depends on many parameters or factors clustered into two main categories namely external factors and internal factors (Sadeghi *et al.*, 2016). The former cluster comprises all factors which are out of the private stakeholders' control, either the lenders, the investors, the project company or any of the subcontractors. They are related to the project's political, economic, jurisdictional or legal, demographical and cultural environment and include also the public authorities and third parties (such as impacted populations and end-users) involved in the project. The conditions of each

of these factors can have a significant impact on the ability of the EPC contractor to complete successfully LIPs' construction.

Gunhan and Arditi (2005) claimed that a favorable market was accounted among critical success factors affecting both the project construction and contractors. In addition, Butler *et al.* (2003) suggested also that favorable government policies had a non-negligible impact on project success. Zhang (2005) also observed that the investment climate played a salient role in determining the extent to which a contractor could strive and succeed in a given economy. These researchers and many others have pointed out the effect of external conditions on any successful project endeavor. Besides, considering that in the project finance framework, the procurement process, the risk allocation, the contracting strategy and ultimately the quality of stakeholders are all affected by external factors, it is then necessary to also identify the potential adverse external factors inherent to SSA region which influence the ability of contractors to succeed in the region. Thus, this study investigated external factors pertaining to SSA through a PEST analysis.

In fact, as described in Section 4.1 (PEST analysis for Sub-Saharan Africa), SSA faces different challenges including political, economic, social and technological. Indeed, the PEST analysis revealed that the average values of WGIs for the region were all negative. For instance, the average Political Stability and Absence of Violence (PV) indicators was recorded at -0.56. It indicated that there was still a non-negligible probability of government destabilization (coups, act of terror, rebellion, etc.) in many countries of the region. In addition to political instability, the region suffers also of ineffective governments and government policies. In effect, the Government Effectiveness (GE) indicator showed that 40 countries within the region had a score below zero and the region on average scored a -0.79. It suggested also that most of the countries in SSA suffer of deficient public and civil services which are often subject to political pressure.

Moreover, policies formulation and implementation are also problematic in such countries. With instable regime which lack effectiveness, unsurprisingly the rule of

law is hardly enforceable in most of SSA countries. In fact, the Rule of Law (RL) index was recorded at -0.64 which indicated a weakness in law enforcement across the region. Countries in the Middle African region are those which suffer most from the absence of rule of law. These countries registered indices below -1.0 (see Table 4.1.1). The rule of law is particularly important to successfully implement the project finance framework because the entire process depends solely on the enforceability of contracts and securities (warranties and guarantees).

Poor government effectiveness and weak rule of law led to an overall poor quality of regulatory. In fact, the Sub-Saharan region registered on average a -0.67 for the Regulatory Quality (RQ) index. This value of the RQ index suggest that SSA institutions still struggle to formulate and implement sound policies and regulations that promote private sector development.

Based on WGIs, political risks in SSA are mainly caused by (i) the fragility of government and regulation system and (ii) the inefficiency or inconsistency of judiciary systems. This two issues or risks are mainly dealt with in concession agreement and transferred to the granting authority. The government fragility is often addressed in a force majeure clause whereby the concessionaire is relieved of any of its obligations in case of political turmoil, war, sabotage, etc. By applying the back to back principal, the EPC contractors could also be exonerated of their obligations in case of political instability. In addition, sponsors, lenders and EPC contractors often get a compensation in case of contract termination by a new political regime during construction phase. Regarding the regulatory system, a similar approach is applicable. In the concession agreement, regulatory risk especially permitting risks are allocated to the public authority.

The inefficiency of judiciary systems is instead addressed through a clause of arbitration. The arbitration would then be set outside the project country. Investors often choose the ruling of the international chamber of commerce (ICC) in a court located for instance in Geneva. In addition to the clause of arbitration, investors and lenders can also ensure their contracts with a political risk insurance like MIGA. These

insurance providers cover among other risks the expropriation risk and the breach of contract risk.

Besides political risks, the PEST analysis highlighted also economic issues inherent to SSA. More than 50% of Sub-Saharan countries are low income countries, in other words, these countries' GNI per capita is lower than 995 US dollars (table 4.2). This figure was recorded below the average world GNI which was evaluated at 2,496 US dollars the same year (World bank, 2017). As presented in table 4.3, most of these countries present high inflation risk which undermine the reliability of costs estimations. In most contracts, the public sector does not retain macro-economic risks during construction. Thus, these risks remain at the SPV level which in turn would seek to transfer to its sub-contractors. The cost variation risks, as explained in Section 2.8, can be dealt with by using a lump-sum and date certain turnkey EPC contract. Nonetheless, payment mechanisms in concession agreement often include indexation formulation which address the inflation risk during operation. This is generally the case for energy and transportation projects.

Besides, the economic freedom index (which assess altogether the rule of law, the government size, the regulatory efficiency and the market openness) ranked most of the African countries in the lower quartile with a score averaging 52.8 (Table 4.2.1.1). Also, the GDPs of many SSA countries were low (32 countries with GDP below US$ 20 Bn) (Table 4.1.2). Such scores suggested that the trade volume in the majority of SSA countries is relatively small in comparison to other regions of the world. Therefore, supply risks (or material scarcity risks) can be a major issue for large infrastructure projects in SSA since these projects involve large quantities of material.

The social assessment of SSA also showed that the region is facing major social issues. In fact, 30 countries (i.e. 65%) in SSA registered a Human Development Index below 0.550. These countries are also accounted among the least human developed countries in the world. The development is assessed in term of life expectancy, year of schooling and GNI per capita. As for the year of schooling, it appeared in effect that citizens of many SSA countries, as shown in table 4.5, have an average year of

schooling below 6.0 years while the world average year of schooling is estimated at 8.4 years. Such low average of schooling years undermines the availability of qualified labors. In addition to low HDI, the technological assessment of the region revealed that access to new technologies was still one of the major challenges in the region. The average ICT Development Index was reordered at 2.53 (with more than 20 countries below average) when the world average was estimated at 5.03 (ITU, 2015). The low IDI suggested that contractors should anticipate a potential rise in management costs especially for communication costs and training costs for large infrastructure projects which often involve new working techniques and technologies.

The PEST analysis conducted for SSA resulted in the identification of four main external risks which could lead to adverse effects on EPC contractors' ability to successfully complete LIPs by affecting either the construction scope, schedule or price. These risks include political and institutional risks (materialized by the fragility of government and regulation system and the inefficiency or inconsistency of judiciary systems), material supply risks (low trade and inefficient regulatory policy), human resource risks (unqualified labor with low literary) and cost escalation risks caused by the high inflations rate. These risks cumulated with internal construction risks definitely increase the likelihood of LIPs failure. Thus, it requires EPC contractors to have tools approved by the financing parties to be compatible and eligible for LIPs developed under the project finance scheme in SSA.

4.3.2. Key Characteristics of EPC Contractors

Though much of the project success depend on external factors, it is worthwhile noting that the ability of EPC contractors as organizations to perform the construction work at a desired level remains the core factor which make them eligible for LIPs and upon which depends the long-term success of every LIP. Therefore, critical success factors for contractors in the construction industry have been the subject of investigation for countless researchers in the last thirty years. For instance, Tripathi and Jha (2018) endeavored to determine the success factors for construction organization and observed that there were at least six critical success factors (CSF) including expe-

rience and performance, top management competence, project related factor, supply chain and leadership, availability of resources and effective cost control measures. The authors argued that experience and performance could be measure by the client satisfaction, the company reputation and experience in the construction industry. Butler *et al.* (2003) emphasized that contractors' experience was also measured in terms of track record for projects completed on schedule with good quality and at a affordable price, or in terms of technological advancement. Lu *et al.* (2008) also stated in their paper that good relationship with local authorities, local service providers (i.e. subcontractors) and clients were critical to ensure contractors success.

On clients' satisfaction, Abu Bakar *et al.* (2011) and Mbugua *et al.* (1999) suggested that the success factor depended much on the contractor's capacity to anticipated or understand clients' expectation related to the end-product and the performance of services.

Regarding top management competency, Tripathi and Jha (2018) claimed that the factor could be measured based on contractors' professionalism (or culture), competitive strategy and financial soundness. The authors further suggested that the availability of qualified staff, resources and effective human resource department should not be overlooked by contractors if they were to complete successfully their contracts. These success factors were also identified by Butler*et al.* (2003) who highlighted the importance of availability of qualified personnel and cost control procedure for contractors to enjoy a sustainable business. In addition to the availability of qualified staff, Dikmen *et al.* (2005) asserted also that effectiveness of information flow within the organization remained a critical factor for contractors' success.

Furthermore, Lzahrani and Emsley (2012) indicated in their research that besides past experiences and resources, the environment, health, safety and quality factor became an important gauge of project success due to the lasting impact of construction projects on the natural environment and communities and also the hazardous conditions encountered on LIP construction sites. In their research, the environment, health and safety factors were determined based on six variables including the health and

safety records; occupational safety and health administration incidence rate; quality control (and policy) and quality assurance. They argued that the environment, health and safety became a critical success factor to encourage the completion of a project without major accidents or injuries and limited or controlled impact on the natural habitat. In addition, Abu Bakar *et al.* (2011) reported that contractors' ability to implement health and safety management plan in line with clients' requirement constitutes a major advantage for contractors to ensure project successful completion. Finally, Lu *et al.* (2008) advocated that financial soundness and appropriate organizational structure were indispensable attributes of EPC contractors to ensure the project completion.

Table 4.11. Critical Success factors.

Critical Success factors	**Sources**
	Tripathi and Jha (2018),
Efficient supply chain management	Lu *et al.* 2008
Good relationship with local authorities and service providers (i.e. subcontractors) and client	Butler *et al.* (2003); Dikmen *et al.* (2005); Lu *et al.* (2008);
Good reputation and experience in construction business	Arslan and Kivrak (2008); Butler *et al.* (2003);
Track record for completing the project on schedule with good quality and fair pricing	Butler *et al.* (2003); Lu *et al.* (2008); Mbugua *et al.* (1999)
Experience in latest technology	Dikmen *et al.* (2005)
Effective project management improving schedule, cost, and quality of work	Arslan and Kivrak (2008); Butler *et al.*. (2003);
Environment, health and safety	Tripathi and Jha (2018) ; Lzahrani and Emsley (2012)
Availability of qualified personnel	Gunhan and Arditi (2005); Butler *et al.* (2003)
Availability of cost control procedure	Lu *et al.* (2008); Arslan and Kivrak (2008); Butler *et al.* (2003);
Client's satisfaction in terms of product and services	Abu Bakar et al. (2011); Mbugua *et al.* (1999)
Implementation of health and safety management plan	Butler *et al.* (2003); Abu Bakar *et al.* (2011)
Appropriate organizational structure	Lu *et al.* (2008);
Effective risk management capability	Lu *et al.* (2008) Arslan and Kivrak (2008)
Professionalism/culture of the organization	Butler *et al.* (2003); Dikmen *et al.* (2005)
Effectiveness of information flow in the organization	Dikmen *et al.* (2005); Lu *et al.* (2008);
Financial soundness	Lu *et al.* (2008); Mbugua *et al.* (1999)

Based on the results presented in Section 4.2.1, there were 11 statements for which both the capital providers and the advisors unequivocally agreed. These statements registered in both cases responses with means above 4.00 with skewed distributions

(negative) and had p-values greater than 0.05 for the Mann-Whitney U test, except for the statements "Turnkey_ Contracting", "Equator_ P" and "ISO_ 14001" for which their p-values were recorded below 0.05. For these three statements, capital providers showed a much stronger agreement compared to the advisors (see Table 4.3.2 below).

While analyzing responses in the DE-TC subcategory, it was observed that a previous experience in the project country, a long-term experience in SSA or an experience as sub-contractors were necessary but not perceived as key attributes by both group of respondents. However, they indicated that previous experiences as "main contractor" in LIPs were a key specification they looked after while selecting EPC contractors in SSA. It is in fact a characteristic which allows, at a very early stage, to assess the EPC contractors' ability to manage LIPs complexity. The literature review suggested indeed that contractors" inability to cope with the large infrastructures" complexity was one of the major causes of project failure; especially for local construction firms in SSA. (Williams, 2002; Zawdie and Langford, 2000). These failure conditions are mainly due to the numerous and interdependent organizational units, tasks and specializations.

In addition, main contractors' obligations under EPC contracts consist primarily in delivering projects in accordance with the scope, the budget and at desired performance level. It is the fundamental reference to define projects' successful completion. Tripathi and Jha (2018) findings suggested that certain critical success factors such as the experience and performance, top management competence, efficient supply chain management and leadership were all necessary to complete the project.

Table 4.12. Key Characteristics.

Characteristics	**Risks factors**	**Tangible mitigation capacity factors**	**Means**		**p-values**	**Variables**
			Capital providers	**Advisors**		
Category 1: Degree of experience						
Large infrastructure management skills	complexity management	One LIP as main contractor	4.35	4.2	0.35	*"MAIN_CONTRACTOR"*
Knowledgeability of Engineering-Procurement-Construction (EPC) tender process	Contracting strategy	Previous participation in an Engineering-Procurement-Construction (EPC) tender process.	4.35	4.17	0.353	*"EPC_TENDER"*
Knowledgeability of international finance institutions' procurement processes	Stakeholder relation	One project finance transaction one with international finance institutions or development banks.	4.12	4.1	0.593	*"IFIS_EXPERIENCE"*
Knowledgeability of turnkey contracting strategy	Contract price escalation	Delivery of one LIP under a turnkey contract.	4.76	4.32	0.019*	*"TURNKEY_CONTRACTING"*

Table 4.12. Key Characteristics (cont.).

Characteristics	**Risks factors**	**Tangible mitigation capacity factors**	**Means**		**p-values**	**Variables**
			Capital providers	**Advisors**		
Compliance with international E&S standards	Environmental and social impacts	one project applying IFC performance standards	4.29	4.05	0.199	*"IFC_PS"*
		One project applying the Equator Principle.	4.65	4.1	0.005*	*"EQUATOR_P"*
Category 2: Organizational readiness						
Exclusion from sanction lists	Business integrity	Absence of sanction	4.76	4.66	0.155	*"SANCTION_LIST"*
Sound E&S and QHSE procedure	Environment and social	Existence of an environmental Management System or ISO 14001 certification	4.53	4.05	0.023*	*"ISO_14001"*
	Health and safety	Existence of safety procedure in line with OHSAS 18001 or OHSAS 18001 certification	4.41	4.07	0.131	*"OHSAS_18001"*

Table 4.12. Key Characteristics (cont.).

Characteristics	**Risks factors**	**Tangible mitigation capacity factors**	**Means**		**p-values**	**Variables**
			Capital providers	**Advisors**		
Robust quality insurance system	Quality insurance	Existence of quality insurance procedures or ISO 9001 certification	4.53	4.12	0.059	*"ISO_9001"*
Category 3: Financial capacity						
Provision of corporate guarantee	Corporate liability	Existence of corporate guarantee mechanism	4.29	4.15	0.446	*"CORPORATE_GUARANTEE"*

Also, effective project management and risk management capability leading to improving schedule, cost, and quality of work, were also identified as contributors to main contractors' successful performance (Arslan and Kivrak, 2008). It was observed that in terms of technical and contextual experience, lenders, investors and advisors tended to value not specific attributes but umbrella attributes which already involve a group of success factors like the main contractor. Other CSFs under the main contractor characteristic include the availability of qualified personnel and the effectiveness of information flow within the organization (Lu *et al.*, 2008; Dikmen *et al.*, 2005). In fact, on LIPs construction site, the main contractor is the entity responsible for the performance and management of all resources (its own resources and those of its sub-contractors) and it is expected to establish an efficient flow of information among all stakeholders (i.e. employees, sub-contractors, communities and clients). It takes, however, qualified labors to communicate efficiently and minimize the likelihood of project failure. As described in the PEST analysis, qualified labor in many Sub-Saharan countries remains an issue since a great majority of people have little to no access to either school or new technologies including internet. This is a serious handicap for inexperience contractors in the region. In this instance, a previous experience as main contractor, especially in developing countries, would demonstrate that the contractor is well aware of the potential labor and communication risks. Thus, having this key characteristic is an advantage for EPC contractors tendering for a project financed LIPs in SSA.

For the DE-L subcategory, the survey evidenced that both capital providers and advisors considered the contractor's knowledgeability of Engineering-Procurement-Construction (EPC) tender process as a key attribute for project finance transactions. The finding was in line with Vinter (1998) and Yescombe (2002) arguments discussed in Section 2.8.2. In fact, since BOT concession scheme has gained momentum for large infrastructure projects in SSA, lenders and investors strive to transfer all construction risks to contractors through EPC procurement process comprising contracts with back-to-back provisions.

Typical EPC tender process includes technical, financial and legal assessments of the bidders. Galloway (2009) also supported that bidders involved in an EPC tender process are expected to conduct thorough risks analysis including external and internal project risks. This assessment is assumed to be reflected in the technical, financial and legal proposal. It could be the reason why lenders, equity providers and advisors did not emphasize on previous experiences in the project country but rather they tend to rely on EPC contractor's ability to adequately assess the risks, price them and ultimately be fully responsible for them.

The fact that financing parties consider the knowledgeability of EPC tender process as a key characteristic for project finance can also be explained through Ravanshadnia *et al.* (2010) findings. Their research demonstrated that EPC delivery systems had also the ability to speed up project completion through the decrease of the number of interfaces, reduce project costs, simplify contract structure, increase constructability and create a single point of responsibility. Even though the knowledgeability of the EPC tender process was not identified per se as a CSF, resemblances are found with the risk and liability assessment CSF identified by Chan *et al.* (2001). Nevertheless, the knowledgeability of the EPC tender process consists in a much more completed set of capabilities that goes behind the sole risk and liability assessment to include also competitive pricing capabilities. Therefore, contractors which are accustomed with such EPC tender process know in detail the type of risks to look after, how to adequately price them and how to explicitly address them in a contract in a competitive situation. Such characteristics couple with the turnkey contracting strategy decreases significantly lenders and investors exposure to external and internal risks such as cost escalation risk and labor risk. It also explains why for LIPs sourced through the project finance scheme in SSA, financing parties prefer EPC contractors acquainted with EPC tender process.

In addition, the research highlighted that financing parties emphatically designated the knowledgeability of international finance institutions and their procurement processes as one of the key characteristics for EPC contractors' eligibility. Butler *et al.* (2003), Dikmen *et al.* (2005), Abu Bakar *et al.* (2011) and Mbugua *et al.* (1999)

already highlighted how critical to contractors' success were good relationships with local authorities, service providers (i.e. subcontractors) and client. However, there is little to no emphasis on relationship with the client's creditor. In fact, when it comes to capital provision, multilateral and bilateral institutions play a catalyst role in providing the financing for infrastructure project in SSA (Europe Investment Bank, 2018). They participate to nearly all LIP transactions in SSA and bring the majority of the funds required for the construction. Their financing instruments often comes with a set of legal obligations and performance indicators to be fulfilled by key stakeholders involved in the project (i.e. the granting authority, the project company and the subcontractors) (Khan and Parra, 2003).

For contractors, it is then crucial to understand or be acquainted with the sort of commitment these institutions request to avoid any stakeholder conflicts or miscommunication that could lead to a loan draw stop or force either party to leave the project (Masrom *et al.*, 2015). Therefore, lenders and investors are mainly inclined to select contractors they can relate to, based on common or similar experiences. Furthermore, by working with EPC contractors registered in their database, international financial institutions seek to mitigate reputational risk that could potential arising from contractors' inability to respect their requirements.

Financing parties have also identified the knowledgeability of turnkey contracting strategy as a key characteristic of EPC contractors in the SSA context. As discussed in Section 2.8, EPC procurement process and turnkey contract constitute the main financial risk mitigants for lenders and investors. In fact, through turnkey contract, lenders and equity providers seek to limit their exposition to cost escalation. The PEST analysis pointed out that high inflation rate and low trade volumes in most of Sub-Saharan countries exacerbated cost escalation risks in LIP developments. The survey findings were alignment with Loots and Henchie (2007) observation described in Section 2.8.1.

Indeed, through turnkey lump-sum contracts, all construction obligations (including (i) conformity to technical specifications and functionality, (ii) schedule and (iii)

performance level) are transferred to the EPC contractors in exchange of a fixed price. Hence, any unforeseen costs which were not strictly identified by the EPC contractor during the tender phase (and addressed in the contract) or not specifically allocated to a third party, remain to be assumed by the contractor (Galloway, 2009). In addition, financing parties do expect EPC contractors to budget reasonable contingencies in its price to also absorb any escalation risk either caused by macroeconomic factors or project related factors (Yescombe, 2002).

With respect to the critical success factor identified in the literature review, there was no mention of the knowledgeability of turnkey contracting strategy as a critical success factor for contractors. Instead, an emphasis was put on the availability of cost control procedure within contracting organization to make them successful. (Lu *et al.*, 2008; Arslan and Kivrak, 2008; Butler *et al.*, 2003). This absence can be explained by the fact that many authors approach this research topic (i.e. success factors) from a contractor-angle rather that financing parties' (lenders, investors and advisors) perspective. And, most contractors do not perceive the turnkey contracting strategy as a CSF because this type of contracting strategy is highly risky for EPC contractor considering the increased project and markets' sophistication (Khan and Parra, 2003). Even though, Loots and Henchie (2007) findings on turnkey contracting strategy suggest that it is an attribute linked to the procurement process (i.e. the project finance framework) rather than the project geography, turnkey contracting strategy remains a key characteristic in a SSA context considering the high risk of cost escalation and material supply.

In the DE-E&S category, the research findings showed also that financing parties are increasingly sensible to environmental and social impacts. Poorly managed, these risks can have lasting notorious impacts on the biodiversity and communities in the vicinity of the project site. However, dealing with those risks is often delicate. Capital providers agreed that implementing project in accordance with IFC performance standard significantly reduce the environmental and social risks. In effect, the IFC performance standards became a widely accepted guideline in the field of environment to ensure responsible implementation of projects. They set performance objective in

terms of assessment and management of environmental and social risks and impacts (PS1), labor and working conditions (PS2), resource efficiency and pollution prevention (PS3), community health, safety, and security (PS4), land acquisition and involuntary resettlement (PS5), biodiversity conservation and sustainable management of living natural resources (PS6), indigenous peoples (PS7) and cultural heritage (PS8) (IFC, 2019).

The IFC performance standards are particularly important where regulatory systems, government policies and rule of law are weak. Unfortunately, as discussed in the PEST analysis, this is the case for many SSA. Therefore, lenders and investors are unable to rely on local environment and social regulations. In addition to IFC performance standards, the results indicated that financing parties valued also the knowledgeability of the Equator principles as a key characteristic for EPC contractors in project finance. As a matter of fact, the Equator Principles (EPs) is an environmental and social risk management framework embraced by 96 financial institutions all over the world (Equator Principles Association, 2019).

Like IFC performance standards, the EPs were primarily designed to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making. These principles are particularly applied to four financial products including project finance advisory services, project finance, project-related corporate loans and bridge loans (Equator principles Association, 2019). Tripathi and Jha (2018) in their research also pointed out the environment, health and safety management as critical success factor for EPC contractors which makes them accountable for the impacts generated by the project construction and promotes project completion with minimum causalities.

However, there is a little nuance between their findings and results obtained in this study; and that is the policies against which the EPC contractor is made accountable for. The lack of constancy in regulatory policies in many SSA countries also signify the absence of strong coercive measures against EPC contractors in case of environmental and social law violation. Therefore, it is very difficult for lenders and investors to rely

on the local regulators to ensure that EPC contracts fulfill environmental and social obligations with respect to local law. Hence, the need for creditors to find an alternative policy to assess EPC performance with respect to the impact on the environment and local population and workers.

Considering IFIs' dedication to sustainable project environment, contractor's ability to manage environmental and social impacts in accordance with international accepted standards like IFC performance standards or Equator Principles constitutes therefore a key attribute for EPC contractors valued by many project finance experts. This attribute is then specifically linked to the existence or not of reliable environmental and social policies in the project country.

For the organizational readiness category, the research revealed that capital providers and advisors attached a great importance to contractors' corporate culture translated in a set of procedure put in place to tackle external risks. A similar observation was made by Butler *et al.* (2003) and Dikmen *et al.* (2005) which had confirmed in their research that contractors' success depended also on the level of professionalism applied by the organization and its culture. In effect, the results showed also that corporate risks such as business integrity risks, environment and social risks, health and safety risks and quality insurance risks were key concerns of financing parties.

To address business integrity risks, it is customary for lenders and investors to conduct integrity check through Know-Your-Client (KYC) due diligence (IFC, 2009). This assessment includes a review of the public information of the EPC contractors and an analysis of international organizations' debarment database. Sanctions lists are particularly scrutinized because they expose company which engaged in illicit actions. Good reputation was indeed identified by Arslan and Kivrak (2008) as a key success attribute for contractors in the construction industry; however, in their research they focused on the contractors' reputation in terms of competency and experience rather than its integrity. The latter is crucial for creditors because it carries potential reputational risk which are far more contagious and devastating for financial organizations.

In SSA, KYC due diligences are consistently carried out by lenders and investors because many countries still struggle with high corruption as observed with the control corruption (CC) index in Section 4.1.1. Therefore, the exclusion from any sanction list, which suggest that the contractor has good working ethic, is also considered to be a key attribute for EPC contractors' selection in project finance transactions developed in SSA.

As described above, management of environmental and social impacts according to internationally accepted standard was fundamental for financing parties. Also, the research pointed out that financing parties were also interested in the types of procedure contactors elaborated to ensure a good management of and appropriate responses to environmental and social impacts. Such findings are in line with the CSF literature which advocated in fact that the implementation of health and safety management plan was part of the CSFs for EPC contractors (Butler *et al.*, 2003; Abu Bakar *et al.*, 2011).

In addition to the six variables of the health-safety-quality CSF described in Lzahrani and Emsley (2012) research, it was observed that lenders and capital providers were greatly interested in contractors having an environmental management system in line with ISO 14001 or having an ISO 14001 certification. In addition to the ISO 14001 certification, they also looked favorably upon contractors which had safety procedure in line with OHSAS 18001 or OHSAS 18001 certification.

Therefore, capital providers and lenders equality rely on EPC contractors' knowledgeability of international standards and sound E&S and QHSE internal procedure to address environmental and social risks in large infrastructure projects developed in SSA. In addition, the results also revealed that finding sound E&S procedures with EPC contractors was a much bigger concern for capital providers compare to advisors. It is probably because they are the true owner of the project and as such, they are those who are the most exposed to reputational risk.

The research also showed that financing parties paid much attention the corporate organization and quality insurance. In fact, organizational complexity and uncertainty involved in large infrastructures projects are often the cause of project failure (Williams, 2002). The inability of EPC contractors to cope with this level of complexity results at best into a poor performance of the infrastructure or at worse to the complete project failure. Lu *et al.* (2008) claimed that efficient organizational structures represented a CSF in the construction industry. This is an attribute that is looked after by all stakeholders regardless of the procurement process or the project's location.

Nevertheless, contractors' ability to organize and track systematically their activities while applying the highest standard of quality in the industry can still make a difference in tender processes for large infrastructure project sourced through project finance. According to the research results, financing parties had strong preferences for contractors which had quality insurance procedure in place or were ISO 9001 certified (a standard focusing on quality management including a strong customer focus, an assessment of the top management motivation and implication and companies' process to continual improvement in order to meet customer's requirements). Such finding suggest that the possession of robust activity management system and quality insurance procedures was also a key quality financing parties look after when involved in the selection of an EPC contractor for a project finance transaction in SSA.

Besides, Abu Bakar *et al.* (2011) also claimed that contractors success depended on their ability to satisfy their clients' requirements in terms of products and services. Therefore, it is arguable that robust activity management systems and quality insurance procedures are specific to project finance in SSA and that external factors have significant impact on their outcome or perception by lenders and investors.

In the Financial capacity category, only one attribute was seen to be paramount for both capital providers and advisors. The survey results indicated that an EPC contractor's ability to provide corporate guarantee significantly increased its eligibility by financing parties in project finance transactions. As discussed in Section 2.9, corporate guarantees like parent guarantee are instruments provided by the contractors

to legally involve its mother company in the project on jointly liability basis. This appears to be more relevant for large infrastructure projects in SSA because most EPC contractors working on LIPs in the region are mainly headquartered outside SSA and participate in project through temporary set subsidiaries (Zawdie and Langford, 2000). This corporate structure indeed presents advantages for EPC providers because it can be fiscal efficiency and ease the contracting procedure for local labors and services. However, it is very disadvantageous for financing parties since the newly created entity has neither credentials nor the financial capacity to ensure construction completion and performance and pay liquidated damages as requested by the owner (Bram, 2005; Yescombe, 2002; Gatti, 2008).

The ability of EPC contractors to provide corporate guarantee complements the financial soundness CSF identified in the literature review (Arslan and Kivrak, 2008; Lu *et al.*, 2008; Mbugua *et al.*, 1999). A corporate guarantee would not be effective if the parent company does not have both the technical and the financial resources to back the contracting subsidiary. Nonetheless, it is worthwhile noting that high turnover per se was not identified as a key attribute by the experts. Again, the reason may be found in the corporate structure of large and international EPC contractor in SSA.

In addition to these key characteristics identified above, there were other considerations lenders and equity providers had when assessing the eligibility of EPC contractors for LIPs in SSA. Based on the results, these considerations comprised the absence of political exposed person in the contractor's top management or among its shareholders, the provision a liquid performance bond obtained from a financial institution with a minimum rating of "BBB+", previous experience of the contract in the project industry and with similar technology in SSA and the contractor's track record in terms of project completed within schedule and budget.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The PEST analysis conducted for SSA resulted in the identification of four main external risks which not only had an impact on the construction scope, schedule and price but also influenced lenders, investors and advisors eligibility criteria for EPC contactors in large infrastructure projects developed under a project finance scheme in Sub-Saharan Africa. These risks comprised political and institutional risks, cost escalation risks and human resource risks. These risks cumulated with internal construction risks require EPC contractors to have appropriate skills and tools to manage them adequately. The research conducted in Section 4.2, revealed that capital providers and advisors were mainly concerned by nine internal risks during LIPs development in SSA; these risks included complexity management risks, contracting strategy risks, stakeholder relation risks, cost escalation risks, environmental and social risks, business integrity risks, health and safety risks, quality insurance risks and corporate liability risks.

Furthermore, in this research three categories of mitigants based on EPC contractors' degree of experience, organizational readiness and financial capability were presented. For each category, the experts were presented with some tangible mitigation indicators against construction risks identified in the literature review. Based on the mitigation indicators, the research highlighted a set of nine key characteristics pertaining to EPC contractors capable of making significant differences for lenders, equity providers, and advisors. These characteristics included (i) experience in managing LIPs as main contractor, (ii) knowledgeability of EPC tender process, (iii) knowledgeability of IFIs procurement processes, (iv) knowledgeability of turnkey contract strategy, (v) compliance with international E&S standards (especially IFC performance standards and Equator Principles), (vi) exclusion from sanction lists, (vii) implementation of sound E&S and QHSE procedures, (viii) utilization of robust quality insurance systems and (ix) provision of a corporate guarantee.

These characteristics can be further clustered into two groups based their sensitivity to external factors. The sensitive characteristics are those which can require different skills and expertise based on external factors encountered in a given region in particular for the SSA region; as opposed to insensitive characteristics which are more organizational centered characteristics which EPC contractors need in order to sustain their businesses in the construction industry.

5.1.1. Location Insensitive Characteristics

5.1.1.1. Implementation of Sound E&S and QHSE Procedures . Nowadays, implementing sound E&S and QHSE procedures is much more perceived as an industry best practice rather than an attribute pertaining to a group of contractors. This is due to an increased awareness of the colossal impact the construction industry has on the environment and communities around the world. As a matter of fact, sound E&S and QHSE procedures allow for a quick assessment of an organization's E&S policy, its awareness of the environment and social issues resulting from construction activities and its willingness to promote safety working environment. Furthermore, sound E&S and QHSE procedures are also used to evaluate whether a contractor will be capable to implement effectively the environment and social action plans resulting from the environmental and social impact assessment. Even though this characteristic is not specifically location sensible, it can constitute an impediment for EPC contractors wishing to penetrate developed economies known for their strict environmental and labor policies, ultimately imposing certain conducts and procedures to contractors which to enter such markets. As a matter of fact, this characteristic depends principally on the organizational culture, vision and business strategies. Lenders and investors tend to identify the implementation of sound E&S and QHSE procedure as a key characteristic because they seek for a compatible organization with which they can relate to in terms of business philosophy in relation to environment, health and safety issues.

5.1.1.2. Utilization of Robust Quality Insurance System. Previous studies already highlighted how critical was a robust quality insurance system to ensure contractors' success in the construction industry. The findings of this research suggest that this CSF is also applicable for project financed LIPs in SSA. They are consistent with the nature of the characteristic. In effect, this characteristic is intrinsically related to the vision of the EPC contractors as organization and the way they choose to conduct their business to make it sustainable. The project location has little to do in influencing the choice of lenders and investors when it comes to quality insurance system. Nevertheless, it is an attribute of salient importance for project finance because in this type of procurement process the product and services purchased by creditors and investors from the EPC contractors are unique, capital intensive and represent the main collateral asset to repay the debt. Therefore, the financing parties expect EPC contractors to implement the highest industry standard to satisfy the eligibility criteria and ultimately deliver a product at the required performance level to enable the project company to run its business as envisaged.

5.1.1.3. Exclusion from Sanction Lists. Unethical business conducts are reprehensible in every business environment. Nevertheless, the perception and the capacity of a nation to diligently address business misconduct varies from one country to another. Therefore, contractors' ethical standards are often assessed based on international organizations' records of illicit transactions. The exclusion from sanction lists is also used as a criterion to evaluate contractor's capacity to maintain its integrity even in unfavorable circumstances where corruption is perceived as a common practice. Besides, lenders (and especially DFIs and regulated equity firms) in general are forbidden to work with any sanctioned entity (under international and local law). Therefore, they include in their loan agreements clauses that forbid the project company as well to enter into any service agreement with sanctioned companies. Consequently, even if sponsors happen to have a different approach, there are left with no choice than to include this perquisite in their selection procedure otherwise they will be unable to raise any debt. Like the QHSE procedure, lenders may, in the context of their due diligence, require from the EPC contractor to provide anti-money laundry procedure

or ethic code used by the organization.

5.1.2. Location Sensitive Characteristics

5.1.2.1. Experience in Managing Lips as Main Contractor. As described in Section 4.3 above, the experience in managing LIPs as main contractor is a sort of umbrella embodying a set of CSFs such as experience and performance, top management competence, efficient supply chain management and leadership. These CSFs are perpetual endeavors of EPC contractors regardless of procurement type or the project location. Nonetheless, some factors related to main contractors can vary from one location to another. For instance, the availability of qualified labor, the chain supply management or the technological obsolesce. In SSA all three factors can be somehow challenging for EPC contractors to successfully achieve LIPs. Yet, the research also revealed that an experience as main contractor in other region of the world could also be enough for lenders and investors in project finance transaction in SSA.

5.1.2.2. Knowledgeability of EPC Tender Process, Turnkey Contract Strategy. The knowledgeability of EPC tender process and turnkey contract strategy are perhaps the most important characteristics of EPC contractors in project finance and especially SSA. These two characteristics are complementary and address specifically (i) the main principles of project finance (the allocation of risks) and (ii) lenders and investors concern regarding their financial exposure. In fact, in project finance other contract strategy such as the cost-plus or multiple-contract strategies cause investors' (including lenders') return to be volatile due to the certainty on cash-flow to be disbursed during construction. Even though the concept of EPC tender process and turnkey contracting are universal, the risks intended to be covered in these two approaches are primarily local. Since contractors are forced to package their technical, legal and financial offers, they are then forced to conducted a thorough assessment of their risks and capabilities with regard to the project country or region where the LIP is be constructed. Furthermore, with the turnkey contract, EPC contractor are again obligated to commit financially (guarantees) for the package of risks they have iden-

tify during the tender process. In SSA, four external factors namely, the availability of qualified labor, the cost escalation, the inefficiency of regulatory systems and the scarcity of materials caused by economic stagnation have a significant impact on the outcome of EPC tender process, turnkey contract and ultimately on the capacity of the EPC contractor to complete successfully LIPs.

5.1.2.3. Knowledgeability of Ifis Procurement Processes. The knowledgeability of IFIs procurement processes is not as vital as the EPC tender process or the turnkey contracting in project finance however it can be a valuable skill for project in developing countries. In fact, the EPC contractors are likely to encounter DFIs on LIPs in developing economies because these are regions where DFIs deploy their capital. In SSA, they are the major lenders of LIPs developed under the project finance framework and their financing comes with performance criteria that can be costly for EPC contractors when not anticipated. For instance, while working in SSA, DFIs tend to impose to EPC contractors to develop E&S management plan that are in accordance with IFC performance standards or their own performance standards. Therefore, EPC contractors that are familiar with these kinds of requests are already equipped with the proper tool to address these demands. Thus, they do not only increase their eligibility in terms of practices, but they are also most likely to present a consistent financial offer that takes into account DFIs requirement when they participate in the financing of the targeted LIP. Besides, DFIs tend to work with EPC contractors which are already in their database because it largely contributes to reduces their reputation risk exposure.

5.1.2.4. Compliance with International E&S Standards. As previously mentioned in this research, E&S issues are at the core of every LIPs especially those developed under project finance frameworks. They influence the design, the organization on the project site and ultimately the cost of the project. In addition, EPC contractors are increasingly demanded to build sustainable infrastructures with minimum impact on the environment and communities. Nonetheless, there are as many E&S regulation as they are countries in the world. As a matter of fact, every country has its own environmental regulation with definite performance standards (sometimes including specific

provisions relate to endanger spices). Taking into account the sensitivity of E&S matters, a strong regulatory system, a strong legal framework and an efficient government are necessary to ensure the enforceability of local standards. Unfortunately, as explain in the PEST analysis, either one of these three prerequisites or a combination of all three are often not met in many countries of SSA, which makes it difficult for certain lenders to rely on the local environmental regulations. Thus, as a common reference, lenders and investors mostly refer to the IFC performance standard or the EPs. Therefore, for LIPs procured through project finance, it is vital for EPC contractors to acquaint themselves with the IFC performance standards or EPs and furthermore develop E&S procedures in line with these principles to penetrate the project finance market in SSA.

5.1.2.5. Provision of Corporate Guarantee. The provision of a corporate guarantee is mainly applicable to subsidiary. It is required when the parent company is not itself the EPC contractor. Hence, it is fundamentally related to the corporate structure each EPC contractor choose to implement for a given project. As explained in previous Sections, often when EPC contractors are not already established or headquartered in the project country, they create a local special purpose vehicle that will enter into the EPC agreement with the project company. In this case, the corporate guarantee is crucial for the bankability of the project because the entity signing the EPC contract has neither credentials nor a strong balance sheet that can stand against all the liabilities of the EPC providers in the EPC contract. Therefore, parent companies engaging into project finance deals in SSA should be ready to back, with a lenders' and investors' compatible parent guarantee, any local entity they control (either fully or partial) and which is signing the EPC contract with the project company.

5.2. Recommendations

The objective of this research was to identify key characteristics for EPC contractors required to participate in project financed LIPs in SSA and to develop a front-end approach for EPC contractors to increase their eligibility for this market. By acknowl-

edging the key characteristics, the EPC contractors can make a self-assessment of their capacity to win a bid under project finance framework in SSA on a different basis rather than only the price. Furthermore, it will help EPC contractors to adequately anticipate the contractual obligations, the risk allocated to them and ultimately provide a much accurate financial offer which considers the context. Nevertheless, these characteristics can also be perceived as an impediment for certain EPC contractors because they may require a shift in the corporate culture, strategy or business approach. This is true specifically for insensitive characteristics described above because they are related to the organization itself. However, for region sensitive characteristics it is possible for EPC contractors to breach their deficit or weakness by applying three sorts of bidding strategy: Advisory services, joint venture or subcontracting (see Table 5.1).

These three strategies are implementable individual or cumulatively depending the contractors' skills. The EPC contractors can have recourse to advisory services to acquire knowledge on the project environment (political, economic, legal, environmental, social, etc.). In addition, advisors can be utilized in assessing the risk allocation during the EPC tender process to ensure an adequate pricing by the contractor. The advisor can also help contract upgrading their E&S procedure and elaborate E&S management plan in line with both the local regulations and the international standards like the IFC performance standards. Similarly, advisors which possess a track record working with DFIs, can also assist and review during the bidding phase the offer to ensure that they are compliant with DFIs requirement in all respect, thus increasing the likelihood of winning the bid.

Table 5.1. Strategies for bridging key characteristics .

Key Characteristics	**Organizational shift**	**Advisory Services**	**Joint venture**	**Subcontracting**
Location sensitive				
Experience in managing LIPs as main contractor			X	
knowledgeability of EPC tender process		X	X	
knowledgeability of IFIs procurement processes		X	X	X
knowledgeability of turnkey contract strategy		X	X	
compliance with international E&S standards		X	X	X
provision of corporate guarantee			X	
Location insensitive				
Exclusion from sanction lists	X			
Sound E&S and QHSE procedure	X		X	X
robust quality insurance system	X		X	X

The second strategy available for an EPC contractor would be to enter into a joint-venture agreement with other EPC contractors to make-up for its weaknesses (see Table 5.1). Thus, lenders and investors can rely on complementary characteristics of the member of consortium to award the project. This strategy is applicable for all key characteristics except for the exclusion from sanction list. The additional advantage of a joint venture is that liabilities of the EPC contracts with respected to the EPC agreement are also allocated among members of the consortium to the extent possible. In other words, each party commitment is proportionate to its obligation in the contract. Nonetheless, it is worthwhile mentioning that all parties remain jointly and severally liable to the project company.

The third strategy consist in identifying key subcontractors that can individually or jointly make-up for the contractors' weaknesses. This strategy is like the joint-venture strategy but differs on the liability allocation, and it is much more limitative. As opposed to the joint-venture strategy, in the subcontracting strategy the contractor

remains the sole entity liable for the contractual obligation with respect to the SPV. In addition, this strategy would be effective only for characteristics related to E&S and QHSE procedure, knowledgeability of IFIs procurement processes and compliance with international E&S standards while using specialized engineering firms to manage the construction works.

5.3. Further Research

This research mainly focusses on development finance institutions, equity provider, technical and legal advisors to define the key characteristics of EPC contractors for project financed LIPs in SSA. This choice was directed by the important contributions of these institutions in project finance transactions in SSA. Further research could be done to assess other experts' opinion, for instance, experts working in the public sector, in commercial banks or O&M providers. In addition, following research could also assess the impacts of EPC price on such key characteristics. In other words, research could determine whether introducing commercial consideration would result in a different set of characteristics.

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APPENDIX A: SURVEY QUESTIONNAIRE

SECTION 1: INTRODUCTION

Dear Madam, Sir,

Thank you for taking the time to complete this survey.

Section 2 of the survey consists in assessing political and economic indicators based on their importance to determine the most adequate environment to foster a successful development of project finance frameworks in Sub-Saharan Africa.

Section 3, presented in three types of queries, purports to assess the contractors' key characteristics which enable successful development of Large Infrastructure Projects (LIPs) sourced through project finance schemes in Sub-Saharan Africa. Thus, type I focuses on the contractor's technical abilities to manage its supply chain and correctly construct the project. Type II assesses the contractor's financial health with respect to the project's scale. At last, type III will address the contractors' integrity and best practices awareness.

For the purpose of the survey, Large Infrastructure Projects (LIPs) are defined as multidisciplinary infrastructure projects (e.g. power plants, airports, ports, etc.) requiring a minimum €100 million capital expenditure for construction.

Q1 Before you start, could you please indicate which type of organization you are working for?

- Investor (Private Equity)
- Financial Institution (Lender)
- Government entity (Grantor)
- Advisory firm
- Other (please specify)

Figure A.1. Survey Questionnaire 1.

A.1. Section 2.

SECTION 2

Q2 which economic indicator below is for you synonymous with a favorable environment for Project Finance frameworks in a Sub-Saharan African country?

- High Gross Domestic Product (GDP)
- High GDP growth rate
- Low inflation rate
- High GDP per capita

Q3 how would you rank the following political indicators to ensure a successful implementation of Project Finance framework in a Sub- Saharan African country?

- Political stability and absence of violence
- Reliable government policies
- Contracts and property rights enforceability
- Government incentives for private sector
- Perceived prevalence of corruption

Q4 Please rank the following attributes in terms of attractiveness regarding a Sub-Saharan African country.

- Strong political framework and institutions
- Stable economy
- Availability of qualified labor

Figure A.2. Survey Questionnaire 2.

A.2. Section 3.

Table A.1. Q5 To Ensure LIPs' Successful Construction, the Contractor MUST.

	STRONGLY DISAGREE	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
- have constructed at least ONE (1) LIP in the project country.					
- have previous experience in the project country regardless of the project size.					
- have at least FIVE (5) years of experience in Sub-Saharan Africa.					
- have built at least ONE (1) LIP of similar technology in Sub-Saharan Africa.					
- have at least TEN (10) years of experience in the LIP's industry.					
- have constructed at least ONE (1) LIP as "main contractor?.					
- have participated into at least TWO (2) LIPs as "sub-contractor".					
- be well acquainted with IFC performance standards.					

Table A.2. Q6 LIPs' Successful Development in Sub-Saharan Africa Depend.

	STRONGLY DISAGREE	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
- Contractors' good understanding of the Engineering-Procurement-Construction (EPC) tender process.					
- Contractors having a track record of LIPs in Sub-Saharan Africa which contain at least 50% of Local Content (labor, services, products...)					
- Contractors' ability to perform at least 50% of the construction works itself. - Contractors having an in-house design capacity.					
- Contractors having a track record of at least 50% of its contracts completed within BUDGET.					
- Contractors having a track record of at least 50% of its contracts completed within SCHEDULE.					
- Contractors having a track record of at least 50% of its contracts completed within schedule AND budget.					

Table A.3. Q7 To Minimize Default Risks During Construction, the Contractor SHOULD.

	STRONGLY DISAGREE	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
- have already participated into a project finance transaction involving at least ONE (1) of the international finance institutions or development banks.					
- have already delivered at least ONE (1) LIP under a turnkey contract.					
- be listed among the world's best contractors according to the ENR 250.					

Table A.4. Q8 A LIP in Sub-Saharan Africa is Only Bankable When the Contractor.

	STRONGLY DISAGREE	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
- holds shares in the project company.					
- is able to provide a liquid performance bond obtained from a financial institution with a minimum rating of "BBB+".					
- provides requisite security at the relevant corporate level (e.g. in the form of a Parent Company Guarantee)					
- has a Net Asset Value which is at least FIVE (5) times greater than the LIP cost.					
- has Working Capital which could cover at least 25% of the LIP cost.					
- provides a Performance Bond of at least 30% of the LIP cost.					

Table A.5. Investors or Lenders Will Only Finance a LIP, if the Contractor.

	STRONGLY DISAGREE	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
- has an office in the project country.					
- is not controlled by a governmental entity.					
- is a public listed company. - has NO political exposed person in its top management or among its shareholders.					
- is NOT on any sanction list including but not limited to project country, European Union and the World Bank sanction lists.					

Table A.6. Q10 To Ensure that LIPs are Constructed in More Responsible Manner.

	STRONGLY DISAGREE	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
- is well acquainted with the Equator Principle.					
- has an Environmental Management System or is certified ISO 14001 - is certified ISO 9001.					
- has safety procedure in place in line with the OHSAS 18001 or certified OHSAS 18001					