JIMMA UNIVERSITY
JIMMA INSTITUTE OF TECHNOLOGY
SCHOOL OF GRADUATE STUDIES
FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING
CONSTRUCTION ENGINEERING AND MANAGEMENT CHAIR

CONSTRUCTION CONSULTANCY SERVICES: RISKS AND PRACTICE OF PROFESSIONAL INDEMNITY INSURANCE IN ADDIS ABABA, ETHIOPIA

A Thesis submitted to School of Graduate Studies, Jimma University, Jimma Institute of Technology, Faculty of Civil and Environmental Engineering in Partial Fulfillment of the Requirements for the Degree Master of Science in Construction Engineering and Management

by

Munash Mersha Woldetsadik

August, 2020
Jimma, Ethiopia

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Advisor: Engr. Bien Mercado Maunahan SIGNATURE_____

Co - Advisor: Engr. Sintayehu Assefa Ambo SIGNATURE_____

August, 2020
Jimma, Ethiopia

DECLARATION

I declare that this research entitled "Construction Consultancy Services: Risks and Practice of Professional Indemnity Insurance in Addis Ababa, Ethiopia" is my own original work, and has not been submitted as a requirement for the award of any degree in Jimma University or elsewhere.

Munash Mersha Woldetsadik _____ _____
SIGNATURE DATE

As research Adviser, I hereby certify that I have read and evaluated this thesis prepared under my guidance, by Munash Mersha Woldetsadik entitled "CONSTRUCTION CONSULTANCY SERVICES: RISKS AND PRACTICE OF PROFESSIONAL INDEMNITY INSURANCE IN ADDIS ABABA, ETHIOPIA" and recommend and would be accepted as a fulfilling requirement for the Degree Master of Science in Construction Engineering and Management.

Advisor: Engr. Bien Mercado Maunahan _____ _____
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Co - Advisor: Engr. Sintayehu Assefa Ambo _____ _____
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ABSTRACT

Construction consultants are one of the significant stakeholders in the construction industry and are involved in the construction of a project, starting from conducting feasibility studies to contract closeout. They are representatives of the client and independent contract administrators and are bound contractually and legally for their services. Hence, they are prone to risk for their roles and responsibilities. To alleviate this problem is to come across alternative practices to be used in more quantity. This research was conducted to assess risk management and professional indemnity insurance practices of construction consultants in Ethiopia. It identified significant risks in construction consultancy services in the pre-construction, construction, and post-construction stages.

This research is both qualitative and quantitative in nature. Literature review of text books, research papers, journals, magazine, internet, and other sources were conducted to collect secondary data. The data obtained was used to prepare questionnaire which was distributed to and collected from consulting firms in Addis Ababa. SPSS and Microsoft Excel software were used to analyze the results of questionnaire using descriptive statistics.

In this research, 53.8% of the consultants stated they had a formal risk management plan and used either an in house risk manager or insurance broker to manage risks. However, most consultants showed poor performance in actual application of the different techniques in the processes of risk management, relying mostly on expert judgments, interpersonal skills, and meetings. 81% of the consultants had professional indemnity insurance coverage that protects them from errors and omission and negligence liabilities.

The consultants still do not consider risk management as a priority and their main reason to acquire professional indemnity insurance was only when a clause was specified under specific contractual obligations. Hence, the application of risk management techniques and awareness of professional indemnity insurance is lacking among construction consultants.

Keywords: Risk management, Consultancy services, Liability, Professional Indemnity Insurance

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ABBREVIATION

AHP	Analytic Hierarchy Process
CPAF	Cost Plus Award Fee
CPIF	Cost Plus Incentive Fee
CQS	Selection Based on the Consultants' Qualifications
DBB	Design Bid Build
EEA	Ethiopian Economic Association
FBS	Selection under a Fixed Budget
FIDIC	Fédération Internationale des Ingénieurs-Conseils
FMEA	Failure Modes and Effects Analysis
FPPPA	Federal Public Property Procurement Agency
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
GTP	Growth and Transformation Plan
ITC	Instructions To Consultants
LCS	Least-Cost Selection
LOI	Letter Of Invitation
MDB	Multilateral Development Bank
NGO	Non-Governmental Organizations
PII	Professional Indemnity Insurance
PMI	Project Management Institute
PPA	Public Procurement Agency

QBS	Quality-Based Selection
QCBS	Quality and Cost Based Selection
REOI	Request for Expressions of Interest
RFP	Request for Proposals
SSS	Single-Source Selection
TOR	Terms of Reference

CHAPTER ONE
INTRODUCTION

1.1. Background

The construction industry is one of the major industries contributing to the growth and development of the Ethiopian economy. The efficient and effective construction industry can enhance national competitiveness and create enormous employment opportunities. During the GTP I period, the construction industry, on average, grew at 28.7% per annum, pushing its share in GDP to rise from 4% in 2009/10 to 8.5 % by 2014/15 (National Planning Commission 2016).

The Ethiopian government had planned the GTP program to build the capacity of local contractors and consultants to meet 70% of the local construction demand. To achieve this, it was planned to increase the number of local contractors and consultants to 6,000 and 600, respectively, by 2019/20 (National Planning Commission 2016).

The Ethiopian construction industry faces many challenges. Inefficiency and poor performance of stakeholders, low capacity, and capability of contractors and consultants are perceived. According to the Ministry of Urban Development and Construction (2012), inadequate and erratic work opportunities, inappropriate contract packaging of works that favor foreign firms in donor-funded projects, low public investment in infrastructure projects, and over-dependence on donor funding are constraints hampering the performance and development of the industry.

Construction is a complex and challenging process. It requires coordination and communication of multiple parties such as the owner, the design professional, other contractors and subcontractors, and suppliers, all of whom may have different purposes and goals. At the start of a project, many factors are unknown, which makes construction a risky business. Risk is a multi-facet concept. In the context of the construction industry, it could be the likelihood of the occurrence of a definite event/factor or combination of events/factors which occur during the whole process of construction (Jayasudha and Vidivelli 2016).

Insurance is one of the tools most often used to manage risk in connection with construction projects. One type of insurance for services is professional indemnity insurance. It covers legal costs, expenses, and compensation paid to a claimant as a result of a service, which has been proven to be inadequate or negligent in any way, resulting in a financial loss for the client. Consultants need to acquire professional indemnity insurance to protect them if a claim is brought against them either by the client, contractor, or general public.

The consultant is one of the contractual parties that influence the progress and achievement of a given construction project. Most construction consultants are involved from design to construction contract closeout, and the overall performance of a given project is dependent upon their engineering and management skills and knowledge. They are constantly in contact with the client, the contractor and the general public. Assefa (2008) recognized consultants as one of the key stakeholders with high power, interest, and influence in the Ethiopian construction industry.

In order to overcome challenges and plan for uncertainties, it is crucial to have a good risk management team. Risk management involves risk identification, risk quantification, risk response planning, and risk control.

Therefore, a prudent consultant should be able to understand, evaluate, and manage risks whenever possible. This research discussed the current risk management and professional indemnity insurance practices undertaken by Ethiopian construction consultants.

1.2. Statement of the Problem

According to Yimam, (2011) one of the project management knowledge areas, risk management, could be considered to be totally unknown in the management of construction project in the country or practiced little or by very few in the industry due to the low level of awareness and importance given to it.

The number and expertise quality of consultants in Ethiopia is very low. The available domestic expertise is far from meeting the rising demands of the construction industry in the country. The shortage of such high-level expertise domestically has been costing the country huge scarce foreign exchange (Ethiopian Economic Association 2008).

Building collapses due to poor design and quality supervision, construction delays and cost overruns due to poor construction contract administration and projects rendered unfit for their intended purposes subjecting clients for additional rectification costs are only a portion of problems that are attributed to construction consultants. Such events were recently reported in Addis Ababa which exposed the consulting firms to risks in liability claims (Addis Fortune, 2016) and (Addis Fortune, 2018). Nonetheless, risks in construction consulting services are not recognized or are usually underrated.

1.3. Research Questions

This research will answer the following questions.

i. What are the major types of risks in Ethiopian construction consultancy services?
ii. What are the risk management systems employed by consultants?
iii. To what extent is professional indemnity insurance practiced by consultants in Ethiopia?

1.4. Objectives

1.4.1. General Objective

The main objective of this research was to evaluate construction consultancy services' risks and practice of professional indemnity insurance in Addis Ababa, Ethiopia.

1.4.2. Specific Objectives

The specific objectives of this research are

i. To identify major types of risks in construction consultancy services in Ethiopia
ii. To assess current risk management systems implemented by construction consultants in Ethiopia
iii. To assess the current practice of professional indemnity insurance as risk mitigation by construction consultancy firms in Ethiopia

1.5. Scope of the Study

This study focused on identifying the risks faced by local construction consultants that are based in Addis Ababa. Risks that stem from conditions of contract and applicable laws were investigated. The risks originating from the services provided by the consultant during

the pre-design stage, design and bidding stage, construction stage, and post-construction stage were identified. Under project delivery systems such as the DB (Design –Build), DBO (Design-Build-Operate) and others, the consultant, in addition to carrying out the pre-design and design services, becomes the contractor (constructor and operator) that constructs and operates the works. Risks in such cases, where the consulting firm undertakes construction and operation services, are not considered in this research. The research did not include foreign consultants operating in Ethiopia.

1.6. Significance of the Study

This research will be important to create awareness for construction project clients, contractors, and the general public on the roles, responsibilities, and obligations of the consultant. It will help consultants to identify risks in the industry and enable them to adopt and update their risk management system and procure professional indemnity insurance. It will help clients in the selection of consultants and what key characteristics to look for in a consultant. It will guide new consultancy firms entering the industry. Different government bodies charged with drafting, enacting, executing, and regulating the construction industry can use it as feedback to improve existing practices. Professional unions and further researchers can also benefit from this research.

CHAPTER TWO
LITERATURE REVIEW

2.1. Background

2.1.1. The Ethiopian Construction Industry

The construction industry is one of the economic sectors that contributes to the growth and development of a country. The diverse nature of the industry enables it to mobilize and effectively utilize human and material resources: draw the expertise of the various construction stakeholders and, in addition, a major consumer of the products of the manufacturing sector. It also plays critical roles in the development and maintenance of housing and infrastructure which promotes local employment and improves economic efficiency (Abubaka, Abdullahi and Bala 2018).

Many reports highlight the remarkable expansion of the construction industry in Ethiopia as it has built large volumes of buildings and infrastructure items. The expansion in the size of the industry is most notable. National accounts data in the African Statistical Yearbook (Economic Commission for Africa 2018) show that construction Gross Domestic Product (GDP) grew from 16,074 million Ethiopian Birr in 2009 to 292,209 million Ethiopian Birr in 2017, an 18-fold growth. The annual growth rates of the industry in the past decade have been remarkable; the figures were as high as 31.5, 38.7, and 20.7 percent in 2012, 2013, and 2017, respectively. The contribution of the industry to national GDP during the period 2009 to 2017 ranged between 5 and 17 percent (Economic Commission for Africa 2018). However, the construction industry faces many problems and challenges which need to be addressed (Ofori 2018).

2.1.2. Major Stakeholders in the Ethiopian Construction Industry

Stakeholders are defined as individuals or groups who will be impacted by or can influence the success or failure of an organization's activities. Stakeholders may be groups or individuals who supply critical resources or place something of value at risk through their investment of funds, career, or time in pursuit of the organization's business strategies or goals. Alternatively, stakeholders may be groups or individuals opposed to the organization or some aspect of its activities (Asefa 2018).

The Ethiopian construction industry comprises of organizations and persons who include companies, firms, and individuals working as consultants, main contractors, and sub-contractors, material and component producers, plant and equipment suppliers, builders and merchants. The industry has a close relationship with clients and financiers. The government is involved in the industry as purchaser (client), financier, regulator, and operator (Ministry of Urban Development and Construction 2012).

Previous research conducted showed the major stakeholders in the Ethiopian construction industry and summarized as follows.

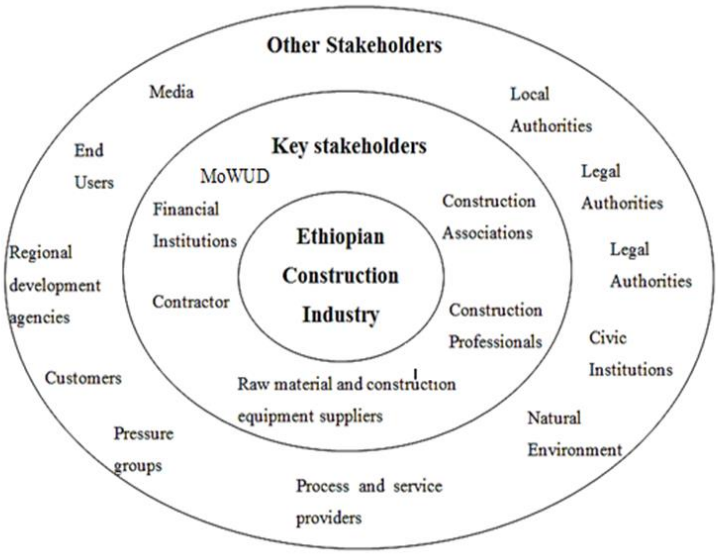

Figure 1 Stakeholders in the Ethiopian Construction Industry (Asefa 2018)

As depicted in Figure 1, the consultant is one of the key stakeholders in the industry. The following sections describe the consultant and discuss the current role of the consultant in the Ethiopian construction industry.

2.2. The Consulting Service in Construction

2.2.1. Consulting Services

World Bank, (2006) defines consulting services as services of a professional nature provided by consultants using their skills to study, design, organizes, and manages projects, advise clients, and, when required, builds their capacity.

Typically four characteristics of general services are cited

1. Services are more or less *intangible*;
2. Services are *activities* or a *series of activities* rather than things;
3. Services are at least to some extent *produced and consumed simultaneously*, which means the service cannot be stored for use at a later date;
4. The customer *participates in the production process,* at least to some extent (Sporrong 2014).

Consulting services encompass multiple activities and disciplines, including the crafting of sector policies and institutional reforms, specialist advice, and integrated solutions, change management and financial advisory services, planning and engineering studies, and architectural design services. Consultants also provide project supervision, social and environmental assessments, technical assistance, and program implementation (World Bank, 2006).

Consultancy, like other professions, is also a business. Its business success is a prerequisite to the employment of well-qualified staff able to provide competent services to clients. Maintaining high professional standards and doing good business are not mutually exclusive. However, when there is a conflict between professional standards and business interests, the profession's code of ethics states that the former should not be compromised. Conversely, a well-developed consulting profession contributes to the quality of the engineering profession as a whole. The interrelations among the components of the profession are so strong that it is not possible to develop one successfully in isolation from the others (Kirmani and Baum 1991).

The consulting profession offers professional services to clients in various fields of specializations on a fee basis. The term "professional services" underlines the need to conform to the technical and ethical standards of the profession and the academic preparation, knowledge and often long and intensive training to acquire the experience necessary to provide such services. Specialization, in a given field, emphasizes the high level of expertise required to provide a quality service (Sporrong 2014).

2.2.2. The Consulting Service in Construction

The Architect, Engineer, Consultant, Resident Engineer, Chief supervisor are terms commonly used interchangeably to express consulting service providing entities in construction.

The architect is the licensed design professional who, acting as an agent for the owner by providing architectural expertise, generates a design concept for the project. While the specific role of the architect varies greatly according to the delivery method, it is the architect who designs, documents, and administers the contract(s) for construction of the project. The "architect" can be an individual or a firm and may contract with consultants such as engineers who augment and support the design effort. In all delivery methods, the architect generates documents that describe the design intent. The contractor uses these documents to build the building (The American Institute of Architects 2014).

Consulting services may be provided by individuals, firms, or corporations, but they share the same characteristics. The clients may be individuals, firms, public sector enterprises, governments, or international organizations, but the character of the professional-client relationship remains the same (World Bank 2006).

2.2.3. Construction Consulting Services in Ethiopia

To work as a consultant in Ethiopia, applicants must submit applications for registering as consulting offices under consulting architects and engineers, consulting architects, general consulting engineers, or specialized consulting engineers. Consultants registering in office for consulting architects and engineers may participate in the preparation of total design documents for building and civil projects befitting their categories. Those consultants registered in the Office for Consulting Architects may participate in the preparation and design of building projects befitting their categories. Those consultants registered in the Office for General Consulting Engineers may participate in the preparation of all engineering design works befitting their category. On the other hand, applications for registration in the Office of Specialized Consulting Engineers may be submitted in the specific fields of engineering like structural, road, sanitary and mechanical, foundational, electrical, quantity surveying, and surveying. Consultants registered in any of the above-

specialized fields may participate in the preparation of design projects befitting their categories (Hagos and Shewangezaw 2009).

Foreign construction consultants have mainly handled the design and supervision works of many bigger infrastructural and building projects. In donor-funded projects, local consultants are generally associated with international consulting firms for both design and supervision works. Most domestic consultants consider that they are unreasonably disadvantaged by donor policies, which require experience on substantial projects experience that they cannot obtain by virtue of the same policy Consultants are also very few and have low capacity to supervise complex projects. Hence, sustaining the current trend in the industry using the low domestic capacity would be difficult (Ethiopian Economic Association 2008).

2.2.4. Project Delivery Systems

The projects delivery system is defined as a method for procurement by which the clients' transfer or share risks to other project entities. These entities typically are a design entity that takes responsibility for the design and a contractor who takes responsibility for the performance of the construction (Tsai and Yang 2010).

The consultant must be able to recognize and work within various forms of building delivery systems. The most common forms of delivery systems are the Design-Bid-Build (DBB) and the Design-Build (DB) methods. Each method carries different obligations, goals, and pitfalls for the consultant. Understanding, contractually, how a project will be constructed is key to the management of risk during construction (Winkler and Chiumento 2009).

The difference in project delivery systems has a direct impact on the relations, roles, liability, and obligation of project members, and even the relation on potential risks. Above the project delivery systems, the ranking of risk factors, and the amount of risks may vary with a different stage of the project (Tsai and Yang 2010).

In the traditional design-bid-build project delivery method, there is a clear line demarking the roles of designer and builder. While the project design is underway and documents are being prepared, management of the project is the responsibility of the architect. After the documents have been bid and a general contractor selected, management of the project

passes to the contractor, although the architect remains the manager of the design team (The American Institute of Architects 2014).

2.2.4.1. The Triangular Relationship

Winkler & Chiumento, (2009) represented the relationship among owner, architect, and contractor as a triangle as shown in Figure 2. The owner is at the apex, where he is supported by the design professional (architect or engineer) and the contractor on separate legs of the triangle. These solid line legs represent a direct contractual relationship between owner and architect and between owner and contractor. The relationship between architect and contractor is depicted by an open arrow that represents a relationship not likely to be fixed by a contract. Often the relationship is defined in the construction documents by a listing of the roles that each plays in supporting the owner's effort to achieve the desired result. Neither the architect nor the contractor has a direct contractual relationship with each other to cooperate in this area, but both are contractually obligated to the owner to do so.

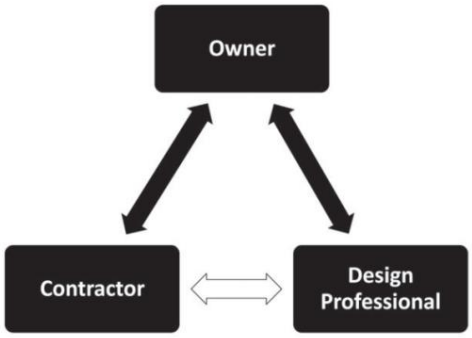

Figure 2 The owner, architect and contractor triangle (Winkler and Chiumento 2009)

2.2.5. Selection and Employment of Consultants

During the selection stage, the competent professional consultant will be able to offer the client a team that has the education, training, practical experience, expertise and judgment to carry out the project in a cost effective and quality manner (FIDIC 2011).

The tender process may take a number of forms; the main distinguishing feature is the level of competition. Open tendering involves a high-risk element for the client, as many of the tendering organizations will be unknown. With selective tendering in either one or two stages a limited number of organizations are invited to tender after some form of pre

selection or pre-qualification has taken place. In this case, award to the lowest conforming tender is not such a high-risk strategy. Negotiated tendering takes place when a client approaches a single organization, based on reputation, but this can also be time consuming (Smith, Merna and Jobling 2006).

The selection of consultants can be done through different methods. The World Bank recommends Quality and cost-based selection (QCBS).

2.2.5.1. Quality and Cost Based Selection (QCBS)

QCBS uses a competitive process among shortlisted firms that takes into account the quality of the proposal and the cost of the services in the selection of the successful firm. Cost as a factor of selection shall be used judiciously. The relative weight to be given to the quality and cost shall be determined for each case depending on the nature of the assignment (World Bank 2014).

The selection process shall include the following steps:

a) preparation of the TOR;
b) preparation of cost estimate and the budget, and shortlisting criteria;
c) advertising;
d) preparation of the shortlist of consultants;
e) preparation and issuance of the RFP (which should include: the Letter of Invitation (LOI), Instructions to Consultants (ITC), the TOR, and the proposed draft contract);
f) receipt of proposals;
g) evaluation of technical proposals:
h) consideration of quality;
i) the public opening of financial proposals;
j) evaluation of financial proposal;
k) final evaluation of quality and cost; and
l) negotiations and award of the contract to the selected firm.

While the quality and cost-based selection method may be applied in all conditions, other methods of selection may be adopted based on the types and circumstances of the assignment. These include quality-based selection (QBS), selection under a fixed budget

(FBS), least-cost selection (LCS), selection based on the consultants' qualifications (CQS) and single-source selection (SSS).

2.2.5.2. Quality-Based Selection (QBS)

QBS is a selection process to determine the most appropriately qualified consultant based on quality-cum technical competitiveness attributes, leading to a negotiated award of Services on a fair and reasonable basis. In QBS, the 'Q' does not stand for best quality, but rather most appropriate quality. A fundamental benefit of QBS is that the consultant is able to develop the scope of work appropriate to the task without fear that he/she will be undercut by a competitor who is prepared to offer less than complete/adequate services (FIDIC 2011).

2.2.5.3. Selection under a Fixed Budget (FBS)

Client would establish a budget for the consultancy services, and the consultants are then required to submit technical proposals according to the services outlined by the client. Selection is based on the best technical proposal. The budget system is suitable for projects with a fixed budget on consultancy services or when it is difficult to identify the extent of services required, e.g. for feasibility study, claims evaluation and negotiation (Ng, Kumaraswamy and Chow 2001).

2.2.5.4. Least-Cost Selection (LCS)

This method is generally appropriate for selecting consultants for assignments of a standard or routine nature where well-established practices and standards exist. Under this method, a "minimum" qualifying mark for the "quality" is established. Under this method, the minimum qualifying mark shall be established, understanding that all proposals above the minimum compete only on "cost." (World Bank 2014).

2.2.5.5. Selection Based on the Consultants' Qualifications (CQS)

This method may be used for small assignments or emergencies for which the need for issuing an RFP and preparing and evaluating competitive proposals is not justified. Consultant is selected entirely on the likely quality of services provided, and the assessment is simply based on the technical proposals submitted. Remuneration may be calculated according to the fee scale published by the relevant professional institution(s) with or without any adjustments (Ng, Kumaraswamy and Chow 2001).

2.2.5.6. Single-Source Selection (SSS)

This method does not provide the benefits of competition in regard to quality and cost, lacks transparency in selection, and could encourage unacceptable practices. Therefore, SSS should be used only in exceptional case (Thai 2009).

2.2.6. Types of Contract

A consulting firm contract may take any form which is agreeable to the parties involved, but certain proven types of the contract have been developed, which are useful for certain building projects. This can be fixed price and cost-type contracts.

2.2.6.1. Fixed Price/Stipulated Sum

This method of agreeing a contract price is widely used in the construction industry, where one party pays an acceptable sum for a specified amount of work to another party who agrees to undertake it. It is nearly always used in connection with competitively bid work (some public bodies are constrained by law to use this method) and has the advantages of enabling the owner to know the final cost of construction at the outset of the work and releasing the contractor from having to keep accurate time records for the owner's scrutiny. Stipulated sum contracts have certain disadvantages; for example, escalation or inflation of prices or unforeseen circumstances might affect the contractor's fixed profit margin. In some cases, this could mean a higher base bid to cover such contingencies, and so the owner may pay more than is strictly necessary. However, standard forms of contract often include equitable clauses to deal with these matters (e.g., escalation clauses, concealed conditions clauses, etc.) (Greenstreet, Greenstreet and Schermer 2005).

2.2.6.2. Cost-type Contracts

Cost-plus-fee contracts provide that the owner reimburse the contractor for all construction costs and pay a fee for its services. How the contractor’s fee is determined is stipulated in the contract, and a number of different procedures are used in this regard. Commonly used are provisions that the fee shall be a stipulated percentage of the total direct cost of construction or that the fee shall be a fixed sum. Incentive clauses are sometimes included that give the contractor an inducement to complete the job as efficiently and expeditiously as possible through the application of bonus and penalty variations to the contractor’s basic fee. A guaranteed maximum cost is frequently included in cost-plus contracts. Under this form, the contractor agrees that it will construct the total project in full accordance with the

contract documents and that the cost to the owner will not exceed some total price (Sears, Sears and Clough 2008).

2.2.7. Relevant Provisions to Consider in Contracts

The following are some factors to consider when selecting the type of contract: The uncertainty of the scope of work needed, the party assuming the risk of unexpected cost increases, the importance of meeting the scheduled milestone dates and the need for predictable project costs (Darnall and Preston 2012).

The World Bank suggests that consultants should pay attention to the following provisions while making contracts.

- *Currency.* RFPs shall clearly state that firms may express the price for their services in any fully convertible currency.
- *Price Adjustment.* To adjust the remuneration rates in a time-based contract for foreign and/or local inflation,
- *Payment Provisions.* Payment provisions, including amounts to be paid, schedule of payments, and payment procedures, shall be agreed upon during contract negotiations. Payments may be made at regular intervals (as under time-based contracts) or for agreed outputs (as under lump-sum contracts).
- *Proposal and Performance Securities, and Liquidated Damages.* Proposal and performance securities are not recommended for consultants' services, but shall, if required, be in reasonable amount.
- *Conflict of Interest.* The consultant shall not receive any remuneration in connection with the assignment except as provided in the contract. The consultant and its affiliates shall not engage in consulting or other activities that conflict with the interest of the client under the contract.
- *Professional Liability.* The consultant is expected to carry out its assignment with due diligence and in accordance with the prevailing standards of the profession. As the consultant’s liability to the client will be governed by the applicable law, the contract need not deal with this matter unless the parties wish to limit this liability.
- *Applicable Law and Settlement of Disputes.* The contract shall include provisions dealing with the applicable law and the forum for the settlement of disputes.

Consultants' contracts shall always include a clause for settlement of disputes (World Bank 2014).

2.2.8. The Role of Consultants in the Phases of Construction

The project stage, normally progress through a universal sequence of four stages, that is first, proposal surveying: referring to analysis and evaluation on whether the plan desired by the client is technically and financially feasible; second, scheme designing: referring to the design package, including measuring, geological surveying, drawings, budget, etc., third, procurement contracting: referring to selecting the contractor and handling all business related to project delivery such as procurement of equipment, materials, etc.; and fourth construction receiving: referring to the contractor completing the project and turn-over to the client (Tsai and Yang 2010).

The consultant has a wide variety of roles to play during the construction process. Because the consultant plays a multifaceted part in the construction project and is usually involved in the project from the project's inception to its completion, it is important to fully understand consultant and authority. Doing so ensures that the consultant can be fully maximized on each construction project (Ip 2009).

On the one hand, the Engineer has a number of functions in which he acts, either expressly or impliedly, as the agent of the Employer. On the other hand, both parties to the contract agree, at the time of entering into the contract, that the Engineer is to perform certain determination/certifier functions under the contract. The Engineer (or Employer's Representative) is thus a very powerful person who is also referred to as a decision-maker, a function that requires a certain degree of impartiality and fairness from him (Jaeger and Ho'k 2010).

Consultants are involved from the inception of the construction project closeout. FIDIC policy statement on the role of the consulting engineer during construction states that a fully professional service by a consulting engineer to a client for a project comprises five main stages, as follows:

1. Investigation and report,
2. Detailed design and preparation of contract documents,
3. Arranging a contract,

4. Services during construction,
5. Acceptance of Works, commissioning of systems, and resolution of final account (FIDIC 2019).

2.2.8.1. The project brief

Once an owner has identified the need for a new facility, he or she must define the requirements and delineate the budgetary constraints. Project definition involves establishing broad project characteristics, such as location, performance criteria, size, configuration, layout, equipment, services, and other owner requirements needed to establish the general aspects of the project. Conceptual planning stops short of detailed design, although a considerable amount of preliminary architectural or engineering work may be required. The definition of the work is basically the responsibility of the owner, although a design professional may be called in to provide technical assistance and advice (Sears, Sears and Clough 2008)**.**

Briefing is a two-way educational process which takes place between the client and the architect from the beginning. This can range from discussion, which simply needs to confirm the design attitude towards the small job, to innumerable meetings or visits concerned with teasing out complete information for a large job. This information then needs to be considered against the practical conditions within which the design has to be achieved and must be considered in the investigation made in support of the proposals to be put forward. The results represent the essential framework for the design process (Green 2001).

2.2.8.2. Design Services

The architect's design services on big projects may include structural, mechanical, and electrical engineering services, although more complex buildings will necessitate the engagement of consultants. Design services are divided into schematic design stage where the architect provides conceptual ideas for the project, illustrating the scale and relationships of the programmatic components and design development stage where the schematic design approved by the owner, along with an updated budget, the architect starts preparing more detailed illustrations and data related to the proposed design. (Greenstreet, Greenstreet and Schermer 2005).

There exist a few main factors which cause errors to occur in designs. They include the following: Designer's lack of knowledge or experience, lack of time to prepare high quality design documentation, working on two-dimensional documentation which hinders design verification, lack of coordination between subjects, wrongly defined or imprecise scope of duties and human errors (Juszcyk, et al. 2014).

2.2.8.3. Preparation of Construction Documents

When details of the project have been sufficiently determined and approved by the owner, the architect will undertake: preparation of detailed working drawings and specifications sufficient for construction purposes; assistance to the owner in securing bidding information, forms, contracts, and conditions any further changes in the projected construction cost; assistance to the owner in filing for any government approvals. Because of their important interrelationship, drawings and specifications should be developed together to avoid any duplication or omission of information (Greenstreet, Greenstreet and Schermer 2005).

2.2.8.4. The Construction Phase

Every building construction project begins with the objective of completing the project in accordance with the details of the contract. The client, the consultant, and the contractor contribute their share to fulfill the requirements at the start of a project. When a project progresses into the construction phase, the requirements and quality standards defined during the design phase start to change (Choudhry, et al. 2017).

A contract administrator who is employed to supervise the carrying out of building works may in certain respects be regarded as an agent of the employer. This has a number of important consequences, notably as to the extent to which the contract administrator can bind the employer by actions and the scope of the duty of care and skill owed by the contract administrator to the employer. These duties include preparation of contracts and variations, suspension of work, delegation of authority, advice to the employer, instructions to the contractor, information to the contractor, inspection and monitoring of the contract work and quantity surveying functions. A contract administrator has a significant part to play in exercising judgment and reaching decisions on various matters under the contract. In so doing the contract administrator acts, not as the agent of the employer, but as an independent professional concerned primarily in giving certifications. Although the issue of

certificates is the most important aspect of the contract administrator's 'independent' role, it is not the only one. Construction contracts may also use other forms of words, such as requiring the contract administrator to 'make decisions' or to 'give opinions' (Hughes, Champion and Murdoch 2015).

The limits of this role are expressed within the owner-architect and owner-contractor agreements, and great care should be taken by the architect not to exceed or mishandle the powers necessary for the administration of the contract. If the architect's powers are exceeded, such acts can be ratified by the owner, but it is obviously preferable to avoid the situation if possible (Greenstreet, Greenstreet and Schermer 2005).

2.2.8.5. Post Construction Services

It is easy to assume that design services have ended simply because construction has been completed and all fees have been paid. That is why it is important to think in terms of owner needs rather than services after construction has completed. Post-construction offers opportunities to gain important information for the future relative to design functionality, services performance, owner satisfaction, and the possibility of future work. These may include maintenance and operational programming, start-up assistance, record drawing, warranty review and post-contract evaluation. Other potential additional services include move-in assistance, disaster planning, energy analysis and monitoring, and forensic analysis (The American Institute of Architects 2014).

Table 1 summarizes the roles and responsibilities of the consultant as a contract administrator during the construction and post construction phases.

Table 1 Role of the consultant as a contract administrator (The American Institute of Architects 2014)

Activities	Tasks	Documentation
Preconstruction conference	Review contractor's construction schedule Review contractor's submittal schedule Review contractor's required submittals Review schedule of values Review quality control/testing procedures	Preconstruction conference report Administrative procedures manual (optional)

	Review allowances/contingencies Review bond requirements	
Construction	Conduct scheduled site visits Monitor progress and quality of work Determine work conformance Participate in project meetings Issue site observation reports Send/answer requests for information Review contractor submittals Review value analysis substitutions Prepare change orders Review applications for payment Issue work change proposals Monitor allowances Monitor contingencies Monitor progress and quality of work Approve minor changes Review quality control reports Cooperate with owner's consultants Review change order pricing	Site observation reports Project meeting reports Work changes proposal requests Change order recommendations Change orders Construction change directives Supplemental instructions Requests for information Certificates for payment Action item lists Document logs
Substantial completion	Inspect project for substantial completion Review contractor's punch lists Prepare certificate(s) of substantial completion Document owner-accepted nonconforming work Monitor building start-up and commissioning	Amended punch lists Certificate(s) of substantial completion
Closeout conference	Review contractor closeout documents Review record documents Receive contractor written notice of final completion	Closeout lists Transmit record drawings to copy owner
Contractor's warranty	Review compliance completion items (if requested by owner)	Letter to general contractor citing warranty corrections required
One-year follow-up review	Review warranty items to be completed or corrected prior to end of warranty (if requested by owner)	List of outstanding warranty items to owner

2.3. Project Management in Construction

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. Project management is accomplished through the

appropriate application and integration of the project management processes identified for the project (Project Management Institute 2017).

Construction project management involves different stakeholders, including the client, the consultant, the contractor, and the general public, who have a vested interest in the outcome of a project. Each stakeholder has a different purpose and interest in the project.

In most construction projects, the client comes up with the idea of a project and hires a consultant that conducts feasibility studies and prepares necessary designs and documents for the procurement of the contractor that will construct the facility. In other cases, the consultant itself designs and constructs the facility. Hence, the role and responsibility of the consultant differ depending on the conditions of the contract and project delivery system. The consultant is expected to have good project management skills to implement its duties.

As the Project Management Institute (PMI) identified, there are ten project management knowledge areas that project managers should be familiar with in order to carry out their projects successfully. These areas include Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resources Management, Project Communications Management, Project Risk Management, Project Procurement Management, and Project Stakeholder Management (Project Management Institute 2017).

Construction has been slow in applying management procedures that have proven effective in other industries. The construction industry is at or near the top in the annual rate of business failures and resulting liabilities. The reasons are: Construction projects are unique and construction projects involve many skills largely non-repetitive in nature. Projects are constructed under local conditions of weather, location, transportation and labor that are more or less beyond the contractor's control. Construction firms, in main, are small operations, with the management decisions being made by one or two persons .There are special problems in construction. The future cannot be forecasted and construction is a high-risk business (Gupta, Sharma and Trived 2015).

2.4. Risk and Project Risk Management in Construction

2.4.1. Risk

Risk is defined as the uncertainty of outcome, whether positive opportunity or negative threat, of actions and events. The risk has to be assessed in respect of the combination of the likelihood of something happening and the impact which arises if it does actually happen (Gupta, Sharma and Trivedi 2015).

Project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives. Components of risk are an event that may or may not happen, the probability of the occurrence of that event, and the impact of the occurrence of that event. There are many sources of uncertainty in construction projects, which include the performance of construction parties, resource availability, environmental conditions, the involvement of other parties, contractual relations, etc. As a result of these sources, construction projects may face problems that cause a delay(s) in the project completion time (Bassiony, et al. 2015).

Risk often varies in the likelihood of its occurrence and its impacts from one project to another, and risk changes its nature during the project life cycle. A lack of project information, particularly in the early stage of a construction project, always leads to a higher degree of risk associated with cost, time, and quality. The level of risk, however, may decrease with project development. When risks are being realized as the project progresses, the increased level of certainty reduces the level of risk in the project. Project risks often tend to be interrelated, but they can sometimes be considered in isolation. Risks can not only affect the achievement of project objectives but also influence the occurrence of one another. The perception of risk varies at both individual and organizational levels because different people hold different views and have different understandings of a particular risk's components, sources, probabilities, consequences, and preferred actions. People's beliefs, attitudes, judgments, and feelings are believed to influence risk perception to a certain extent (Goh and Abdul-Rahman 2013).

Risk always has a cause and, if it occurs, a consequence. Risks can have positive or negative consequences. Success is dependent on maintaining a high commitment to risk management procedures throughout the project. At the definition phase of a project, it is

valid for an initial risk assessment to be conducted. It will save much-wasted effort chasing an impossibly risky outcome and divert effort towards more beneficial projects with lower risks. Two fundamental types of risks are always present: 1) project risks – associated with the technical aspects of the work to achieve the required outcomes; and 2) process risks – associated with the project process, procedures, tools and techniques employed, controls, communication, stakeholders and team performance (Young 2007).

2.4.2. Risk Management

Risk management can be defined as an organized and comprehensive method tailored toward "analyzing," "identifying," and "responding" to risk factors in order to achieve the project goals. Having a good understanding of risks allows the parties involved to take steps in order to reduce their negative impacts (Banaitis and Banaitiene 2012).

It is not possible to manage all the risks in a construction project. However, it is important to focus on vital risks. Attempting to identify all the risks can be a waste of time and counterproductive. It was observed that the majority of decisions on construction risk management are done based on intuition, previous experience, and the manger's professional judgment. As a result of ignorance and doubts on sustainability, formal methods available are not being applied for the activities of the construction (Bahamid and Doh 2017).

Risk management has become an essential requirement for construction projects. The risk management process includes Hazard identification, Risk assessment, and Risk control. Risk is assessed by Qualitative Methods and Quantitative Methods. Risk management is the systematic process of identifying, analyzing, and responding to project risk and it includes maximizing the probability and consequences of positive attributes and minimizing the probability and consequences of attributes adverse to project objectives (Bassiony, et al. 2015).

Construction projects are inherently risky. That is, construction projects operate in an increasingly dynamic and pluralistic society. This is compounded by complex relationships with owners, designers, contractors, subcontractors, suppliers, government authorities, the public, and stakeholders (Chileshe, Hosseini and Jepson 2016).

Risks that have not been identified and managed are undoubtedly unchecked threats to a project's objectives, which in turn may lead to considerable overruns in cost and schedule. For this reason, a systematic approach must be taken to manage risks throughout the development of a project. Risk management is a proactive decision-making process, which involves accepting a known risk and/or taking steps to mitigate the impact and likelihood of the occurrence of risks, to minimize the threats and maximize the opportunities. Despite numerous risk management processes proposed in the literature, the five main steps in the risk management process are, generally, risk planning, risk identification, risk analysis, risk response, and risk monitoring and control (Goh and Abdul-Rahman 2013).

To make effective and efficient risk management, it is necessary to have a proper and systematic methodology and, more importantly, knowledge and experience of various types. For example, it requires knowledge of the unforeseen events that may occur during the execution of a project, on the actions that work well or not when one of these events happens, on ways to assess a risk or estimate the likelihood that it will occur, and so on. The absence of an effective project risk management function has several negative consequences for participants in a project due to a lack of preventive action against the risks and uncertainty that any project presents. For example, the lack of prevention against the risk of scope definition of a project, or environmental hazards or communication risks, between others, leads to delays, significant increases in costs and contractual disputes, among others (Serpellaa, et al. 2014).

The lack of a project risk management approach that is effective has a lot of unpleasant effects on the project participants as a result of deficiency of actions to prevent the uncertainty and risks that are present in a project. Risk management is essential to predict serious threats to a project before they happen. Other benefits include

- Mitigation plans can be derived and implemented immediately.
- Contingency plans can be derived in advance.
- Valuable data for negotiating with suppliers are obtained.
- The process creates clearly defined 'ownership' for risks to ensure they are monitored.
- It helps to create a 'no surprises' environment.

- It encourages decisive leadership rather than crisis management.

Risk management does have a cost, but in most situations, this is significantly less than the cost of correcting the subsequent issues when a risk occurs (Young 2007).

A process of risk management in projects is a rational chain of practices taken by decision-agents in order to keep the implementation of the project under certain conditions. The decision-agents need to identify, analyze and evaluate the risks in all project life cycle and use their organizational structure and administrative practices in order to act on the risks in favor of the project. Project complexity and the maturity of the organizations are viewed as important factors that can affect the success of a project (Rodrigues-da-Silva and Crispim 2014).

2.4.2.1. Risk Management Planning

Plan Risk Management is the process of defining how to conduct risk management activities for a project. The key benefit of this process is that it ensures that the degree, type, and visibility of risk management are proportionate to both risks and the importance of the project to the organization and other stakeholders. This process is performed once or at predefined points in the project. Expert judgment, data analysis (stakeholder analysis), or meetings can be used to develop the risk management plan (Project Management Institute 2017).

2.4.2.2. Identify Risks

This step involves the identification of risks that arise from all aspects of the context described in the previous step. The process may concentrate on one or many possible areas of impact relevant to the project, but a standard methodology should be applied across all functions. It is important to ensure that the widest range of risks is identified, as risks that are omitted at this step may not be analyzed and treated in subsequent steps. Valid information is important in identifying risks and in understanding the likelihood and the consequences of each risk. Existing information sources need to be accessed and, where necessary, new data sources developed. Although it is not always possible to have the best or all information, it should be as relevant, comprehensive, accurate, and timely as resources will permit. This means that it is critical to have specialists and experienced staff assists in the risk identification activity (Cooper, et al. 2007).

The key benefit of this process is the documentation of existing individual project risks and the sources of overall project risk. It also brings together information so the project team can respond appropriately to identify risks. This process is performed throughout the project (Project Management Institute 2017).

Bahamid & Doh, (2017) had identified the techniques mostly used in developing countries to identify risks as follows.

- Checklists: Know potential points that can fail in previous projects and thus is very helpful in risk identification. This allows project managers to know the risks present and makes them be involved in the process of risk identification, which will ultimately lead to greater acceptance of any means implemented to minimize the risks.
- Interviews with experts: Historical data analysis for projects that appear similar and examine similar past or present projects, risk analysis, lessons learned, or project evaluations are other methods available for getting feedback about risks involved in a project.
- Experience: Checking historical data of past projects that are similar can only be useful in a limited number of conditions. Such systems are most often restricted in terms of their usability or important data that are stored.
- Brainstorming: Can be of use for projects involving new risks, new management arrangements, or for developing initial checklists. This may be useful in risk management workshops.

2.4.2.3. Perform Qualitative and Quantitative Risk Analysis

The risk analysis step assigns each risk a priority rating, taking into account existing activities, processes, or plans that operate to reduce or control the risk. It may use forms of analysis that range from simple qualitative methods to more sophisticated quantitative approaches (Project Management Institute 2017).

The quantitative risk analysis attempts to estimate the risk in form of the probability (or frequency) of a loss and evaluates such probabilities to make decisions and communicate the results. In this context, the ‘uncertainty’ associated with the estimation of the frequency (or probability) of the occurrence of the undesirable events and the magnitude of losses (consequences) are characterized by using the probability concepts. When evidences and

data are scarce, uncertainties associated with the quantitative results play a decisive role in the use of the results (Modarres 2006).

Qualitative analysis is based on nominal or descriptive scales for describing the likelihoods and consequences of risks. This is particularly useful for an initial review or screening or when a quick assessment is required. Semi-quantitative analysis extends the qualitative analysis process by allocating numerical values to the descriptive scales. The numbers are then used to derive quantitative risk factors (Cooper, et al. 2007).

While the key benefit of quantitative risk analysis is that it quantifies overall project risk exposure, and it can also provide additional quantitative risk information to support risk response planning. This process is not required for every project, but where it is used, it is performed throughout the project (Project Management Institute 2017).

Risk analysis is the most tasking procedure in managing risk. This is due to the fact that it involves assessing the chances of the event of a risk and their outcomes on a project's objectives. Its main aim is to evaluate risk by separating the unnecessary events, the chances of the unwanted event happening, and the size of such events meaning that it is the transitional process between identifying risk and its management. It includes uncertainty in a qualitative and quantitative manner to evaluate the potential effects of risk. The evaluation should largely focus on risks that have high chances or effects (Bahamid and Doh 2017). The following techniques are used for risk analysis in developing countries.

- Risk Matrix: Risk classification into a limited number of categories
- Monte Carlo simulation: Aggregate the combined effects resulted from uncertain parameters; precise experimental statistical data; computationally expensive
- Analytic Hierarchy Process (AHP): Risks events are ranked based on pairwise comparisons. Limited to a few numbers of pairwise comparisons
- Fuzzy logic assessment: Useful where probabilistic data are absent. Not as precise as probabilistic methods
- Failure modes and effects analysis (FMEA): Identify critical risk events. Only quantify one consequence in a particular time
- Expected Monetary Value Analysis: This looks at the likelihood part of the system states and is based on a gain matrix

- Expert judgment: Based on the advice of a professional to analyze the failure rate and chances of success of the total project

2.4.2.4. Plan Risk Responses

Plan Risk Responses is the last risk process in the planning process group. In it we detail responses to the risks that we have determined require a response. We use all the data assembled in the risk register to select an appropriate risk response strategy for each risk we have identified. These risk responses have a wide ranging impact on the project plan, affecting contracts, cost estimates for specific work breakdown structure elements, duration estimates and staffing patterns (Billows 2011).

Risk response techniques are:

- Risk-retention: Involves considering that a particular risk situation exists and making conscious steps to accept the level of risk, without engaging in any special efforts to control it.
- Risk reduction: An approach adopted to bring the probability of occurrence of risks and their effects below an acceptable threshold.
- Risk sharing: Principally obtained through a contractual mechanism to develop a sense of collective responsibility among the project stakeholders.
- Risk control: Does not seek to stop the source of the risk completely, but takes steps to reduce the risk present
- Risk avoidance: A refusal to accept the action taken or risk, to ensure that the risk is not going to continue.
- Risk transfer: Shifts and changes, along with ownership, from one party to another third party, without changing the total amount of risk or reducing how crucial the risk sources are (Project Management Institute 2017).

2.4.2.5. Implement Risk Responses

Risk response control is the process of keeping track of the identified risks, monitoring residual risks and identifying new risks, ensuring the execution of risk plans, and evaluating the plans' effectiveness in reducing risk. It is the process by which risks are kept in the forefront of management discussions and, therefore, reviewed on a periodic basis. The project organization must maintain a readiness to respond to risk that includes ways to

minimize threats and maximize opportunities. Integrated risk management requires that we identify the ability and capacity to treat risks (Goncalves and Heda 2014).

2.4.2.6. Monitor Risks

An effective project monitoring and controlling system is fundamentally important in project-based organizations. A project monitoring and control system focuses on minimizing deviations from project plans, identifying and reporting the status of the project, comparing it with the plan, analyzing the deviations, and implementing the appropriate corrective actions. An effective system should clearly define the monitoring policy and the intervention and control policy (prevent, intervene and correct) (Toth and Sebestyen 2015).

The key benefit of this process is that it enables project decisions to be based on current information about overall project risk exposure and individual project risks. This process is performed throughout the project. Audits, meetings, and data analysis of technical performance and reserves can be used (Project Management Institute 2017).

The risk management cycle, as shown in Figure 3, is a continuous process that can be broadly summarized as a process involving risk identification, risk assessment and making decisions on the necessary course of action on how to deal with these risks.

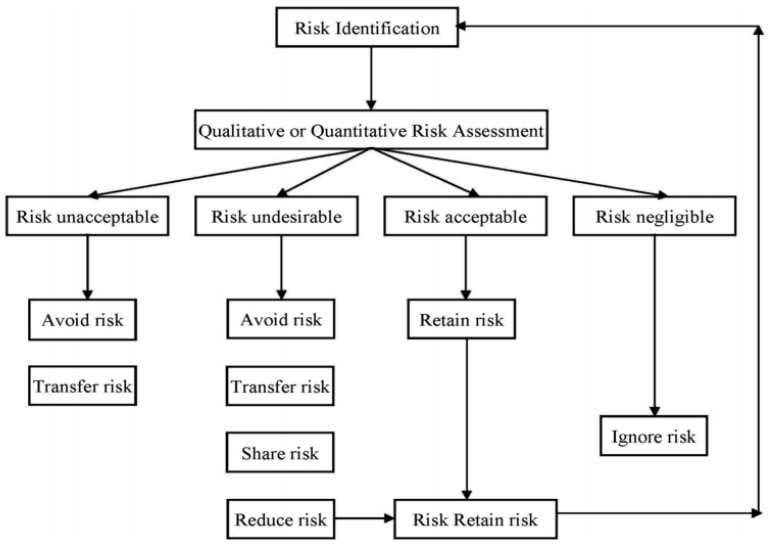

Figure 3 Risk management cycle (Odimabo and Oduoza 2013)

2.4.3. Risks in Construction

It is common knowledge that risk means the likelihood of a specific event or circumstance combined with the consequences that will follow when this event eventuates. In most cases, it is something which the parties do not expect to occur either deliberately or innocently. It depends on the particular case whether the parties have made allowance for risk or not. It is imperative for any contract for the execution of works to deal with risk. The options are manifold. The parties may ignore the risk, or they may make allowances for it. However, in any case, the risk must be allocated to the parties. Allocation of risk may be implicit or express. Entering into a construction contract usually means to assume the risk, which one is either a matter of law or a matter of fact. If the contract itself does not contain any risk apportionment rules, the law will be decisive. Thus a legal and contractual risk assessment is strongly recommended (Jaeger and Ho¨k 2010).

Risk is perhaps the most intractable variable in the building process. Players in the project do their best to manage, reduce, or transfer their exposure to liability as the project unfolds. Key risk considerations include the following:

- *For the owner:* Can the project accomplish its goals within the constraints of time and budget? Does the owner have the capability to understand the project and support the decisions necessary to complete it?

- *For the architect and the architect's consultants*: Can the project be accomplished within the standard of care at an acceptable level of quality, within the owner's parameters, the architect's own capabilities and skill, and the strictures of the fee?

- *For the contractor and the contractor's subcontractors:* Is it possible to complete the project within a contractually stipulated time frame and/or cost, given market conditions, availability of subcontractors, and the contractor's experience and capabilities? (The American Institute of Architects 2014).

As a party enters into contractual obligations freely, it accepts certain risks that are allocated to it and promises to bear these risks if and when they eventuate. In this way, the contracting parties can plan ahead with calculable certainty their schemes and arrange their business affairs (N. G. Bunni 2003).

Risks in construction have been identified and classified by different authors. Odimabo & Oduoza, (2013) classified construction risks under broad categories as shown in Table 2 below.

Table 2 Risks in construction

Physical risks • Occurrence of accident because of poor safety procedures • Supplies of defective materials • Varied labor and equipment productivity	***Environmental risks*** • Environmental factors (flood, earthquake, etc.) • Difficulty to access the site (very far, settlements) • Adverse weather conditions
Construction risks • Rush bidding • Gaps between the implementation and the specification due to misunderstanding and specification • Undocumented change orders • Lower work quality in presence of time constraints • Design changes • Actual quantities differ from the contract quantities	***Financial risks*** • Inflation • Delayed payment in contracts • Financial failure of the contractor • Unmanaged cash flow • Exchange rate fluctuation • Monopolizing of materials due to closure and other unexpected political conditions
Design risks • Defective design (incorrect) • Not coordinated design (structural, mechanical, electrical, etc.) • Inaccurate quantities • Lack of consistency between bill of quantities, drawings and specifications • Rush design • Awarding to unqualified designers	***Legal risks*** • Difficulty to get permit • Ambiguity to work legislations • Legal disputes during the construction phase among the parties of the contract • Delayed dispute resolutions • No specialized arbitrators to help settle fast
Logistics risks • Unavailable labor, materials and equipment • Undefined scope of working • High competition in bids • Inaccurate project program • Poor communication between the	***Management risks*** • Ambiguous planning due to project complexity • Resource management • Changes in management ways • Information unavailability(include

home and field officers (contractors side)	uncertainty) • Poor communication between involved parties
Political risks • Segmentation of construction process • Working at dangerous) areas • New governmental acts or legislations • Unstable security circumstances (invasion) closure	

Renuka, Umarani, & Kamal, (2014) differentiated risks as engineering risks and non-engineering risks based on the different sources of risks. Figure 4 represents this classification.

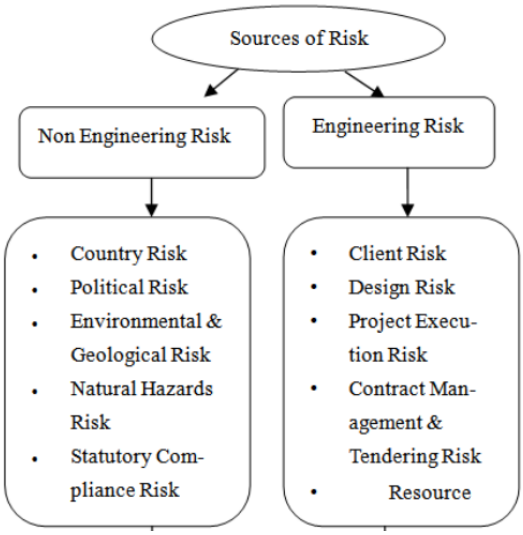

Figure 4 Sources of risk (Renuka, Umarani and Kamal 2014)

There are, however, specific risks that are beyond the capacity of a party to accept. In such circumstances, it would be better to name these risks and specify the method of dealing with and managing them.Bunni N. G., (2003) classified risks based on the chronological stages of a construction project. This classification is used in this research.

- **Risks Associated With the Feasibility Stage:** Risks in the feasibility stage include the client's choice of a professional team, choice of site, adequacy of surveys and inspection, client's brief to consultants, adequacy of soil investigation, and adequacy of finance and related calculations.

- **Risks Associated With the Design Stage:** One of the main responsibilities of consultants is to design the facility. Risks in the design stage include negligence and lack of care, lack of knowledge, inadequate checking and work control, failure to take account of foreseeable problems, inadequate performance of mechanical and electrical equipment, choice of contractor and nominated subcontractor, the form of contract conditions, inappropriate choice of design with respect to others and society, state of the art codes and technical knowledge, lack in communication, use of untested and unproven techniques, lack of safety precaution.

- **Risks Associated With the Post-Construction Stage:** Risks can occur during the defects liability period or afterward. These include risks associated with safety, fatigue, acts of God, risks associated with serviceability and resistance to natural and other hazards, wear and tear, risks of fitness for purpose, risks of project operation, human mistakes, and man-made hazards among others.

2.4.4. Potential Sources of Risk for the Consultant

As the scope of services is being defined in a proposal, the next step will be to assess the level of risk associated with that scope of services. This can inform the level of compensation required for the project. Riskier projects can require a higher level of compensation. Each project will have a unique set of circumstances related to the level of risk, but the following are a few examples to assess: (The American Institute of Architects 2014).

• *Client type*. Some clients are more demanding than others. Some argue about every invoice. Some cannot make up their minds about what they like and then change their minds. Some will be building a building for the very first time. These and many other characteristics of clients can have a dramatic effect on the number of person-hours spent on the project. Assess the client before submitting a fee proposal.

• *Type of project delivery.* The same project can have different levels of risk depending on how the construction is procured. A design-build project can be riskier than a traditional design-bid-build project, which may be riskier than a construction-manager-at-risk project.

• *Fast-track and other fast construction schedules.* Typically, any type of fast-track project schedule, no matter what type of construction method is used, is riskier than the traditional method of starting construction when the bid documents are complete. There are inherent risks associated with starting construction prior to the completion of bid documents. These

types of projects have a higher level of risk, and therefore should command compensation associated with that risk.

• *Construction cost responsibility.* The expected responsibility associated with delivering the project design within the owner's budget should be assessed and understood. This risk should drive the architect to be very careful in developing documents. They should be aware of the local construction market and should build into the documents a series of alternates or other techniques to see that the project is delivered on a budget so that an extensive redesign effort can be avoided.

• *Standard of care expectations.* The risk will be dramatically increased if a client or his attorney suggests contract language that alters or increases the standard of care, or if the contract contains an indemnification clause which does not link defects in services to negligence, to which it must go in order for the Professional Liability insurance to be in force.

• *Financial and payment.* Not being paid on time, or not at all, is obviously a significant risk. If a client is not forthcoming about his intentions for payment, then that should be discussed and understood prior to the submission of a proposal for services. Long time frames for payment can have a detrimental effect on the architect's ability to perform the work.

2.5. Insurance

The American Risk and Insurance Association has defined insurance as follows; Insurance is the pooling of fortuitous losses by transfer of such risks to insurers, who agree to indemnify insured's for such losses, to provide other pecuniary benefits on their occurrence, or to render services connected with the risk (E.Rejda 2008).

Article 654(2) of the Commercial Code of Ethiopia (1960) provides a legal definition of insurance policy as follows

"An insurance policy is a contract whereby a person, called the insurer, undertakes against payment of one or more premiums to pay to a person, called the beneficiary, a sum of money where a specified risk materializes" (Commercial code of Ethiopia, 1960).

Insurance is a risk transfer or risk-sharing response. It represents an after-the-event cost containment response to risk. Insurance is most important for low-probability/high-impact risks, such as destruction of assets or the payment of liability costs in circumstances where liability insurance is legally required, or catastrophic losses are possible. As well as repairing

assets, insurance is available for the cost of implementing disaster recovery plans and the business continuity plans (Hopkin 2017).

FIDIC presupposes that risk exists and should be covered by insurance, to the extent that is possible. However, insurance cover is only available for insurable risk, which is a risk depending on fortuity, which means that the event or circumstance has to be sudden and accidental and that comprehensive data for the purposes of premium calculation do exist. Obviously, some of the risks which are inherent to a construction contract do not depend on fortuity. It is then not insurable. Thus differing ground conditions and unusual climatic conditions which may have a critical impact on the successful completion of the works are dealt with separately. This type of risk is also referred to as speculative risk (Jaeger and Ho¨k 2010).

2.5.1. Principles of Insurance

The business of insurance aims to protect the economic value of assets or life of a person through a contract of insurance the insurer agrees to make good any loss on the insured property or loss of life (as the case may be) that may occur in course of time in consideration for a small premium to be paid by the insured. Apart from the above essentials of a valid contract, insurance contracts are subject to additional principles (The Institute of Chartered Accountants of India 2008). These are discussed as follows.

- Principle of Indemnity: The principle of indemnity states that the insurer agrees to pay no more than the actual amount of the loss: stated differently, the insured should not profit from a loss. Most property and casualty insurance contracts are contracts of indemnity. If a covered loss occurs, the insurer should not pay more than the actual amount of the loss.
- Principle of Insurable Interest: The principle of insurable interest states that the insured must be in a position to lose financially if a covered loss occurs
- Principle of Subrogation: The principle of subrogation strongly supports the principle of indemnity. Subrogation means substitution of the insurer in place of the insured for the purpose of claiming indemnity from a third person for a loss covered by insurance. Stated differently, the insurer is entitled to recover from a negligent third party any loss payments made to the insured.

- Principle of Utmost Good Faith: An insurance contract is based on the principle of utmost good faith- that is, a higher degree of honesty is imposed on both parties to an insurance contract than is imposed on parties to other contracts (E.Rejda 2008).

2.5.2. Types of Insurance Cover

The different types of insurance coverage that may be required by an organization are set out in Table 3. Generally speaking; the reasons for buying insurance are as follows: mandatory legal and contractual obligations; balance sheet/profit and loss protection; and employee benefit/protection of employee assets.

Table 3 Different types of insurance covers (Hopkin 2017)

Mandatory, legal and contractual obligations • Employer's liability-compensation to employees injured at works • Public liability- compensation to public or customers • Motor third party- compensation following motor accident • Product liability-compensation for damage or injury • Professional indemnity-compensation to client for negligent advice
Balance sheet/ profit and loss protection • Business premises-damage to premises by adverse events • Business interruption-loss of profit and increase cost of working • Asset protection- losses, such as loss of cash, goods in transit, credit risk and fidelity guarantee(staff dishonesty) • Motor accidental damage-repair of own vehicles • Terrorism-compensation for damage caused by terrorism • Loss of key person-compensation on loss of key staff member
Employee benefit/protection of employee assets • Life and death- benefits to employees that can include: life cover, critical illness cover, income protection, private medical costs, permanent health cover, personal accident and travel injury/losses • Directors' and officers' liability- legal and compensation costs

2.5.3. Insurance in Construction

Construction insurance encompasses all contracts of indemnity within the activities of the construction industry, where insurance is chosen as the medium through which liabilities are

shifted. It involves not only many branches of insurance but also many disciplines and profession (N. G. Bunni 2003).

Insurance is an option to risk response in some situations. Several risks can be insured, and most of the standard-form contracts insist on certain types of insurance. Standard insurable risks are items such as indemnity against third party claims for injury and insurance against fire. There are also opportunities to insure against loss of liquidated damages and other forms of consequential loss. The actual insurance needed for any particular project should be considered very carefully. Consultants will usually take out professional indemnity insurance, to cover themselves and their clients against the risk of failure to perform the duties with the requisite level of skill and care. (Hughes, Champion and Murdoch 2015)

Liability insurance is intended to provide protection to the insured party against specific legal liabilities to which he may become exposed as a result of activities culminating in bodily injury and/or damage to property. Generally, such liabilities arise as a result of negligence and a lack of care. These legal liabilities may be owed to employees (where employer's liability insurance would be necessary) or to third parties (in which case third party liability insurance would apply) (L. B. Bunni 2015).

Other insurances are also required to provide cover for the ordinary day-to-day business and other activities, but these are not dealt with here.

2.5.4. Professional Indemnity Insurance

Professional indemnity insurance (PII) is a form of liability insurance that helps protect professional advice- and service-providing individuals and companies from bearing the full cost of defending against a negligence claim made by a client, and damages awarded in such a civil lawsuit.

Professional indemnity insurance covers professionals, such as architects, engineers, and other consultants, and claims against them arising out of the professional services they provide. Typically the cover includes, and claims may arise from the services involved where they include: a breach of professional duty; negligence; bodily injury and property damage arising from service negligence; fraud/dishonesty other than a company director‘s dishonesty; infringement of intellectual property; breach of duty/confidentiality; defamation; and loss of documents (Gonfa 2016).

Professional indemnity insurance can protect firms against claims arising from breach of professional duty, negligent misstatement or misrepresentation, libel, slander or defamation, intellectual property rights infringement, breach of confidentiality, and employee dishonesty.

Professional liability insurance policies are claims-made policies, meaning that during the policy period, an insured entity is covered for claims made against it by a third party. Regardless of whether the insured entity is liable for malpractice prior to the policy effective date or within the policy period, as long as a third party makes claims against the insured during the policy period, the insurer must provide coverage to the insured. The insurance policy may also have a retroactive date, meaning the insurer may be liable to provide coverage for an incident that occurs prior to the policy period (Weng and Guo 2013).

A major difference between this type of policy and the others is that it is on a "claims made" basis, i.e. the insured is entitled to indemnity only if the policy was effective when the claim was made. Whether the policy was in place when the professional acted in breach of his duty or when the damage occurred is irrelevant. The other types of policies are on an "occurrence" basis, i.e. the insured is covered only if the insurance was in place when the damage or loss occurred. For this reason, underwriters of PI policies will normally pay more attention to the previous activities of the insured than with other types of policies (Ndekugri, Daeche and Zhou 2014).

2.6. Risk and Insurance: A Review of Conditions of Contract

In Ethiopia, the project delivery system in most construction projects the consultants are involved in is the traditional design bid build, whereas they used time-based contracts. The standard conditions of contracts used are the PPA 2011 ICB for services and FIDIC White book. Furthermore, PPA 2011 ICB for works and MDB FIDIC are contract forms that govern the relationship between the client and the contractor and also outline the roles and responsibilities of the consultant. Since this research is limited to local consultants, the applicable law is the Ethiopian law (Civil code). Therefore, the risks in consulting services arise from professional obligations stated in the contract (the contract signed with the client) and extra-contractual (from the applicable laws and standards). The liability for non-performance of its services is the main risk for a consulting firm.

According to Civil Code Art.1771, Effect of non-performance, the client has the right to require the enforcement of the contract if the consultant does not carry out its obligations.

Depending on the circumstances of the case, he may cancel the contract. The client can also require compensation for the damage caused by nonperformance of the contract by the consultant.

Similarly, FIDIC white book clause 6 (Liabilities) and clause 3.3 (Duty of Care and Exercise of Authority) states that the consultant shall only be liable to pay compensation to the Client arising out of or in connection with the Agreement if the consultant fails to exercise reasonable skill, care and diligence in the performance of his obligations under the Agreement.

Under PPA 2011 ICB for services Clause 19 Breach of Contract, it is stated that failure to discharge obligation under the specific contract by either party entitles the injured party to remedy; either to compensation/liquidated damages or termination of the contract. It further states that incase of administrative contracts the public body is entitled to deduct damages from any sums due to the Consultant or call on the appropriate guarantee.

Therefore risks in consulting firms can be summarized from the services the consultant provides as risks in feasibility study stages, design stages, construction, and post-construction stages.

2.6.1. Risks in Conducting Feasibility Studies

The Consultant has an obligation to conduct the necessary inspections to determine the feasibility of the project proposed by the client. PPA ICB works 2011 GCC clause 4.2 states that the consultant should inspect the operating environment and has advised the public body (client) of any aspect of the operating environment that is not suitable for the provision of the consultancy services and that the specified actions to remedy the unsuitable aspects of the operating environment, together with a timetable for and the costs of those actions, have been specified in the relevant parts of the contract for the pre-operational phase.

Failure to do so poses and is a potential liability risk to the consultant.

2.6.2. Risks in Design

The design obligation is a continuing duty up to practical completion. The consultant faces risk for his design with respect to the safety and welfare of the general public, the client and any person that might be affected due to negligence in design. The design should fulfill the requirements of the clients and fit for the intended purpose. The consultant is also liable for

design related communications with the contractor; he should be reasonable and follow standard of care in any modification and addition of design within acceptable time without causing unnecessary delay.

According to MDB FIDIC GCC clause 3.3, Instructions of the Engineer, the Engineer may issue to the contractor at any time instructions and additional or modified Drawings which may be necessary for the execution of the works and remedying of defects. GCC Clause 1.9, Delayed drawings and Instructions, failure of the Engineer to issue notified drawing or instruction within a time which is reasonable and is specified in the notice with supporting details, entitles the Contractor for an extension of time if completion is or will be delayed and/or payment of any such cost plus profit.

PPA ICB works 2011 GCC clause 30.3 states that within 30 days of signing of contract, the consultant shall provide the contractor with a copy of drawings prepared for the implementation of works.

Typical problems arising with designs that may provide a good cause of action against the consultant are if the design adopts out of date methods, the design is not in accordance with the employer's requirements, they do not comply with relevant laws/regulations, the design fails to work or the design involves specification of unsuitable materials. To this end, PPA ICB services 2011 GCC clause 43.3 the Consultant shall ensure that Consultancy Services conform to applicable environmental and quality standards, that no chemical or other product/equipment is used in such a way as to cause negative impact on the environment in general and occupational health hazards for the personnel of the Public Body in particular, and shall employ the most recent technology, safe and effective equipment, machinery, materials and methods, as necessary. The Consultant shall always act, in respect of any matter relating to this Contract, to safeguard the Public Body's legitimate interests, pursuant to Conditions of this Contract

2.6.3. Risks in Supervision and Construction Administration

During construction, the consultant acts as the client's agent. Therefore, his liability is to the client. However, the instructions communicated or delay of such to the contractor may entitle the contractor to claim remedial rights from the client. Since, the supervision of works affects the quality of the built structure; the consultant should exercise skillful supervision of

materials, plants and workmanship to achieve the required standard and safeguard from collapse and failure.

According to PPA ICB works 2011 GCC Clause 1, Definition, the Engineer is a person appointed by the public body to supervise and inspect works and to test and examine the materials employed and the quality of workmanship, including any representative of such person.

Risks in this stage include

- Delayed drawings and instructions (MDB FIDIC GCC clauses 1.9 and 3.3) and (PPA ICB works 2011 GCC clause 15, Modifications by Change Orders)
- Failure to assign suitably qualified Engineer (MDB FIDIC GCC Clause 3.1,Engineer's Duty and Authority)
- Failure to audit the Quality assurance system instituted by the contractor (MDB FIDIC GCC Clause 4.9,Quality assurance) and (PPA ICB works 2011 GCC clause 37, Control and supervision works)
- Failure to inspect any work that is ready and before it is covered up, put out of sight, or packaged for storage or transport or delay of such inspection(MDB FIDIC GCC Clause 7.3,Inspection) and (PPA ICB works 2011 GCC clause 81.2,Inspection and Testing)
- Failure to vary the location or details of specified tests or instruct the contractor to carry out additional tests (MDB FIDIC GCC Clause 7.4,Testing)
- Failure to reject, as a result of an examination, inspection, measurement or testing, any plant, materials or workmanship which is found to be defective or otherwise not in accordance with the contract. (MDB FIDIC GCC Clause 7.5,Rejection)
- Failure to instruct the contractor to remove from the site and replace any plant or material which is not in accordance with the contract, to remove and re-execute any other work which is not in accordance with the contract, to execute any work which is urgently required for the safety of works(MDB FIDIC GCC Clause 7.6,Remedial work)

The consultant also acts as an independent professional when administering the contract during the construction stage. The risks in contract administration include

- Unreasonable withholding or delay in approvals, certificates, consents and determinations and failure to communicate in writing (MDB FIDIC 2006 GCC sub clause 1.3, Communications)
- Failure to give necessary clarification or instruction in case of ambiguity or discrepancy found in documents (MDB FIDIC sub clause 1.5, Priority of documents)
- Failure to obtain prior approval of the client in cases of agreeing or determining an extension of time and/or additional cost, instructing variations, approving a proposal for variation and specifying the amount a payable in each of the applicable currencies (MDB FIDIC sub clause 3.1,Engineers Duties and Authority, with 4.12 Unforeseeable physical conditions,13.1,Right to vary,13.2Value Engineering,13.4,Payment in applicable currencies,) with the exception of emergency occurrence affecting safety.
- Failure to fairly determine any matter raised between the client and contractor (MDB FIDIC sub clause 3.5,Determinations, with 2.5 Employer's claims,20.1,Contractor's claims)
- Failure to instruct the contractor to commence the works within 180 days from the contractor's receipt of Letter of Acceptance (MDB FIDIC sub clause 8.,Commencement of works)
- Inappropriate and/or delayed measurement and evaluation of works executed(MDB FIDIC sub clause 12.3 Evaluation with 12.1,works to be measurement,12.2 method of measurement)
- Unreasonable withholding or delay in certification of payments (MDB FIDIC Clause 14,Contract price and Payment) and (PPA ICB works 2011 GCC clause 64 Interim payment,65,Final statement of account)
- Unreasonable withholding or delay in issuing Taking over certificates(MDB FIDIC sub clause 10.1,Taking over of the works and sections) and (PPA ICB works 2011 GCC clause 84-89)
- Failure to return program for implementation of tasks submitted by the contractor within ten days of receipt (PPA ICB works 2011 GCC clause 41,Program of Implementation of tasks)
- Failure to approve and properly inspect contractor's drawings (PPA ICB works 2011 GCC clause 42, Contractor's drawings)

2.6.4. Risks after Construction Completion

Even if the construction of a project is completed, the risks of the consultant extend to a time duration specified in the contract. According to PPA ICB works 2011 GCC clause 47.5 s the consultant shall remain responsible for any breach of its obligations under the contract for such period after the consultancy services have been performed as may be determined by the law governing the contract.

2.6.5. Other Risks

Consultants have risk in negligence or/and misconduct. There are a vast number of situations including design, supervision and contract administration in which the consultant can commit a wrongful act either due to negligence or willful misconduct.

According to PPA ICB for services GCC clause 5, Fraud and Corruption, sub clause 5.2, if the Public Body determines that the Consultant and/or its Personnel, sub-contractors, sub-consultants, services providers and suppliers has engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices, in competing for or in executing the Contract, then the Public Body may, after giving 14 days' notice to the Consultant, terminate the Consultant's employment under the Contract. Sub clause 5.5 and 5.6 further state that The Agency(PPPA) will debar a Consultant from participation in public procurement for a specified period of time if it at any time determines that the Consultant has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract. Sub clause 5.6 states the agency has also the right to declare that such a Consultant is ineligible, for a stated period of time, to be awarded a Government funded contract.

As such fraud and corruption by the consultant is an illegal act and will lead to debarment (revocation of license) or ineligibility for a certain period of time to participate in contracts. Legally, the personnel or consultant may be judged according to criminal law and this may lead to loss of life, loss of liberty or loss of property.

The consultant shall also follow the Engineering Ethics and code of conduct. As stated in sub clause 45.1 of PPA ICB for services 2011 the Consultant shall, at all times, act loyally and impartially and as a faithful adviser to the Public Body in accordance with the rules and/or code of conduct of its profession as well as with appropriate discretion.

Article 2033,Abuse of powers(2), states that a public servant commits an offence where he turns to his own advantage or to the advantage of another individual, powers conferred upon

him in the public interest by his office. It is difficult to proof such actions and even the contractors or the clients are unwilling to expose such activities because of fear of negative impacts on the construction project or on their firms.

2.6.6. Insurance

According to FIDIC GCC for services 2006 clause 7.1 and 7.2, if required by the client in writing, the consultant shall provide insurance against his liability to cover

- Scope of services
- Against public or third party liability
- Loss or damage of the clients property under use by the consultant and
- Any liability that arise out of the use of the property

The consultant is also required to insure, increase or vary any insurance required by the client after signing of contract. However such costs are to be covered by the client**.** In Ethiopia, according to PPA ICB for services 2011 GCC Clause 48, the consultant is required

- To provide medical insurance for itself, its employees.
- Similar to FIDIC, it is expected to insure loss or damage to the client's equipment used to perform the contract. Insurance is also required against
- Civil liability in case of accident to third party or the client's employee
- Accidental death or permanent disability resulting from bodily injury incurred in connection with the Contract (FPPA 2011).

The main difference in the requirement of insurance is that in FIDIC it specifically requires the consultant to provide insurance that covers the scope of services (professional indemnity insurance) in the general conditions of contract whereas in PPA it has to be specified in the specific conditions of contract and may or may not be required depending on the project (decision of the client).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Research Area

The study was conducted in Addis Ababa, the capital and economic centre of Ethiopia. Addis Ababa lies at an average elevation of 2,200 meters (7,200 ft.) and is a grassland biome; located at 9°1′48″N 38°44′24″E. Addis Ababa has a total population of 2,739,551 urban and rural inhabitants (Wikipedia 2020).

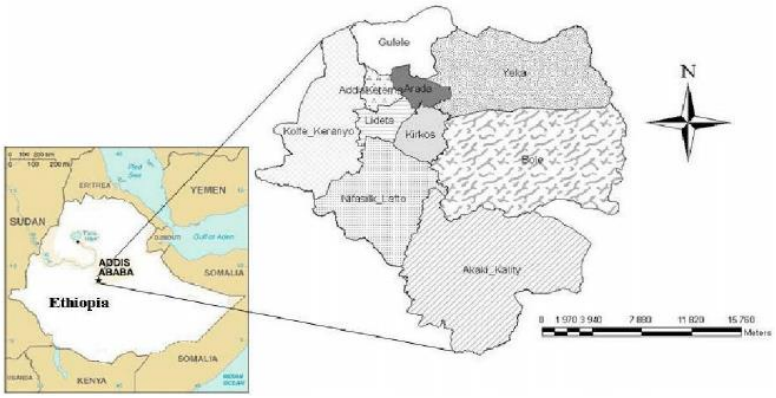

Figure 5 Map of Addis Ababa (Addis Ababa City Government 2020)

3.2. Research Design

This research is a qualitative descriptive research. The first step in conducting this research was to make an in-depth literature review of textbooks, research papers, journals, magazines and other sources. Then, review of contract documents was done. Questionnaire was prepared based on documents' review and literature review and distributed to consultants. Microsoft Excel and SPSS software were used to analyze the results of the questionnaire.

3.3. Study Variables

Dependent variable: Risks in construction consultancy services

Independent variable: Local conditions of contract**,** Project delivery system, Liability of consultants, Risk management practice, Professional indemnity insurance

3.4. Population and Sampling Method

The population for the research is the construction consultants based in Addis Ababa. There are six classes of consultants, i.e., Class 1-6.This research was comprised of consultants from

class 1-3, excluding specialized and highway and bridge consultants. Stratified sampling was used to select the consulting firms. There are three sample determination stages (Cohen, Manion and Morrison 2007).

Stage 1 – Identify characteristics that appear in the wider population, which must also appear in the sample; divide the wider population into homogeneous and discrete groups (strata).

The total population is 100 (see Appendix 3); which is divided into three strata based on the class level the consultants are registered at (classes I, II and III).

Stage 2 – Identify the proportions in which the selected characteristics appear in the wider population, expressed as a percentage.

The total number of construction consultants is 100. Population strata and percentage distribution in each class is

Class 1=46/100*100=46%

Class 2=9/100*100=9%

Class 3=45/100*100=45%

Stage 3 – Ensure that the percentage proportions of the characteristics selected from the wider population appear in the sample

The following formula is used to determine sample size (Getachew 2018).

$$n^{\circ} = \frac{z^2 p(1-p)N}{z^2 p(1-p)+Ne^2} \text{ ... ...Equation 1}$$

Where:

n^{o}= sample size;

z = confidence interval corresponding to a level of confidence;

p = population proportion;

N = population size; and,

e = precision or error limit.

Picking a confidence level of 90% (z becomes 1.645), p = 50% (percentage choice expressed as a decimal), e = 10% and with N being 100, the sample size for consultants becomes;

$$n^{\circ} = \frac{(1.645)^2 0.5(1-0.5) * 100}{(1.645)^2 0.5(1-0.5) + 100 * 0.1^2} = 40.35$$

Making corrections for finite sample size;

$$Ss(new) = \frac{Sample\ size}{1+(sample\ size/population\ size)} \text{ ... ...Equation 2}$$

$$Ss(new) = \frac{40.35}{1+(40.35/100)} = 28.74 \approx 29 \text{ consultants}$$

The sample of responding consultants in each class becomes

Class 1=46%*29=13.34≈13

Class 2=9%*29=2.61≈3

Class 3=45%*29=13.05≈13

Random sampling was used to select the responding consultants.

3.5. Sources of Data

3.5.1. Primary data

Primary data was collected using questionnaires. It was used to gather data regarding the risk management and professional indemnity insurance practices of local consultants.

3.5.2. Secondary data

Literature review was used to gather secondary data. Various publications, including books, reports, journal articles, and previous researches, were thoroughly examined.

3.6. Data Collection Procedure

Various secondary data were collected from different sources to conduct a literature review, and information relating to statistics such as the number of registered consultants in Addis Ababa was obtained from the Ministry of Works and Urban Development. Distribution and collection of questionnaires was done in person, using trained data collectors.

3.7. Data Presentation and Analysis

The descriptive statistics approach method was used to analyze the data. The data collected through questionnaires were compiled and analyzed using Microsoft Excel and SPSS software.

The questionnaire was prepared to ask respondents to rank the listed types of risk according to their probability of occurrence and their impact on project goals (time, cost, and quality). This was done using a 3-point Likert scale for the feasibility stage, design and bidding, construction and construction administration and post construction phases.

The Likert scale point system where: '1' stands for 'low', '2'stands for 'medium', and '3' stands for 'high''. The mean score of these responses was used to rank the most probable and high impact risks and create a risk matrix.

Creating a Risk matrix as a tool for analysis and risk assessment requires establishing criteria for estimating probabilities and consequences. The risk matrix can be created by the multiplication of the individual levels assigned to the probability and consequence as shown in Table 4. (Paciova 2018)

Table 4 Risk matrix tool (Paciova 2018)

Probability	Consequence		
	Negligible	Serious	Very serious
Low	1	2	3
Medium	2	4	6
High	3	6	9

Based on these responses a risk probability-impact matrix is presented. Risk is calculated as a product of the mean of the responses given. The allocated values of the products are as follows: 0.1-1 = 'Minimum', 1.1-2 = 'Low', 2.1-3 = 'Medium-low', 3.1-4 = 'Moderate', 4.1-6 = 'High', 6.1-9 = 'Extreme' (Evans, et al. 2017)

Risk	0.1-1	1.1-2	2.1-3	3.1-4	4.1-6	6.1-9
	Minimum	Low	Medium-low	Moderate	High	Extreme

Risk= Risk probability mean score x Risk impact mean score

The results are presented in percentages, charts, tables, and graphs. Detailed description and explanation of each result are done to quantitatively and qualitatively to analyze the data.

CHAPTER FOUR

RESULTS AND DISCUSSION

The data collected in this research has been analyzed and presented in this chapter. A total of 38 questionnaires were distributed to 19 Class-1, 4 Class-2, and 15 Class-3 consultants centered in Addis Ababa. Out of the 38, 31 were returned. 5 were rejected because they were incomplete.26 completed questionnaires are used in the analysis of this research with a response rate of 89.7%.

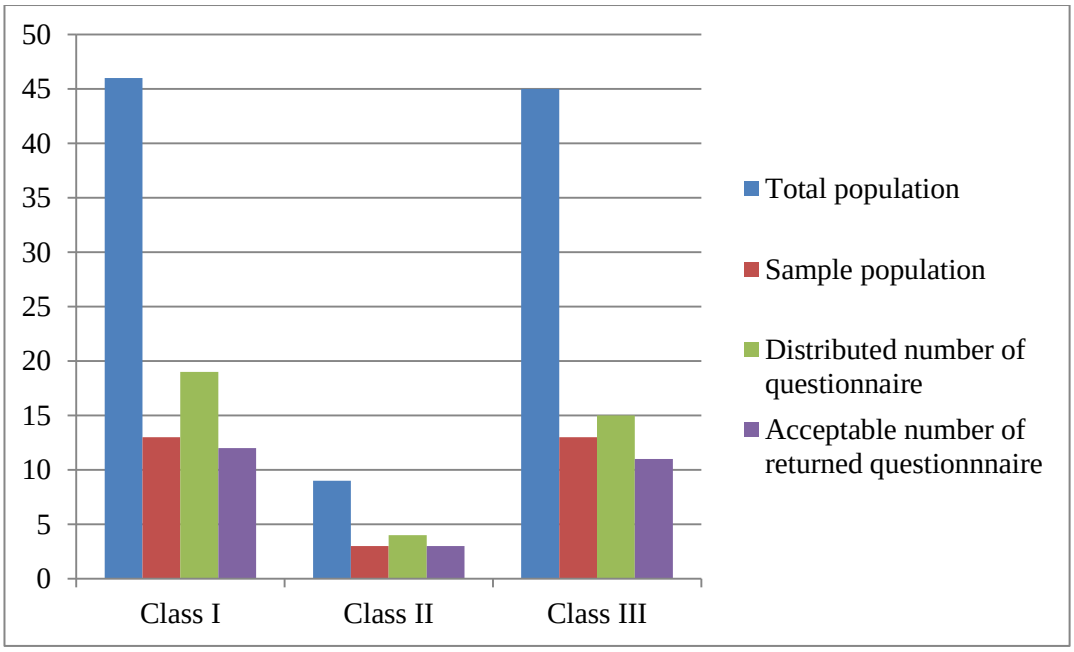

Figure 6 Class of consultants in the study

The majority of the respondents were Bachelor's degree holders (40%) and Master's degree (60%) holders. They held professional job positions of construction site supervisors, design department heads, Project managers of their respective firms, and office Engineers. This ensures that the respondents have practical experience in the field and reliable conclusions can be made based on their responses.

As shown in Figure 7 below, 32% of the respondents had less than 5 years of experience in the industry, while 20% had more than 20 years of experience. Table 9 shows the respondents' experience in the construction industry. After all, the respondents' experience or lack thereof would highly affect the output of this research because respondents with experience will give answers that reflect the current situation of the industry whereas, a sample of respondents containing an only freshly graduated person who might give answers based on theoretical assumptions only will bias the output of the research.

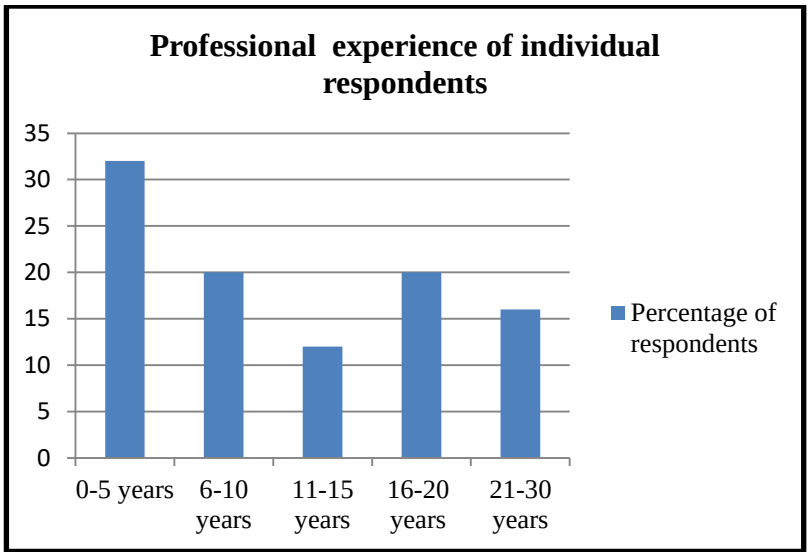

Figure 7 Professional experience of individual respondents

The majority, 92%, of the firms the respondents worked at had less than 15 years of experience in the construction industry. Only 8% had more than 16 years of experience.

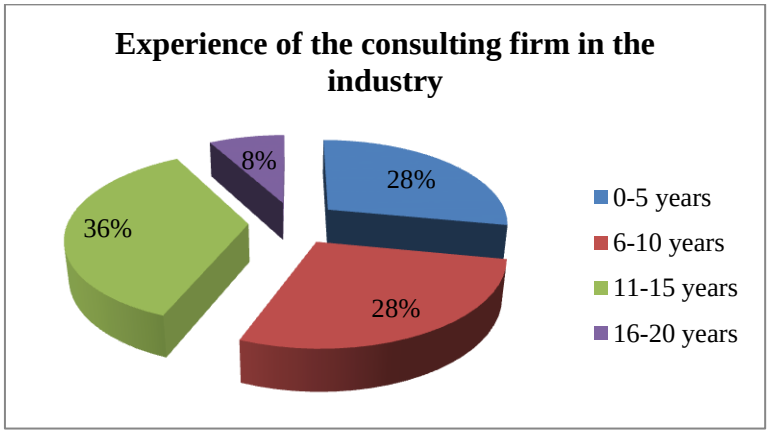

Figure 8 Experience of the consulting firm in the industry

The majority of (92%) of the respondents undertake building construction projects. The remaining 8% are engaged in building projects as well as construction management, and consulting (advice provision) services.

4.1. Risks in the Phases of a Construction Project

4.1.1. Risks in the Feasibility Stage

Any construction project begins when the client comes up with the idea to construct a certain facility. It therefore hires the consultants to conduct feasibility studies to assure the constructability and identify obstacles that may hinder the success of the project. In conducting these investigations the consultancy firm faces different risks. These risks are

tabulated below based on the mean rankings of respondents. Risks relating to making finance and related calculations have the highest probability of occurrence (mean ranking of 2.52) while risks relating to owner are brief to the consulting team ranked least probable (mean ranking of 2). On the other hand, the risks relating to the owner's brief to the professional team and inadequacy in conducting soil investigations, surveys and inspections were identified to have the highest impact (mean ranking of 2.56) on fulfilling project goals. The risk magnitude of each risk was calculated as the product of mean values of probability of occurrence and impact on project goals as shown in Table 5. Accordingly, risks relating to adequacy of finance and related calculations resulted in the highest magnitude of 5.85 whereas adequacy of soil investigations resulted in a relatively smaller risk magnitude of 5.

Table 5 Risks in the feasibility stage

Risks in the feasibility stages	Probability of occurrence		Impact on project goals		Calculated Risk Magnitude
	Mean	Std. Deviation	Mean	Std. Deviation	=Probability*Impact
Adequacy of finance and related calculations	2.52	0.714	2.32	0.627	5.85
Adequacy of soil investigations	2.20	0.816	2.28	0.843	5.0
Adequacy of surveys and inspections	2.16	0.800	2.56	0.768	5.53
Choice of site	2.08	0.759	2.52	0.714	5.24
Owner's brief to the professional team	2.00	0.764	2.56	0.712	5.12

As presented in the risk matrix in Table 6 all the risks in the feasibility stage are categorized under high risks because most of these risks have a higher probability of occurrence and medium impact on project goals; with the exception of risks relating to adequacy of finance and related calculations which has a higher impact but a medium probability of occurrence. The consultant is an agent of the client during this stage. The basis for the whole project is laid down when the client briefs the consultant on of the project goals and expected outcome. Ambiguous and unclear descriptions of the client's intentions lead to longer design time and repeated redesigns. The choice of site or provision of assistance to the client in selection,

conducting surveys, inspections and soil investigations ultimately affect design decisions, therefore any error or inadequacy of such is a high risk for the consultant. The consultant also performs finance and related calculations to determine the project budget and feasibility, inadequacy in doing so will result in over or under budget allocation by the client which usually leads to cost overruns. Since the consultant is employed by the client, and cost deficiency of the client will result in delayed payments to itself and the contractor.

Table 6 Feasibility stage risk matrix

	Impact of risk			
		Low	Medium	High
Probability of risk occurrence	Low			
	Medium			• Adequacy of surveys and inspections • Choice of site • Owner's brief to the professional team • Adequacy of soil investigations
	High		• Adequacy of finance and related calculations	

Risk	0.1-1	1.1-2	2.1-3	3.1-4	4.1-6	6.1-9
	Minimum	Low	Medium-low	Moderate	High	Extreme

4.1.2. Risks in the Design and Bidding Stage

Risks in the design and bidding stage are one of the most common areas where consultants are more susceptible to. Lack of safety precautions, negligence and lack of care, inadequate checking and works carried out in haste were identified as risks that are most likely to occur with mean probability of occurrences of 2.32, 2.12 and 2.04 respectively. Inadequate performance mechanical and electrical equipment was least likely to occur with a score of 1.56. Negligence and lack of care (mean impact value=2.72), lack of safety precautions

(mean impact value=2.64) and lack of knowledge (mean impact value=2.52), were found to have the highest impact on the outcomes of a project. Inadequate performance of mechanical and electrical equipment was also found to have the least impact on project goals with mean impact value of 1.84.

Table 7 Risks in the design and bidding stage

Risks in the design and bidding stage	**Probability of occurrence**		**Impact on project goals**		**Calculated Risk Magnitude**
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**	**=Probability *Impact**
Lack of safety precautions	2.32	0.69	2.64	0.49	6.12
Negligence and lack of care	2.12	0.971	2.72	0.614	5.77
Lack of knowledge	1.92	0.862	2.52	0.714	4.84
Inadequate checking and work carried out in haste	2.04	0.735	2.36	0.81	4.81
Choice of contractor and nominated subcontractor	2	0.764	2.2	0.816	4.4
Form of contract conditions	1.84	0.746	2.32	0.802	4.27
Use of untested and unproven techniques	1.84	0.85	2.32	0.69	4.27
Failure to take account of foreseeable problems	1.96	0.79	2.16	0.85	4.23
Inappropriate choice of design with respect to others or society	1.84	0.898	2.2	0.913	4.05
State of the art, codes and technical knowledge	1.76	0.779	2.24	0.723	3.94
Lack in communication	1.76	0.663	2.08	0.862	3.66
Inadequate performance of mechanical and electrical equipment	1.56	0.768	1.84	0.898	2.87

With a risk magnitude of 6.12, lack of safety precautions poses a great risk to consulting firms. Safety is one of the common risk areas that are given little attention in construction. The consultant should pay special attention during design to take the necessary safety precautions and make sure the design fulfills all safety requirements because failure in design of a certain facility will cost not only the consultant but also the client, the contractor and the general public (end product users) and in some cases may cost lives.

Most risks in this stage are in the high category including negligence and lack of care, inadequate checking and work carried out in haste, and lack of knowledge which occur due to poor performances of employees. These can happen during both design and bidding stages. Errors as a result of any of the above cases can affect the evaluation of the contractor and may lead to conflicts and disputes during the construction stage. On the other hand, risks due to inadequate performance of mechanical and electrical equipment such as computers and others that are used during these stages may happen frequently, and since the consultant continually repairs or maintains these failures, the impact on project goals is lower and is categorized under the medium-low category.

Risks due to failing to follow state of the art codes and technical knowledge may occur if the consultant uses obsolete and outdated design and specification that is below the accepted norm among other consultants, which has both a medium probability of occurrence and impact and was therefore a moderate risk. Other risks in this category are lack in communication and inappropriate choice of design with respect to others or society, which can be attributed to poor management decisions. Table 8 shows the risk matrix for this stage.

Table 8 Design and bidding stage risk matrix

		Impact of risk		
		Low	Medium	High
Probability	Low			
	Medium		• Inappropriate choice of design with respect to others or society • Lack in	• Negligence and lack of care • Lack of knowledge • Use of untested and unproven techniques

of risk occurrence			communication • State of the art, codes and technical knowledge	
	High	• Inadequate performance of mechanical and electrical equipment	• Inadequate checking and work carried out in haste • Failure to take account of foreseeable problems • Choice of contractor and nominated subcontractor • Form of contract conditions	• Lack of safety precautions

Risk	0.1-1	1.1-2	2.1-3	3.1-4	4.1-6	6.1-9
	Minimum	Low	Medium-low	Moderate	High	Extreme

4.1.3. Risks in the Construction Stage

The list of risks the consultant is exposed to in the construction stage is longer because this stage involves different stakeholders, including the contractor, the client, the general public, and others. Therefore, the consultant has to deal with each party. It is contractually obligated to the client while it is liable to other parties extra contractually (in tort) as a professional. Variations from contract documents, fraud, and infidelity, inadequate site supervision, and inadequate site management of contractors are risks that are highly likely to occur ranking an average of 2.32, 2.24, 2.2 and 2.16. Defective material and workmanship (mean ranking=2.44), conflicts leading to disputes mean ranking=2.44), negligence, and lack of care mean ranking=2.36), variations from contract documents (mean ranking=2.36) are also risks with the highest impact on project goals.

Table 9 Risks in the construction stage

Risks in the construction stage	Probability of occurrence		Impact on project goals		Calculated Risk Magnitude
	Mean	Std. Deviation	Mean	Std. Deviation	=Probability *Impact
Variations from contract documents	2.32	0.748	2.36	0.7	5.48
Inadequate site supervision	2.2	0.764	2.32	0.802	5.1
Fraud and infidelity	2.24	0.779	2.16	0.8	4.84
Negligence and lack of care	2	0.764	2.36	0.757	4.72
Inadequate site management of contractors	2.16	0.624	2.16	0.624	4.67
Programme of work	2.08	0.759	2.12	0.726	4.41
Payment certification	2.04	0.79	2.16	0.746	4.41
Work approval and acceptance	2	0.866	2.2	0.764	4.4
Defective material and workmanship	1.8	0.816	2.44	0.768	4.39
Technical complexity and innovation in design requiring new methods of construction and/or erection	2.08	0.812	2.04	0.735	4.24
Incompetence	1.96	0.735	2.12	0.726	4.16
Inefficiency and delays	2.04	0.841	2.04	0.79	4.16
Acts of man	1.92	0.759	2.12	0.927	4.07
Conflict leading to disputes	1.6	0.707	2.44	0.712	3.9
Malicious act	1.64	0.757	2	0.866	3.28
Dangerous substances and items during construction and/or commissioning	1.52	0.823	2.08	0.862	3.16
Preparation of progress reports	1.92	0.759	1.6	0.707	3.07
Approval of removal of support	1.56	0.712	1.96	0.79	3.06
Acts of God	1.36	0.569	1.84	0.898	2.5
Strike	1.28	0.614	1.88	0.881	2.41

Risks in the construction stage vary from medium-low to moderate. Acts of God such as earthquakes, heavy rainfall, and landslides have low probability of occurrence but higher impact and are medium-low risks to the consultant even if they may have greater impact on the contractor (the constructing entity). The consultant has the obligation of supervising the project and follows up the works of the contractor, perform inspections, give approvals, check and certify payments. Fraud and infidelity, incompetence, negligence and lack of care are common in performing these responsibilities pose high risks. Risks such as preparation of progress reports to the client are categorized under moderate risks.

Table 10 Construction stage risk matrix

	Impact of risk			
		Low	Medium	High
Probability of risk occurrence	Low			• Acts of God • Strike
	Medium		• Acts of man • Dangerous substances and items during construction and/or commissioning • Approval of removal of support • Preparation of progress reports • Malicious act • Conflict leading to disputes	• Defective material and workmanship • Negligence and lack of care • Programme of work • Incompetence • Inefficiency and delays • Payment certification • Work approval and acceptance
	High		• Technical complexity and innovation in design requiring new methods of construction and/or erection • Inadequate site management of	

			contractors • Fraud and infidelity • Inadequate site supervision • Variations from contract documents	

Risk	0.1-1	1.1-2	2.1-3	3.1-4	4.1-6	6.1-9
	Minimum	Low	Medium-low	Moderate	High	Extreme

4.1.4. Risks in the Post Construction Stage

Risks in the post-construction stage are not as likely to occur as risks in the previous stages. However, they have a great impact on the utilization and operation of the constructed facility. With this regard, risks associated with safety were rated to occur more likely and have a greater impact than other risks in this category (mean ranking=1.84). Risks associated with resistance to natural and other hazards are least likely to occur (mean ranking=1.56), and risks associated with project operation (mean ranking=2.08), had relatively less impact on the consultant.

Table 11 Risks in the post-construction stage

Risks in the post-construction stage	Probability of occurrence		Impact on project goals		Calculated Risk Magnitude
	Mean	Std. Deviation	Mean	Std. Deviation	=Probability*Impact
Risks associated with safety	1.84	0.898	2.4	0.764	4.42
Risks associated with fitness for purpose	1.76	0.879	2.4	0.707	4.22
Risks associated with project operation	1.72	0.792	2.08	0.759	3.58
Risks associated with serviceability	1.6	0.764	2.16	0.8	3.46
Risks associated with resistance to natural and other hazards	1.56	0.651	2.2	0.764	3.43

The risks of construction for the consulting firm are still present even if the construction of a project is completed and the consultant has issued a completion certificate. These risks vary

from moderate to high risks. Once again, risks associated with safety are a major concern along with risks associated with fitness for purpose. Their probability of occurrence may be medium but their impact is higher, after all, constructing a facility that is unsafe or unfit for its intended purpose is an absolute waste of resources. In rare cases, risks associated with serviceability, risks associated with resistance to natural and other hazards and risks associated with project operation may occur and these risks are categorized under moderate risks.

Table 12 Post construction stage risk matrix

	Impact of risk			
		Low	Medium	High
Probability of risk occurrence	Low			
	Medium		• Risks associated with serviceability • Risks associated with resistance to natural and other hazards • Risks associated with project operation	• Risks associated with safety • Risks associated with fitness for purpose
	High			

Risk	0.1-1	1.1-2	2.1-3	3.1-4	4.1-6	6.1-9
	Minimum	Low	Medium-low	Moderate	High	Extreme

4.2. Current Risk Management Systems Implemented By Construction Consultants in Ethiopia

To assess current risk management systems implemented by construction consultants in Ethiopia. To this end, consultants were asked to answer whether they had a formal risk management plan in place. The survey showed that 53.8% of the respondents stated having formal risk management plan in place.

Among the reasons for not having a formal risk management plan in place were given

- The consulting firm was just at the entry-level into the industry, and they did not consider it a priority

In cases where the firms had formal risk management in a plan, they were asked to identify the person in charge of risk management. The most common replies indicated they used Risk managers within the organization, used insurance brokers, or assigned construction Consultants/Engineers. A few (11.5%) used departmental personnel. However, none hired independent risk consultants.

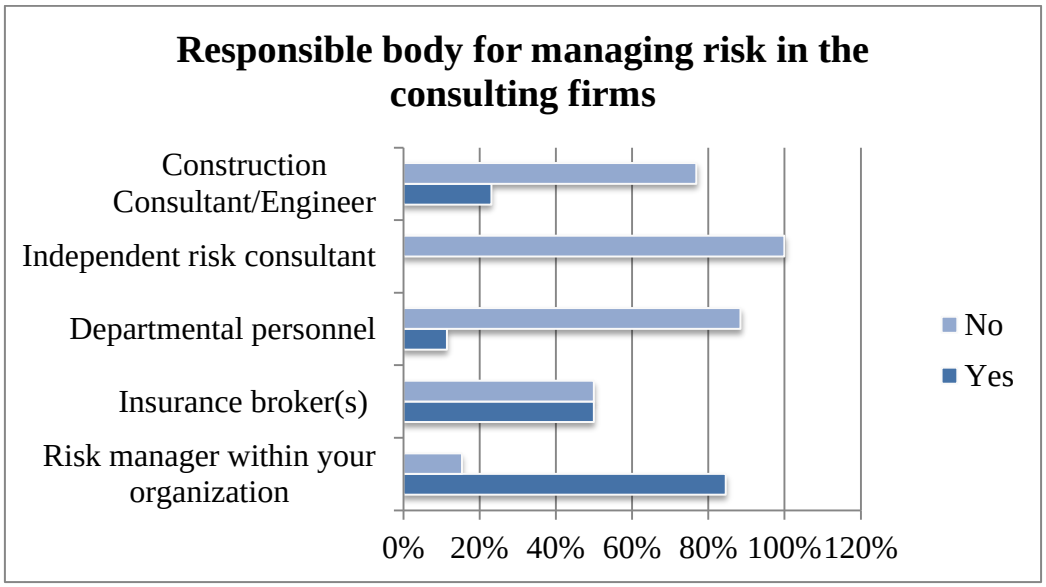

Figure 9 Responsible body for managing risks in consulting firms

The construction stages can be broadly categorized into the Feasibility stage, Design and bidding stage, Construction stage, and the Post-construction stage. The respondents were asked to identify at which stage they implemented risk management.

The overall result shows the consultants mostly practiced risk management at the design and bidding, and construction stages of construction (42% and 62%), whereas they were most unlikely to practice it in the feasibility and post-construction stages (23% and 12%). This shows that consultants give little attention to risks that occur prior to the commencement and completion of a construction project even if risk management should be a continuous process throughout all the phases of a construction project.

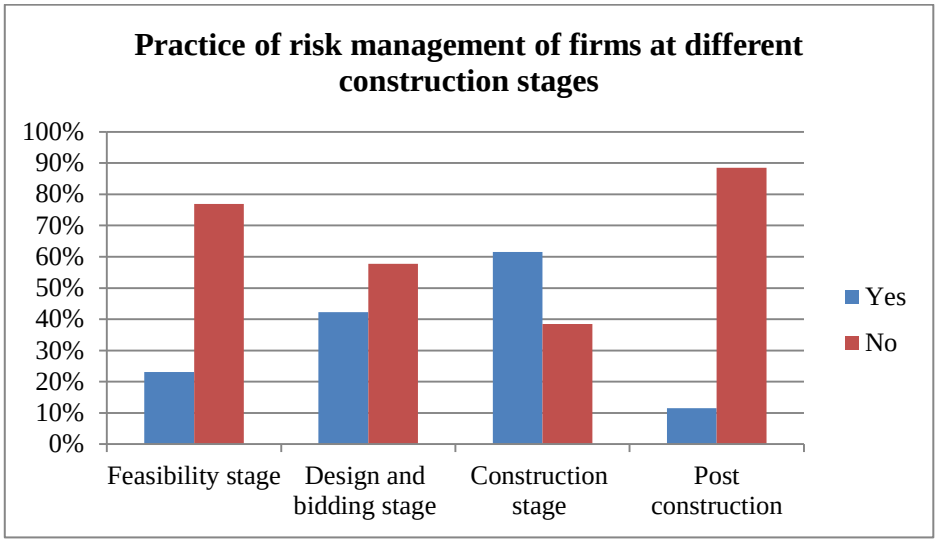

Figure 10 Practice of risk management of firms at different construction stages

Risk management involves risk identification, risk analysis and assessment, risk impact analysis, risk response and risk monitoring. Different tools and techniques can be used for each process. The respondents were asked to identify which techniques the used to determine which techniques are mostly used by consulting firms in Addis Ababa and the results are presented as follows.

4.2.1. Risk Identification Techniques

There are different risk identification techniques used by consultants. 77% of the respondents used interpersonal and team skills, while prompt lists were rarely utilized (12%) by consultants.

4.2.2. Risk Analysis and Assessment Techniques

During the risk analysis and assessment stage, the consultants used Data representation and expert judgment, with a majority of 77% and 38%, respectively. On the other hand, interpersonal and team skills and data gathering techniques were least utilized by consultants, with only 12% and 15% of the consultants applying these techniques, respectively.

4.2.3. Risk Impact Analysis Techniques

The survey data indicated that sensitivity analysis is mostly used technique to determine the impact of risks, with 53.8% of the respondents replying positively to using this technique. Decision tree analysis and simulations were used 19% of the time. However, influence diagrams were rarely used with 11% of the time.

4.2.4. Risk Response Strategy

Once the types of risks are identified, their probability of occurrence is identified, and their impact on project goals is determined; the consultant decides on how to treat the risks. According to the survey, most consultants, 34.6% of them avoided the risks, while mitigation and transfer of risk were used 30% of the time. Only 11% of the consultants exploited the risks. Figure 11 summarizes the extent to which different risk management tools and techniques are applied by consultants.

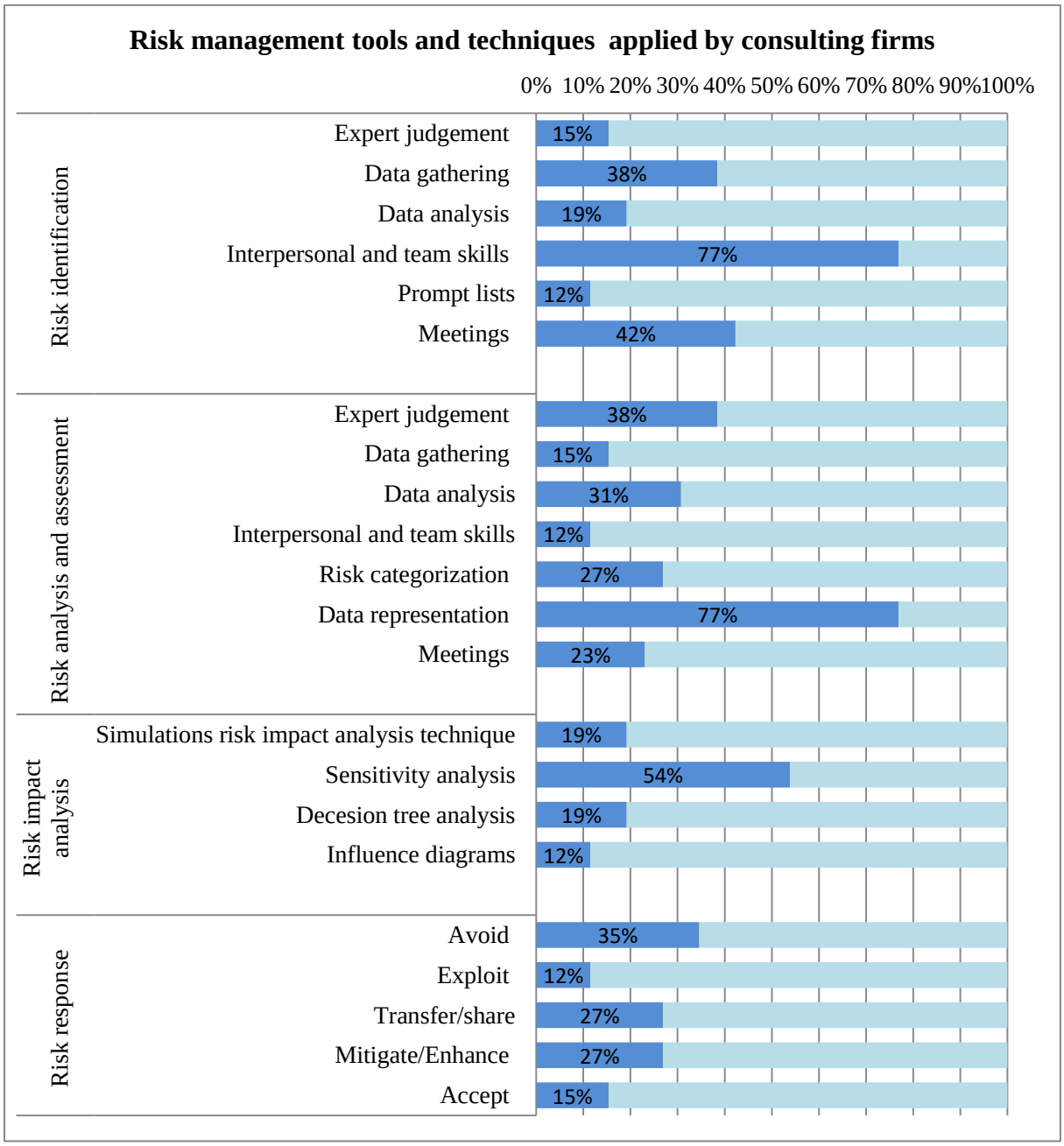

Figure 11 Risk management tools and techniques applied by consulting firms

As shown in Figure 11, consultants have better experience in implementing qualitative risk analysis methods. However, these techniques may not result reliable outputs especially if the consultants are new entries to the construction industry. This indicates application of risk management techniques can be improved to incorporate quantitative methods.

4.3. The Practice of Professional Indemnity Insurance in Ethiopia

One of the techniques to respond to risk is using insurance. Professional indemnity insurance is available for consultants to cover errors and omissions and negligence claims. However, not all consultants possess this insurance cover.

The standard bidding document in Ethiopia, PPA ICB for services 2011 GCC clause 48, states that the consultant should take out insurance including medical insurance , the consultant's liability in respect of sickness or industrial accident affecting its employees, loss of, or damage to, the public body equipment used to perform the contract; civil liability in the event of accidents caused to third parties or to the public body and any employee of that entity arising out of the performance of the contract; and accidental death or permanent disability resulting from bodily injury incurred in connection with the contract. However, the requirement for professional indemnity insurance must be specified under the specific conditions of contract by the client.

The survey conducted showed that 81% of the consultants own insurance cover, and 19% of them do not. 23.1% of the firms that owned stated self-protection as a reason for buying the premium while a majority of 76.9% only bought it due to contractual obligation (in cases where FIDIC conditions of contract was used or where the consultant was required to do so under the specific conditions of contract in PPA).

30.8% of the respondents reported they had instances where the insurance company had to pay the premium for claims made against the consultant. In 7.7% of the cases, the claims were related to services given in the design and bidding stage, whereas the other 23.1% occurred during the construction stage. No claims were made during the feasibility stage and the post-construction stage. Only 15.4% of the consultants stated they encountered problems while dealing with insurance companies.

The small percentage of consultants that buy premiums self-initiated for protection against risks indicates a lack of awareness of the importance of professional indemnity insurance among consultants.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Conclusions

The contract conditions and applicable law of the country and the chosen project delivery method determine the risk allocation in a given project; therefore the consultants' risks and liability are determined by the roles and responsibilities related to the services it provides. Risks in consulting firms are inherent during the feasibility stage, design stage and bidding stage, construction and in post construction stage.

Major risks in the feasibility stage are related to services rendered to the client. These risks range from medium to high risks. High risks to consulting firms include risks resulting from inadequacy of surveys and inspections, choice of site and owner's brief to the professional team. During the design stage, lack of safety precautions is identified to be extremely risky whereas inadequate performance of mechanical and electrical equipment posed lower risk. Risks can also occur due to failure or errors in machinery and equipment utilized in preparation of the design. Compared to the risks in other stages, the probability of occurrence of risks in the post construction stage are lower but have a higher impact. Risks associated with safety and fitness of purpose is major risks in this stage whereas risks associated with serviceability, resistance to natural hazards and project operations are moderate risks.

Most consulting firms stated they had formal risk management plans. However, their applications of different tools and techniques in risk identification, risk analysis and assessment, risk impact analysis and risk response strategies were poor and were limited to making decisions based on meetings and expert judgments rather than adopt a suitable technique for different project scenarios.

The ownership of professional indemnity insurance has shown progress over the past decade. Some consultants buy professional indemnity insurance for self-protection but most buy it due to contractual obligations (where FIDIC condition of contract was used or was specified under PPA SCC). A few cases were reported where the insurance companies had to pay to cover claims made against the consulting firms. Majority of the claims were made for services provided in the construction stage while a few were during the design stage. No claims were made during the feasibility and post construction stages. Therefore, consulting firms are more prone to risks during the construction stage than the other stages.

5.2. Recommendations

1. Consultants should have a detailed knowledge of the applicable laws, rules and regulations, the different project delivery systems, contract types and other factors that affect the amount of risk allocated to the consulting firm. They should continually update themselves to the current state of the art professional level to establish competitiveness in their field.
2. Consultants should utilize different risk management techniques in the identification, analysis and assessment, impact assessment and risk response method suitable for the particular risks at hand instead of only focusing on interpersonal skills, expert judgment and informal meetings that are currently being used.
3. Consultants should always have professional indemnity insurance to protect themselves. However they should have detailed understanding of the risks that are covered by the insurance. This should also be a mandatory requirement in the standard bidding document in Ethiopia (PPA ICB for services 2011) and stated under the general conditions of contract, which isn't being implemented currently.
4. Consultants should work together with major stakeholders in a construction project to effectively manage project risks throughout all the construction phases.
5. Clients should have a qualified team of experts that can draft suitable request for proposals for projects, brief consultants on the expected output of the intended projects and capable of selecting the consultant that fulfills the requirements of the project.

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APPENDICES

APPENDIX 1

Questionnaire Cover Letter

I am currently engaged in conducting a research study entitled "Risks in Construction Consultancy Services and Their Practice of Professional Indemnity Insurance in Ethiopia: A Case of Addis Ababa City" as a part of my MSc. Study in Construction Engineering and Management at Jimma University, Jimma University Institute of Technology.

The main objective of this research is to assess and identify the major risks in construction consultancy services and to determine the current practice of professional indemnity insurance for construction consultants in Ethiopia. I believe your responses to this questionnaire are crucial to my research given your experience and educational backgrounds. Therefore, I request you to fill out the questionnaire earnestly.

Confidentiality

I solemnly assure you that the information you provide in this questionnaire will remain confidential and that the information you provide me with will only be used for academic purposes. I kindly ask you to please complete the questionnaire and return it to me within a week of receipt to enable me finalize the research on time.

If you have any questions or comments, please don't hesitate to contact me. You can reach me at

Mob: 0913-30-38-39 or email: munashmersha@gmail.com

Thank you for your time and cooperation.

Regards,

Munash Mersha, Graduate Student at Jimma University Institute of Technology, Faculty of Civil and Environmental Engineering

MSc. in Construction Engineering and Management Program

Advisor: Eng. Bien Mercado Maunahan

APPENDIX 2

QUESTIONNAIRE DISTRIBUTED TO CONSULTANTS

SECTION I - RESPONDENT AND COMPANY PROFILE/GENERAL INFORMATION

Direction: Please answer the following general questions by filling the blanks and marking "**X**" on the spaces provided as appropriate

1. Name of your organization (optional) _____

2. Name of the person filling the questionnaire (Optional): _____

3. E-mail address/contact info./(for possible follow-up communication):

_____

4. Position/role in the company you represent: _____

5. What is the highest level of education you have received?

A. Doctorate Degree ☐
B. Master's Degree ☐
C. Bachelor's Degree ☐
D. Certificate/Diploma ☐
E. Short-Term Training ☐
F. Other (Please Specify)
_____

7. Level of experience in the construction industry:

0-5 years ☐
6-10 years ☐
11-15 years ☐
16-20 years ☐
21-30 years ☐
>30years ☐

8. Number of years your company has been active in the construction industry

0-5 years ☐
6-10 years ☐
11-15 years ☐
16-20 years ☐
21-30 years ☐
>30 years ☐

9. Your consulting firm is involved in:

Building Projects ☐
Bridge and Highway/Road Projects ☐
Construction Management ☐
Specialized Consultant ☐
Water and Sewerage Projects ☐

Other (please specify) _____

10. What class is your company currently registered in?

1 ☐ 2 ☐ 3 ☐

SECTION II-TO IDENTIFY MAJOR RISKS ARISING FROM PERFORMANCE OF SERVICES OF THE CONSULTANT

Which areas of risks occur more frequently in performing your services as a consultant and which areas of risk result in major impact (on time, cost and quality)?

Please rate them with their likelihood of occurrence and level of impact (1= low, 2= moderate, 3=high). Please tick accordingly.

Categories		Likelihood of occurrence			Impact			Not applicable
		1	2	3	1	2	3	
1. Risks in Feasibility stage								
1.1	Owner's brief to the professional team							
1.2	Choice of site							
1.3	Adequacy of soil investigations							
1.4	Adequacy of surveys and inspections							
1.5	Adequacy of finance and related calculations							
1.6	Others, please specify							
2. Risks in Design and bidding stage								
2.1	Negligence and lack of care							
2.2	Lack of knowledge							
2.3	Inadequate checking and work carried out in haste							
2.4	Failure to take account of foreseeable problems							

2.5	Inadequate performance of mechanical and electrical equipment used during the design process							
2.6	Choice of contractor and nominated subcontractor							
2.7	Inadequate preparation of form of contract conditions							
2.8	Inappropriate choice of design with respect to others or society							
2.9	Lack in communication							
2.10	State of the art, codes and technical knowledge							
2.11	Use of untested and unproven techniques							
2.12	Lack of safety precautions							
2.13	Others, please specify							
3.Risks in Construction stage(Supervision and Contract administration)								
3.1	Acts of God such as excessive rainfall, wind and storm, earthquake, flood and the like							
3.2	Acts of man including internal and external factors such as stability of government, financial stability and economic risks, legislation and the like							
3.3	Approval of Technical complexity and innovation in design requiring new methods of construction and/or erection							
3.4	Approval of Dangerous substances and items during construction and/or							

	commissioning							
3.5	Approval of Defective material and workmanship							
3.6	Overlooking Inadequate site management of contractors							
3.7	Approval of Removal of support							
3.8	Negligence and lack of care							
3.9	Fraud and infidelity							
3.10	Preparation of progress reports							
3.12	Strike							
3.13	Malicious act of employees							
3.14	Inadequate site supervision							
3.15	Variations from contract documents							
3.16	Approval of Programme of work of contractors							
3.17	Incompetence							
3.18	Inefficiency and delays in giving approvals							
3.19	Payment certifications							
3.20	Work approvals and acceptance							
3.21	Conflicts leading to disputes							
3.22	Others, please specify							
4. Risks during Post construction stage								
4.1	Risks associated with safety							
4.2	Risks associated with fitness for purpose							
4.3	Risks associated with serviceability							
4.4	Risks associated with resistance to natural and other hazards							
4.5	Risks associated with project operation							

4.6	Others, please specify							

SECTION III: To assess risk management practices used by construction consulting firms in Ethiopia

Direction: Please answer the following general questions by filling the blanks and marking "**X**" on the spaces provided as appropriate

1. Does your company have a formal risk management plan?

   Yes ☐ No ☐

2. If your answer to q.1 is no, why?

   _____

3. If your answer to q.1 is yes, who is responsible for managing risk in your company?

   Risk manager within your organization ☐
   Insurance broker(s) ☐
   Departmental personnel ☐
   Independent risk consultant ☐
   Construction Consultant/Engineer ☐
   Others, please specify_____

4. At which construction stages do you use risk management?

   Feasibility stage ☐
   Design stage ☐
   Construction stage ☐
   Post construction stage ☐
   Others, please specify_____

5. What do you use to identify risks?

   Expert judgment ☐
   Data gathering (Brainstorming, Checklists, Interviews) ☐
   Data analysis (Root cause analysis, Assumption and constraint analysis, SWOT analysis, Data analysis) ☐
   Interpersonal and team skills (Facilitation) ☐
   Prompt lists ☐
   Meetings ☐
   Others, please specify_____

6. What techniques do you use for analyzing and assessing the likelihood (probability) of the risk occurrence for the identified risks?
   Expert judgment ☐
   Data gathering (Interviews) ☐
   Data analysis (risk data quality, risk probability and impact assessment, assessment of risk parameters ☐
   Interpersonal and team skills (Facilitation) ☐
   Risk categorization ☐
   Data representation (Probability and impact matrix, Hierarchical charts) ☐
   Meetings ☐
7. What do you use to estimate the size of the risk's severity or its consequence on project objectives?
   Simulations ☐
   Sensitivity analysis ☐
   Decision tree analysis ☐
   Influence diagrams ☐
   Others, please specify_____
8. What risk response strategy do you usually use?
   Avoid ☐
   Exploit ☐
   Transfer/share ☐
   Mitigate/Enhance ☐
   Accept ☐

SECTION IV: To assess professional indemnity insurance practices of consulting firms as risk mitigation method in Ethiopia

Direction: Please answer the following general questions by filling the blanks and marking "**X**" on the spaces provided as appropriate

1. Do you have professional indemnity insurance?
   Yes ☐ No ☐
2. If no, why?
   Not important for the firm ☐
   Premium is too expensive ☐

Unavailability of service provider ☐

Other, please specify_____

3. If yes, what is your main reason for buying professional indemnity insurance?

   Self-protection ☐

   Contractual obligation ☐

   Other, please specify_____

4. Which risks do the professional indemnity insurance premium you purchased cover?

   Errors and omissions ☐

   Negligence ☐

   Other, please specify_____

5. Are there any risks that are not covered by the professional indemnity insurance currently available in Ethiopia? Please specify.

   _____

   _____

6. Where there instances in which the insurance company had to pay the professional indemnity insurance to cover for any claims?

   Yes ☐ No ☐

7. If yes, the claim was related to the service given in?

   Feasibility stage ☐

   Design and bidding stage ☐

   Construction stage ☐

   Post construction stage ☐

8. Have you encountered any problems with the insurance company relating to professional indemnity insurance?

   Yes ☐ No ☐

9. If yes please state the reason.

   _____

10. Are there any types of insurance that are not available in Ethiopia that you think should be available for consulting firms? Please list.

    _____

    _____

Thank you for your time.

APPENDIX 3

The following data was obtained from the Ministry of Works and Urban Development (MoWUD), which shows the number of consultants with renewed licenses to practice in Addis Ababa for the year 2019/2020.

Table 13 Registered number of consultants in Addis Ababa

	Class 1	***Class 2***	***Class 3***
Consulting Architects (CA)	1	-	1
Consulting Engineers and Architects (CAE)	42	7	43
Construction Consulting Management (CMM)	1	1	-
Consulting Engineers (CEG)	2	1	1
Highway and Bridge Consultants (CHB)	13	-	-
Specialized Consultants (CES)	-	1	-