

**A STUDY OF PROFESSIONAL LIABILITIES AND NEED
FOR PROFESSIONAL INDEMNITY INSURANCE FOR
QUANTITY SURVEYORS**

Lelkada Gamage Manuja

149117 A

Degree of Master of Science

Department of Building Economics

University of Moratuwa

Sri Lanka

February 2018

**A STUDY OF PROFESSIONAL LIABILITIES AND NEED
FOR PROFESSIONAL INDEMNITY INSURANCE FOR
QUANTITY SURVEYORS**

Lelkada Gamage Manuja

149117 A

Thesis submitted in partial fulfillment of the requirements for the degree Master of Science
in Construction Law and Dispute Resolution

Department of Building Economics

University of Moratuwa

Sri Lanka

February 2018

DECLARATION

Declaration, copyright statement and the statement of the supervisor

“I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my thesis, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books)”.

Signature:

Date:

The supervisor should certify the thesis with the following declaration.

The above candidate has carried out research for the Masters thesis under my supervision.

Signature of the supervisor:

Date:

ABSTRACT

Quantity Surveyor is one of the vital professionals involved in the construction industry, dealing with the problems related to construction cost, construction management and construction communication, on behalf of the client, and a cost expert whose prime task is to ensure that the project is kept within the agreed budget and that the client obtains value for money. However, the duties of professionals in the construction industry are subject to various uncertainties and risks such as professional faults, project safety or performance problems, and quality expectations since the professionals are expected to provide their professional services to their best performance and avoid professional negligence and errors. For decades, it seems there has been an explosion of claims against professional liabilities within the profession where the professionals were held liable to the client and others for failures to perform their professional obligations in accordance with the standard of care. However, the various approaches are available to deal with this risk of professional faults and negligence that a professional may adopt are the reduction of risk, risk avoidance and sharing the risk and several countries have already practiced mitigating the effects. One of the mitigation measures is professional indemnity insurance (PII) which undertakes to indemnify the damages caused by the faults and negligence of the professionals committed in the ordinary course of his business. However, when considering Sri Lankan context, the majority of quantity surveyors did not have any idea of the extent of their faults and negligence occurred and if any faults would be committed, they did not have much more knowledge regarding the mitigation measures could be used to address the effects. Therefore, this study aims to explore the measures available to mitigate the professional faults and negligence of quantity surveyors with special emphasis on professional indemnity insurance (PII)

An extensive literature review reveals professional liabilities of quantity surveyors around the world, as well in Sri Lanka, and faults and negligence of quantity surveyors, the reasons of faults and negligence, the effects of such faults to the client and the organization and measures to be used to mitigate the effects with special emphasis to PII. These findings are further confirmed with questionnaire survey which is administered among quantity surveyors. Statistical methods including descriptive statistics analysis is used to analyse the survey data with the aid of Excel.

The use of PII is one of the methods in which a professional could decide to limit the financial consequences of an action brought against him for professional negligence. There is a need for greater awareness on the concept and application of professional indemnity insurance, greater emphasis and encouragement of its use in the construction industry that are best suited to the construction industry.

Keywords: Quantity Surveyor, Professional Liabilities, Professional Indemnity Insurance (PII)

DEDICATION.....

To my beloved parents

TABLE OF CONTENTS

Declaration.....	I
Abstract.....	I
Dedication.....	I
Table of Contents	I
List of Figures.....	V
List of Tables.....	VI
Abbreviation	VII
Chapter One.....	1
1.0 Introduction	1
1.1 Background.....	1
1.2 Research Problem.....	4
1.3 Aim and Objectives of the Study.....	5
1.4 Methodology.....	5
1.6 Scope and Limitations	5
1.7 Chapter breakdown.....	6
Chapter Two	7
2.0 Literature Synthesis	7
2.1 Introduction	7
2.2 Nature of Professionalism and Ethics in General.....	7
2.3 Nature of Professionalism in the Construction Industry	8
2.4 Legislative and Administrative Provisions for Professional Liabilities	9
2.4.1 Contract Law.....	10
2.4.2 Tort Law	12
2.4.3 Code of Professional Conduct and Ethics	12
2.5 Quantity Surveyor as a Professional in the Construction Industry.....	15
2.6 Scope of Quantity Surveyor’s Professional Liability.....	19
2.7 Professional Risks	20

2.8	Faults and Negligence of Quantity Surveyors.....	20
2.8.1	Misleading Pre-Contract Estimate and Advice	22
2.8.2	Failure to take Prompt Action or Response.....	22
2.8.3	Failure to Inform Client on Matters with Significant Cost Implication	23
2.8.4	Inaccurate Determinations in Price Adjustment.....	23
2.8.5	Inappropriate Advice on Selection of Contractors/ Sub-Contractors/ Suppliers.....	23
2.8.6	Omission of Important Clauses in Conditions of Contract	24
2.8.7	Errors in Bills of Quantities.....	25
2.8.8	Loss of Documents or Data.....	25
2.8.9	Mistakes in Bid Pricing	25
2.8.10	Inaccurate Information	25
2.8.11	Fraudulent Misrepresentation.....	26
2.8.12	Misstatement	26
2.8.13	Unfair Treatment to Contractors in Tender Negotiations.....	26
2.8.14	Inadequate Compliance with Standards	27
2.8.15	Lack of Information regarding Quality Assurance and Quality Control.....	27
2.8.16	Arithmetic Errors.....	28
2.8.17	Incorrect Valuation of Construction Work.....	28
2.8.18	Errors in Claim Assessment	29
2.8.19	Unfair Determination for Variations & Claims.....	29
2.8.20	Inappropriate Advice to Clients and Contractors on Contractual Matters	30
2.8.21	Late Certifications and Non-Certifications	30
2.8.22	Lack of Monitoring or Controlling the Cost of Work in Progress	30
2.8.23	Unfair Treatment to Contractors in Final Account Negotiations	31
2.9	Causes of Professional Faults & Negligence.....	31
2.10	Effects of Professional Faults and Negligence	32
2.11	Measures to Mitigate the Effects	34
2.11.1	Internal Quality Assurance System	35
2.11.2	Institutional Control over Professional Practice.....	35
2.11.3	Litigation.....	36
2.11.4	Alternative Dispute Resolution Methods	36
2.11.5	Contingency Allowance	37
2.11.6	Professional Indemnity Insurance (PII) System.....	37

2.12	Chapter Summary	40
	Chapter Three	41
3.0	Research Methodology	41
3.1	Introduction	41
3.2	Research Process	41
3.2.1	Background Study	41
3.2.2	Research Approach	43
3.2.3	Data Collection.....	45
3.2.4	Data Analysis	45
3.3	Chapter Summary	46
	Chapter Four	47
4.0	Research Findings	47
4.1	Introduction	47
4.2	Profile of the Survey Participants	47
4.3	Duties of Quantity Surveyors in Construction Industry	49
4.4	Faults and Negligence of Quantity Surveyors	51
4.5	Causes of Quantity Surveyors' Faults and Negligence	53
4.6	Effects of Quantity Surveyors' Faults and Negligence	54
4.7	Mitigation Measures to Address the Effects.....	56
4.8	Requirement of PII for Indemnifying the Damages	59
4.9	Significant Liabilities of Quantity Surveyors to be Covered under PII	60
4.10	Reasons for Non-Possession of PII in Organization for Quantity Surveyors.....	61
	Chapter Five	63
5.0	Data Analysis and Results – SMEs Interviews	63
5.1	Introduction	63
5.2	Profile of Subject Matter Experts (SMEs).....	63
5.3	Views of SMEs - Duties Performed by Quantity Surveyors	64
5.4	Views of SMEs - Faults and Negligence of Quantity Surveyors	64

5.5	Views of SMEs - Causes and effects of Professional Faults and Negligence	66
5.6	Views of SMEs - Mitigation Measures to address the Effects	67
	Chapter Six	69
6.0	Conclusions and Recommendations	69
6.1	Introduction	69
6.2	Conclusions	69
6.3	Recommendations	72
6.4	Limitations.....	73
6.5	Further research directions	74
	References	75
	Appendix A	83
	Appendix B.....	91
	Appendix C.....	100

LIST OF FIGURES

Figure 3.1: Research Design.....	42
Figure 4.1: Rate of responses	47
Figure 4.2: Suitability of Measures to Mitigate the Effects	58
Figure 4.3: Requirement of PII for Indemnifying the Damages of Quantity Surveyors	60

LIST OF TABLES

Table 2.1: Rights and duties of the consultant as per the FIDIC and CIDA	11
Table 2.2: Code of Professional Conduct & Ethics formed by the RICS and IQSSL.....	14
Table 2.3: Duties of Quantity Surveyors	17
Table 2.4: Provisions in Condition of Contract.....	38
Table 4.1: Demographic Profile of Participants	48
Table 4.2: Duties of Quantity Surveyors	50
Table 4.3: Other Duties of Quantity Surveyors	51
Table 4.4: Faults and Negligence of Quantity Surveyors.....	52
Table 4.5: Other Faults and Negligence of Quantity Surveyors	53
Table 4.6: Causes of Quantity Surveyor’s Faults and Negligence	54
Table 4.7: Other Causes of Quantity Surveyors’ Faults and Negligence	54
Table 4.8: Effects of Quantity Surveyors’ Faults and Negligence	55
Table 4.9: Other Effects of Quantity Surveyors’ Faults and Negligence.....	56
Table 4.10: Mitigation Measures to Address the Effects	56
Table 4.11: Suggestions to mitigate the Quantity Surveyor’s Faults and Negligence	59
Table 4.12: Significant Liabilities of Quantity Surveyors to be covered under PII	61
Table 4.13: Reasons for Non-Possession of PII in Organization for Quantity Surveyors .	62
Table 5.1: Profile of interviewees.....	63

ABBREVIATION

AIQS	-	Australian Institute of Quantity Surveyors
BOQ	-	Bill of Quantities
CIDA	-	Construction Industry Development Authority
CIQS	-	Canadian Institute of Quantity Surveyors
HKEDC	-	Hong Kong Ethics Development Center
ICEC	-	International Cost Engineering Council
IQSSL	-	Institute of Quantity Surveyors Sri Lanka
NZIQS	-	New Zealand Institute of Surveyors
PAQS	-	Pacific Association of Quantity Surveyors
QS	-	Quantity Surveyor
RICS	-	Royal Institution of Chartered Surveyors
SME	-	Subject Matter Expert

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Quantity Surveyor is manifested to be one of the vital professionals involved in the construction industry (Bohari, 2009) since a system of quantity surveying was practiced by the ancient Egyptians (Australian Institute of Quantity Surveyors [AIQS], 2011). Nevertheless, AIQS further highlighted that quantity surveying had not evolved as a profession until the 17th century reestablishment of London after the Great Fire. By the middle of the 20th century, the quantity surveying had developed as a recognized occupation in the construction industry with the traditional role of keeping accounts and cost controlling for both the client and the contractor (Ashworth, Hogg & Higgs, 2013). However, the main duty of quantity surveyor persist the same as discussed in 19th century case *Taylor v. Hall (1870)* (as cited in Bohari, 2009) that is, "taking out in detail the measurement and quantity from plan prepared by an architect for the purpose of enabling builders to calculate the estimate for which they would execute the plans"(p.1).

Meanwhile, in the 20th century, Royal Institution of Chartered Surveyors (RICS) (1971) explained the duty of quantity surveyor is to maximize the utilization of resources in the construction industry and provide the benefit for the society. Further, they added that it can be arisen since providing a cost consultancy service to the client and cost management for the projects as well as involving throughout the whole construction process. Accordingly, AIQS (2011) and RICS further defined, quantity surveyor, as a construction cost consultants, construction or building economists or resource managers who contribute to configuration and evolution of capital asset.

Over again, 'quantity surveyor' has described by Seeley (1997), as a professionally qualified, trained and experienced person, tackle the issues related to construction cost, management, and communication, on behalf of the client. The prime task of the quantity surveyor is to make sure that the project is kept within the allocated budget and as well as that the client achieves value for money; since construction is a major capital expenditure and most of the clients are operating within tight budget which is regularly part of a larger overall arrangement (Potts, 1995). Besides, usual duties of a quantity surveyor or role of the quantity surveyor can be discussed with reference to different stages of the development process as well.

As Potts (1995) explained that if the project cost goes beyond the budget, the scheme of the project could fail. Therefore, the professional liabilities and obligations regarding of cost management are primarily upon the quantity surveyor. Validating the above statement, Alfred (2007) noted that the Hong Kong and UK construction industries has been affected by unethical professional misconducts and ultimately, the industry was unable to meet the client's satisfaction and maximize the value for money over the years. This certifies that the construction projects depend on consultants and important to trust-building in highly manner (Zwikael, 2009). Therefore, RICS (2014) indicated that the quantity surveyors acting as a cost managers must be able to manage costs effectively, equate quality and value to meet each client needs based on the context.

In view of that, since the quantity surveyor play a major role in the construction industry, acting as a financial advisor (Othman, 2012), there are professional liabilities and obligations as well. Generally, the contractual liability arises from the presence of a contractual relationship between the professional and the client; where the obligations and rights of the parties are stipulated in the Conditions of Contract of engagement (Cheung & Tsang, 1997). Hence, under the contract term, the duties are needed to perform with reasonable skill and care by quantity surveyor (Bohari, 2009).

While considering few court cases of Quantity Surveyor's challenges in terms of his role to be played, the case of *Taylor V. Hall (1870)* (as cited in Bohari, 2009) mentioned, there is a lack of authority on the care and standard of skills owed by the quantity surveyor for his client. However, the same court case states, that the occasional mistake or error may not be sufficient to justify the allegation against for quantity surveyor's negligence. However, according to the case of *Waghorn V. Wmbleton (1877)*, when the quantity surveyor is aware regarding the client's monetary constraints on a particular project, then the responsibility to exercise the reasonable care that he considers whether it is possible to exceed the limit and to aware or notify the client in advance.

Again in the case of *London School Board V. Northcroft Son & Neighbour (1889)* (as cited in Ramus, Birchall, & Griffiths, 2007), discussed the liability of quantity surveyor in calculating and overpayments. The client sued the quantity surveyors, because of clerical mistake in the calculations that led to negligence, resulting in overpayments to the contractor. It was held that the quantity surveyor was not liable since he had employed a skilled clerk who had done many calculations correctly.

In the case of *Meigh v. Stockingford Colliery Company Limited (1922)* (as cited in Bohari, 2009), quantity surveyor was obliged to make a precise quantity for the builder or contractor to value. However, the case was filed due to the mistakes in preparation of BOQ caused the client to the losses by the quantity surveyor.

The liability of quantity surveyor has challenged again in *Tyrer V. District Auditor of Monmouthshire (1974)* (as cited in Ramus et al., 2007) case, since an extra payment to the contractor. This was happened due to the quantity surveyor's acceptance of extremely high rates. The same year, in the case filed by *Sutcliffe*, against *Thackrah (1974)* (as cited in Ramus et al., 2007), who was an architect. In this case, two valuations had been prepared by the quantity surveyor based on the work which was defective and architect have not advised the quantity surveyor regarding the defects. It was held that the general rules for negligence of professionals should be applied to all aspects of an architect's duties and he should act impartially in carrying out his duties. The same responsibility apply to the behavior of the quantity surveyor, though it was not an issue according to this case.

In one of the Australian cases of *Bains Harding Construction & Roofing (Aust) Pvt Ltd v. McCredie Richmond & Partners Pvt Ltd (1988)* (as cited in Ramus et al., 2007), the claim was made by the client against the quantity surveyor as some pages had been missed in the tender documents. The defendant was a quantity surveyor who was engaged by plaintiff to formulate a quantity breakdown for a purpose of tender pricing. However, the bill prepared by the defendant appeared to have missing pages causing Bains Harding Construction & Roofing (Aust) Pvt Ltd. to under bid and the case was filed by the plaintiff to claim the loss from the defendant, where the quantity surveyor proved to be wrong.

Similarly, those cases emphasize the challenges of the quantity surveyor's liabilities. As well they prove that quantity surveyor cannot disregard his liability in terms of cost. Further according to Linda, Christabel, and Vincent (2001), in the past two decades, many cases have been related to the ethical professional misbehaviours in all areas of the construction professions, such as engineering and surveying.

Therefore it seems that there is a need to manage and mitigate these risks otherwise affect professionals' business performance and the project performance. However, at the time of quantity surveyor purposelessly faced to an unjustified situation, professional indemnity insurance, also called professional liability insurance is an insurance scheme for professionals, such as quantity surveyors to be protected against negligence or breach of contract claims made by their clients (RICS, 2009). As well RICS (2009) further depicts that

it protects professionals from financial claims and often reputation damaging claims by dissatisfied clients.

1.2 Research Problem

Quantity Surveying is one of the profession involved in the construction industry (Bohari, 2009) and their services assist the client to obtain optimum value for money (Seeley, 1997) throughout the pre-construction, construction and post-construction stages of the project. Therefore, when a quantity surveyor performs his or her duty, then the liability may arise to the client. Cheung & Tsang (1997) depicted that duties of professionals in the construction industry are subject to various uncertainties and risks such as professional faults, negligence, performance problems and quality expectations since the professionals are expected to deliver their professional services to their optimal performance and avoid professional faults and negligence. For decades, it seems there has been an explosion of claims against professional liabilities where the professionals were held liable to the client and others for unable to carry out their professional obligations with the standard of care. Further, Sunday and Afolarin (2013) depicted that even loss of client's reputation and abandonment of project has occurred due to faults and negligence of the constructional professionals. however, the various approaches are available to deal with this risk of professional faults and negligence that a professional may adopt are the reduction of risk, risk avoidance and sharing the risk (Bunni, 2005) and several countries have already practiced mitigating the effects. One of the mitigation measures is professional indemnity insurance (PII) which undertakes to indemnify the damages caused by the faults and negligence of the professionals committed in the ordinary course of his business. However, when considering Sri Lankan context, the majority of quantity surveyors did not have any idea of the extent of their faults and negligence occurred and if any faults would be committed, they did not have much more knowledge regarding the mitigation measures could be used to address the effects. Therefore this general fact led the researcher to explore further and to address the problem of '*What are the professional liabilities of quantity surveyors, causes, and effects of professional faults and negligence and measures available to address the effects with special emphasis on PII?*'.

1.3 Aim and Objectives of the Study

The aim of this study is to explore the measures that can be used to mitigate the professional faults and negligence of quantity surveyors.

Following objectives were established, in order to achieve the aim of this research.

- Review of duties performed by quantity surveyors in the construction industry.
- Identify the faults can be occurred due to the cessation of the liability of the quantity surveyors while performing the duties.
- Ascertain the causes and effects of professional faults and negligence of quantity surveyors.
- Recommend the measures to be used to mitigate the effects with special emphasis to PII.

1.4 Methodology

The existing knowledge of the duties performed by a quantity surveyor, professional negligence or faults made by quantity surveyors when delivering their professional services, causes and effects of professional faults & negligence and mitigation measures available to address the effects were identified from a thorough literature survey. Accordingly, the literature review was done with research papers, books, journal articles, reports on case studies and electronic media. A questionnaire survey was administered among the quantity surveyors in the construction industry to obtain views and finally, a quantitative analysis and expert interviews were utilized to validate the expressions of expertise.

1.6 Scope and Limitations

Considering the time restraints, the scope of the research is limited only to contractual liability between the client and the quantity surveyor and main contractors and quantity surveyors; who are having experience in consultancy and contracting organizations in Sri Lanka.

1.7 Chapter breakdown

Chapter 1 - Introduction

This chapter discusses the background of the research, research problem, aim, and objectives, research methodology, scope, and limitations.

Chapter 2 - Literature Review

Established knowledge about the duties of the quantity surveyor, professional negligence or faults made by quantity surveyors when delivering their professional services, causes and effects of professional faults and negligence of quantity surveyors and measures to mitigate the effects will be reviewed within this chapter.

Chapter 3 - Research Methodology

Chapter three explains the method to be carried out the research, the reasons for executing the methodology which was selected, and how it facilitate to achieve the research objectives.

Chapter 4 - Research Findings

Chapter four explains the analyses and findings of the questionnaire survey in line with the research objectives described in section 1.3.

Chapter 5 - Validation of research findings

Chapter five presents the Subject Matter Experts (SMEs) views on the research findings of a questionnaire survey.

Chapter 6 - Conclusions and Recommendations

Chapter six concludes the research findings relating to research aim and objectives. Further, the chapter provides recommendations and further researches.

CHAPTER TWO

2.0 LITERATURE SYNTHESIS

2.1 Introduction

This chapter intends to provide detailed literature on the field of research, hoping to achieve the identified aims and objectives set out in the previous chapter, and further to establish the research problem.

Therefore, the chapter appraises the existing and current level of knowledge on the liability of quantity surveyor. First and foremost, liabilities of quantity surveyors and to what extent they deliver their professional services are illustrated comprehensively in this chapter. Secondly, professional faults and negligence made in performing their duties, causes, and effects of professional faults and negligence are discussed. Finally, the measures available to mitigate those effects with special emphasis on Professional Indemnity Insurance (PII) are deliberated.

2.2 Nature of Professionalism and Ethics in General

The profession is an occupation that needs both advanced learning and competence of a specialized knowledge and undertakes to promote and protect certain matter that affects others' success (Vee & Skitmore, 2003). Murdoch & Hughes (2001) identified that profession has four defining characteristics such as; a distinct body of knowledge, barriers to entry, service to the public and mutual recognition.

Where, these characteristics show that professionals have specialist skills and knowledge which are acquired through regulated education and training programs supervised by qualified and experienced practitioners (Cunningham, 2011). Murdoch & Hughes (2001) further described the mean of serving the public that is "the true professional places the public good before mere financial reward". Therefore, it is needed to regulations of ethically impeccable professional conduct to balance and handle increasing cost pressures, responsibility for society, and liability for construction deficiencies and damages (Vee & Skitmore, 2003).

However, different reputations were in different professions in term of ethical behaviors. For instance, the public opinion survey conducted in recently, architects were graded as superior in the ethical behavior of lawyers, some doctors, almost all businessman and businesswoman

and clergy being rated the highest (Pressman, 1997). Although there are different professions, it has recognized that professionalism has a clear link with ethics, as a professional need to be trustworthy and competent; since ethics may be considered as being reasonable or not act unjustly or harmful to others (Cunningham, 2011).

The Society of Chartered Surveyors (as cited in Cunningham, 2011) identifies that maintaining the ethical principles is a significant reason of people have faith on professional bodies and from that competence and trust are identified as central elements in generating confidence in the professions. Therefore, professional ethics is a set of standards to address both the moral and professional conduct in their daily practice, and moral responsibility attributed not to an individual but to all professionals working in a particular profession (Rahman et al., 2007). The same author further depicts that, there are many other endeavors to improve the ethical standards and integrity among the professionals in worldwide construction sectors and now there are codes of ethics for almost every profession, as a provision of a framework for arriving at the good ethical choice.

Perceiving the same concept, Cartlidge (2011) also stated that, ethics provide a ‘framework’ or ‘moral map’ to deal with the difficult situations faced by the professionals. As described by Murdoch and Hughes (2008), especially the professionals related to construction operate in a highly fragmented industry, including many different skills and occupations, and where boundaries and relationships are always not clear.

2.3 Nature of Professionalism in the Construction Industry

The construction process where construction professionals operate is a complex matrix of contractual and business relationships and each relationship is defined by mutual obligations and allocation of risks of the assignment (Brennan, 1995). Also, the construction industry is a key industry for economic growth in any country, providing shelter for social and economic activities including on-site and off-site infrastructure to facilitate the smooth operational of these activities (Chigara, Moyo, & Mudzengerere, 2013).

Thus, the construction industry is traditionally divided into three sub-sectors, such as the construction of buildings, infrastructure, and specialty trades. It thus encompasses all the businesses that build either houses or office buildings or highways and bridges, as well as those who do the specialized/ none specialized works in the industry, namely manpower (Szymanski, 2007). Among the manpower, people who are skilled and specialized, holds

some special qualifications derived from training or experience and conforms to the high standard of performance and work ethics are called construction professionals (Shrike, 2009); and as well the focus of this study.

The construction industry which is adjudged to be an industry that co-ordinates various endeavors of professionals in the construction sector depends on teamwork, trust, commitment, and competence for the successful accomplishment of its responsibilities (Usman, Inuwa, & Iro, 2012). This responsibility can only be achieved by the construction industry if the professionals who contribute to the running of the industry are committed to their professional ethics (Usman, Inuwa, & Iro, 2012).

However, Khalid (2007) depicted that the construction professionals have separate contractual relationships with the client since the client engages construction professionals in connection with a project. The Same author further added that they all undertake to perform their work in a professional and workmanlike manner to the established standards of their professions. On the other hand, if they fail to meet these standards, it will result in problems, additional expenses or delays, and also they liable for damages because they will be in breach of their contracts (Seeley, 1997).

Thus, as described by Johnson (1991), construction professionals could not exempt from the common ethical behaviors; such as obligations, duties, and responsibilities; which are binding on ordinary people and are usually bound by a set of principles, attitudes or types of character dispositions that control the way the profession is practiced.

Hence, it is the responsibility of these construction professionals to exercise all reasonable skill, care, and diligence and displays their expertise according to the professional standards (Hussin & Omran, 2009); where among the construction professions of architects, engineers and quantity surveyors, that to be discussed within this study is the professional practice of quantity surveyors.

2.4 Legislative and Administrative Provisions for Professional Liabilities

The quantity surveyor can become liable for any error or negligence under the law of contract, or tort, or, in some instances, under the statute. The regulations, conditions of contract, standards, and code of conduct for professionals stipulate professional liabilities in relation to different aspects and is discussed in this subsection.

2.4.1 Contract Law

According to Turner (2007), for a valid contract to exist between two parties or more, it must be shown that there has been an offer, the offer has been accepted, there must be an intention from both parties to create legal relations and consideration for the promise made in the offer. Both Lupton (2013) and Ramus et al. (2007) contended that in the construction industry, the parties who concerned in a particular project, necessarily require to enter into a contract, which is a legal agreement to discharge certain obligations.

According to Lupton (2013), the terms of the construction contract may either be express or implied. The express terms are those that the parties to the contract agreed upon either orally or in writing and they may either be conditions which are vital and go to the root of the contract or warranties which are less important than conditions (Turner, 2007). The same author further described that implied terms form a part of the contract but which were not mentioned at the onset of the contract. They may come about by the operation of law, by the course of dealing or by a court of law giving effect to the presumed intentions of the contract parties.

A claim for breach of contract can only be brought by a party to the contract. (RICS, 2013) Further Turner (2007) added, whenever there is a breach of contract, the plaintiff is under a 'duty' to mitigate his loss. This means that once he is aware of the breach he must take all reasonable steps to minimize his loss and must refrain from taking unreasonable steps that increase it. The plaintiff is required to act reasonably, but the standard of reasonableness is not high in view of the fact that the defendant has committed a wrong.

Therefore, according to the contract law, when the quantity surveyor discharges his obligations with a reasonable degree of care and skill and there is a possibility of liability to be incurred through the breach of contract.

2.4.1.1 The Professional Consultant Service Agreement

Contractual liability arises from the presence of a contractual relationship between the professionals and the client. The obligations and rights of the parties are stipulated in the conditions of contract of engagement. These obligations may be expressed or implied (Cheung & Tsang, 1997). Proving the same argument, study results of Chan (2005), emphasized that the parties involved in design and design management should clearly

specify the roles and responsibilities in their respective contracts between project participants so as to avoid misunderstanding and disputes.

Further, models of liability with properly drafted clauses, which reveal the local practice and prevalent legal and insurance circumstances, should be provided for the local standard forms of construction contracts and consultants' engagement agreements (Chan, 2005). As noted in the subsection 2.4.1, to arrange an engagement or agreement for working together a set of professionals, the standard code of ethics shall be referred. Based on such professional codes, the contract or the agreement between professional is prepared and hence, one of the major tasks for quantity surveyor is to perform all his professional duties according to the terms of the contract of engagement/ agreement of the professional service. Accordingly, Table 2.1 illustrates the rights and duties of the consultant.

Table 2.1: Rights and duties of the consultant as per the FIDIC and CIDA

Source	Relevant Clauses
FIDIC Client / Consultant Model Services Agreement (FIDIC, 1998, p.2)	5. (i) The Consultant shall exercise reasonable skill, care, and diligence in the performance of his obligations under the Agreement.
Standard Condition of Engagement (ICTAD, 2002, p.7)	3.1 The consultant shall exercise all reasonable skill, care and diligence in the performance of the services under the agreement and shall carry out all his responsibilities in accordance with recognized professional standards.

Further, when drafting an agreement between the client and consultant followings need to be clearly defined (FIDIC, 2011).

- The service to be provided by the consultant engineer.
- The responsibilities and risks to be borne by both the client and the consulting engineer respectively.
- Nature and the maximum amount of the liability that could arise due to the failure of either party to the other in performing their respective responsibilities.
- The period of time for claiming any such liability should be submitted.
- The agreement should record the provisions of the parties to meet the maximum defined amounts of their liabilities arising under the agreement.

Hence, the extent and nature of the duties and responsibilities of the quantity surveyor to the client, along with the powers and authorities assigned to the client will be governed by the contract for services between them (Ashworth, Hogg, & Higgs, 2013).

2.4.2 Tort Law

In tort law, the duty of care is discussed (Burchell, 1994). The duty is implied in a contract to serve the client with reasonable care and skill in performing the professional services (Jayalath, 2011). Seeley (1997) argued that using their technical skill for the benefit of the client, professionals have a “moral duty of care” which requires them to exercise with the “utmost honesty and integrity”. He adds that chartered surveyors should ensure that they do not inadvertently harm the client’s interests or the professionals’ reputation.

Ramus et al. (2007) further depicted that a quantity surveyor should also understand that his responsibilities are not limited to contractual arrangements, there is always a liability could be raised through the law of tort, and particularly the tort of negligence because of the well-recognized case of *Donoghue v Stephenson (1932) AC 562 HL* (Bunni, 2005) where clearly established that it could be liable to a third party who has suffered damage as a result of negligence.

Nevertheless, Burchell (1994) stated that if a case of negligence is to be succeeded, a number of issues have to be proven as referring to above case. They are as follows.

- The defendant owes the other party a duty of care.
- Must prove that the defendant has violated his duty of care.
- It must be reasonably foreseen that harm or damage may result from a breach of duty.
- Must prove that injury, loss or damage has occurred due to a breach of duty.

Hence, according to the tort law, the quantity surveyor is obliged to carry out his professional duties with a reasonable degree of care and skill and there is a possibility of liability to be incurred through the tort of negligence.

2.4.3 Code of Professional Conduct and Ethics

According to the HKEDC (as cited Linda, Christabel, & Vincent, 2001) the definition of ‘professional ethics’ have been already combined with more practical concepts and expectations of the public, like competence, responsibility, and willingness to serve the public.

Molander (1987), Pressman (1997) and Greenhalgh, (1997) stated that a code of ethics depicts the standards of the right and wrong behavior which are established to provide guidance for the professional members or society. It purposes to uphold a higher standard of behavior than what is actually required by the law. As well, Wolverton & Wolverton (1999) emphasized that codes of conduct are pure means for enhancement reputation of the organization through publicizing the marketability of its members' services that adhere to the professional ethical standards.

According to Meyers (1987), codes of conduct are intended to force professionals to constantly examine their morals and values. In addition, to be effective a code needs to be brief and because each problem is unique and unforeseeable, a code of conduct generally contains broad guidance and advice. The code of conduct is established to set the rules and regulations not only by the corporate society but also by professional councils and associations.

These codes of conduct generally are expected to make sure that the best quality and standard of performance is exposed by the quantity surveyors and also achieve and maintain the public's confidence by proving that ethics is very important to the quantity surveyors (Brooks, 1995). Since the study was conducted considering the Sri Lankan professional environment of quantity surveyors, code of ethics of RICS, AIQS, PAQS, and IQSSL are major concerns of the same.

As the codes of any institute represent the standard of professional behavior to which the members of the institute must follow, as provided by the Rules of the Institute, any member whose behavior is against this code shall be liable to reprimand, suspension or expulsion. Since the code of conduct maintains the standard of the profession, the study carried out by Shafiei & Said (2008) revealed that the quantity surveying fraternity is serious in establishing their own competency standards to improve and maintain the services provided by professional quantity surveyors.

Therefore, various professional quantity surveying organizations such as RICS, AIQS, and PAQS had already established the competency standards for their own use. In addition, countries which practice quantity surveyor profession also maintain their own codes of professional conduct. The code of professional conduct and ethics formed by the RICS and IQSSL illustrated in Table 2.2 can be reviewed as an example of such situations.

Table 2.2: Code of Professional Conduct & Ethics formed by the RICS and IQSSL

Source	Code of Conduct and Ethics
Ethics & professional standards (RICS, 2007)	<ul style="list-style-type: none"> • Act with integrity • Always provide a high standard of service • Act in a way that promotes trust in the profession • Treat others with respect • Take responsibility
Code of Professional Conduct and Ethics – Principles (IQSSL, 2016)	<ul style="list-style-type: none"> • Quantity Surveyors shall always act so as to uphold and enhance the honour, integrity and dignity of the profession while safeguarding public interest at all times and wholeheartedly admit that the Institute of Quantity Surveyors Sri Lanka is the sole Sri Lankan professional body representing the quantity surveying profession in Sri Lanka and shall not indulge in any act that would impair or harm the honour, integrity and the dignity of the profession or of the Institute. • Quantity Surveyors shall perform work only in their areas of competence. • Quantity Surveyors shall build their professional reputation on merit and shall not compete unfairly. • Quantity Surveyors shall apply their skill and knowledge in the interest of their Employer or Client for whom they shall act, in professional matters, as faithful agents or trustees so far as they do not conflict with the general public interest. • Quantity Surveyors shall give evidence, express opinions or make statements in an objective and truthful manner and on the basis of adequate knowledge. • Quantity surveyors shall continue their professional development throughout their careers and shall actively assist and encourage persons who are engaged in Quantity Surveying Work under their direction to advance the knowledge and experience.

Accordingly, the quantity surveyors are expected to behave their profession in a manner that does not undermine their professional qualities, and it will not lessen public confidence in the institute or profession. For example, quantity surveyor must avoid reviewing the work of another quantity surveyor for a particular client, except with such quantity surveyor, having understandability of the review and being afforded the opportunity to submit comments on the results of the review (Jayalath, 2011).

RICS formed the rules which stipulated the standards of professional conduct and practice expected of members (RICS, 2007). The following rules govern the members of RICS to carry out their professional work with due skill, care, and diligence.

- Competence: Members shall carry out their professional work with due skill, care, and diligence and with proper regard for the technical standards expected of them

- **Service:** Members shall carry out their professional work in a timely manner and with proper regard for standards of service and customer care expected of them.

The increasing importance of organizational ethics and several benefits which expected from upholding strong ethical standards for firms are pointed out by Cartlidge (2011). They are; gain more competitive advantages than irresponsible firms, be better at attracting and retaining highly qualified employees, more attractive to investors, gain enhanced organization reputation, have better staff morale, Be considered as progressive and be seen as a benefactor rather than exploitative.

Seeley (1997) noted that the purpose of ethical standards is to ensure, that chartered quantity surveyor cannot be party to unprofessional behavior that may jeopardize himself and the professional reputation. Both Seeley (1997) and Murdoch and Hughes (2008) pointed out that breaches of a professional code of conduct may lead to proceedings resulting in termination from the profession. In the study of Ameh and Odusami (2010) showed the quantity surveyor feels it unsuitable to engage in unethical practices, but they are the groups most vulnerable to unethical behavior.

The enforcement of standards and the implementation of ethical principles have become an increasingly important matter for society, since the number of occupations and professional have increased and the work environment has become more ethically sensitive because the credibility of the entire profession is threatened when there are lapses in occurrence of ethical behaviour (Rahman, Wang, & Yap, 2010). Linda, Christabel, and Vincent (2001) noted that the traditional ideas on the profession and professional conducts in Hong Kong have been challenged by recent social, technological and political changes.

2.5 Quantity Surveyor as a Professional in the Construction Industry

Quantity Surveying is one of the profession involved in the construction industry (Bohari, 2009), yet no one can determine the history of quantity surveying began. Still, there were records of calculating materials and manpower, when the Great Wall of China was built. Further, Egyptians also had deployed a person to act as an estimator and planner when the pyramids are built (Pheng & Ming, 1997). Accordingly, by the 19th century, modern Bills of Quantities (BOQ) had started to prepare and by the second half of the 19th century, architects got understandability of the importance of BOQ, as these can be used for the

progress payments, settlement of variations and final accounts, and then they convinced the client to involve the quantity surveyors' service (Pheng & Ming, 1997).

Likewise, the quantity surveyors are being employed as the cost accountant and economist of the construction industry, their services assist the client to obtain optimum value for money (Seeley, 1997). Further, quantity surveyors increase value primarily to the financial and contractual administration at the pre-construction, construction and post-construction stages (Nkado & Meyer, 2001). Thus, the role of a quantity surveyors is, to control and manage costs within construction projects and may use the management procedures and technical tools to succeed goals; however cover a range of activities, including cost estimating, feasibility studies, cost planning, valuation, value engineering, lifecycle costing and cost-benefit analysis(Hussin & Omran, 2009).

Generally, as defined by different associations, the duties of the quantity surveyors (Refer the Appendix A) can be illustrated as in Table 2.3, proving the statement of Ashworth and Hogg (2007); where they stated that the role of the quantity surveyor has developed rapidly from 1970s. As in Table 2.3, the duties of the quantity surveyor are arranged in the order of their frequencies and ranked with the following ranges. A frequency between five to six denotes the most common duties, a frequency between three to four as moderately common duties and a frequency between one to two denotes specific duties.

As observed from Table 2.3, preliminary cost estimates and advice, investment appraisal/ feasibility studies, cost planning and cost checking, value management/ value engineering, advising on contract strategies and procurement systems, estimating contract price for use in benchmarking tenders, preparing tender documents, tendering for winning job, selection of contractors or sub-contractors or suppliers, negotiating contract prices and preparing contract documents, preparing budgets and cash flow forecasts, contract administration, interim valuations and payments, monitoring, and exercising cost control over the project, forecasting costs to complete and preparing financial statements, preparing of variation and claims, valuation of variations, evaluating and settling contractual claims, advice on cost limit & budget, subcontract administration, advice on contractual dispute final account preparation and agreement, settlement of payment disputes and giving expert evidence in arbitrations and disputes and risk management are the most common duties.

Table 2.3: Duties of Quantity Surveyors

1-2: Less Common, 3-4: Common, 5-6: Most Common

Duties of Quantity Surveyor	RICS (2014)	IQSSL (2011)	AIQS (2011)	NZIQS (2015)	CIQS (2013)	ICEC (2011)	Rank		
							Most Common	Common	Less Common
Preliminary cost estimates and advice	1	1	1	1	1	1	√		
Investment appraisal/ feasibility studies	1	1	1	1	1	1	√		
Cost planning and cost checking	1	1	1	1	1	1	√		
Value management/ value engineering	1	1	1	1	1	1	√		
Advising on contract strategies and procurement systems	1	1	1	1	1	1	√		
Estimating contract price for use in benchmarking tenders	1	1	1	1	1	1	√		
Preparing tender documents	1	1	1	1	1	1	√		
Tendering for winning job	1	1	1	1	1	1	√		
Selection of contractors or sub-contractors or suppliers	1	1	1	1	1	1	√		
Negotiating contract prices and preparing contract documents	1	1	1	1	1	1	√		
Preparing budgets and cash flow forecasts	1	1	1	1	1	1	√		
Contract administration	1	1	1	1	1	1	√		
Interim valuations and payments	1	1	1	1	1	1	√		
Monitoring, and exercising cost control over the project	1	1	1	1	1	1	√		
Forecasting costs to complete and preparing financial statements	1	1	1	1	1	1	√		
Preparing of variation and claims	1	1	1	1	1	1	√		
Valuation of variations	1	1	1	1	1	1	√		
Evaluating and settling contractual claims	1	1	1	1	1	1	√		
Advice on cost limit & budget	1	1	1	1	1	1	√		
Subcontract administration	1	1	1	1	1	1	√		
Advice on contractual dispute	1	1	1	1	1	1	√		
Final account preparation and agreement	1	1	1	1	1	1	√		
Settlement of payment disputes and giving expert evidence in arbitrations and disputes	1	1	1	1	1	1	√		
Risk Management	1	1	1		1	1	√		
Project management	1	1			1	1		√	
Facilities management	1					1			√
Property consulting and development services	1					1			√
Due diligence auditing	1	1				1		√	
Asset valuation & management	1					1			√
Insurance valuation	1	1			1	1		√	
Capital allowances	1					1			√
Corporate recovery and insolvency	1					1			√
Sustainability advisor	1					1			√

Project management, due diligence auditing, and insurance valuation could be the moderately common duties while facilities management, property consulting and development services, asset valuation & management, capital allowances, corporate recovery and insolvency, sustainability advisor allowances could be identified as specific duties.

A similar observation was seen with the few research carried out by Ashworth et.al (2013), Greeno (2013). According to them, new and emerging specialist duties of quantity surveyors were project management, facilities management, dispute resolution and expert witness services, property consulting and development services, investment appraisal, life cycle costing and development monitoring, due diligence auditing, asset valuation & management, insurance valuation, building surveying and infrastructure audit. Male (1990) contended that it is necessitated moves into practices of newer areas to maintain professional momentum and to continuing development of the profession.

Besides, by examining the effects due to changing the environment on quantity surveying profession, Ashworth and Hogg (2007) reported that the traditional role of the profession, based mainly on measurement and valuation, has evolved into a more complex, diverse, and sophisticated one demanding a varied range of specialist abilities.

Quantity surveyors require to develop their professionalism and status in order to meet these challenges that practitioners can maintain a competitive benefit (Maidin & Sulaiman, 2011). Additionally, as Ashworth and Hogg (2007), it is also clear that the clients' opinion is that the quantity surveyors can provide objective advice and implement business solutions in the specialist professional field. In this regard, Seeley (1997) argued, that professionals should confirm to their clients that they have the necessary skill and local knowledge to perform such instructions. In addition, the use of their technical skills for the benefit of the client that professionals have a 'moral duty of care' that requires them to be 'utmost honesty and integrity'. He adds that chartered surveyors must ensure that they do not inadvertently harm their client's interests or the reputation of the profession (Seeley, 1997). As well, they cannot run away from the fact that they will face all kinds of risks while carrying out their professions, whether in crimes, tort, the infringement of ethics and other more. Thus, one of the professional's efforts in avoiding or minimizing the risks in his/her profession is to carefully perform the duty according to the professional standard (Hussin & Omran, 2009).

Moreover, it is required to correct the impression of the society, which feels very disappointed and betrayed by the professionals who claim to have more specialized skills and are seen to be more competent than the simple layman (Othman, 2012). Hence, this required the need that construction professionals should rely on code of conduct, which depicts the levels of integrity that they are expected to follow to greater than most other members of society (Fan, 2003). In this regard, professional associations provide important representation for the profession and the development and maintenance of professional standards and code of conduct.

2.6 Scope of Quantity Surveyor's Professional Liability

The employment of a quantity surveyor arises from his appointment by the client or by someone authorized on his behalf to make the appointment. The rights and obligations of the parties are governed from the express terms or implied terms which are of course the starting point.

In so far as any act or omission of the construction professional prejudices any of these interests, and is due to lack of skill or care on his part, he will be failing in his obligations and will, if a breach of duty is clear, be liable to the client for any damage which he may suffer (save, possibly, for pure economic loss). If the construction professionals fail to do so, he becomes liable for damages, which the client is entitled to receive the payments.

Construction professionals may be held liable for their engagers and also to those affected by their work. With regard to the liabilities towards their engagers, the situation of concurrent liability exists. Concurrent liability is the legal term describing the situation when a party is liable to another party for damages for both breach of contract and in tort as a result of the first party's wrongful action (Wallace, 1986). When considering professional liabilities, there are many terms can be found in related to, such as; roles, duties, services, responsibilities, and liabilities. Among those terms discussed in previous subsections, the liabilities or responsibilities of a quantity surveyor is deliberated within this subsection.

Meanwhile, there is an opinion within the construction industry that there are two different levels of liability: 'fitness for purpose' and 'reasonable skill and care' (Chan, 2005). However, the professionals are encouraged to study new frontier by exercising their professional judgment with their best endeavor for professional services. Further, Chan (2005) added, that professional liabilities are judged by the process and their duties are discharged with "due care and skill" and no guarantee for the result (Chan, 2005). As well,

clause 3.1 of the standard condition of engagement of CIDA provides that in the performance of the services under the agreement and carrying out all his responsibilities shall exercise “reasonable care and diligence”.

When considering above literature, it is clear that it is the duty of every constructional professional to exercise his duty right and truly as he ought. When he performs his duty then the liability may arise to his client. In addition, if any professionals in construction industry fail to exercise a skill comparable to that of other professionals in the construction industry will subject him to liability. Liability for breach of a contractual duty to exercise reasonable skill and care is clearly based on fault.

2.7 Professional Risks

Professional duties are based on project documents including consents approved by the authorities’ concerned, applicable laws and regulations, the project-related contracts agreed between various parties (Male, 1990; Othman, 2012). Cheung & Tsang (1997) depicted that the duties of professionals in the construction industry are subject to various uncertainties and risks such as professional faults, project safety/performance problems, and quality expectations since the professionals are expected to provide their professional services to their best performance and avoid professional negligence and errors. The professional risks are allocated to professionals as per relevant regulations/ conditions of contract/standards/ code of conducts for professionals stipulate professional liabilities in relation to different aspects (Cunningham, 2011). The various approaches to risk management or to deal with the risk of professional negligence that a professional may adopt are the reduction of risk, risk avoidance and sharing the risk (Bunni, 2005).

2.8 Faults and Negligence of Quantity Surveyors

As mentioned in subsection 2.7, the duties of professionals in the construction industry are subject to various uncertainties and risks such as professional faults (Cheung & Tsang, 1997). The fault is either intention or negligence of the wrongdoer (Burchell, 1994). The same author defined the negligence, as the failure to exercise that degree of care in which situations the law requires the protection of the interests of others which may be harmful by lack of such care. Negligence, as it is related to the construction industry, it may not be clear, but the courts recognize this disparity and judge the negligence in the construction industry based on professional judgment rather than craft (Pressman, as cited Vee & Skitmore, 2003). Kolawole (as cited by Ameh & Odusami, 2010) categorized the unethical

behavior common to the Nigerian construction industry as “professional misconduct” and “professional negligence.”

Further in the studies of Oyewande (as cited Odusami & Ameh, 2010) showed that 50% of construction failures in Nigeria is traceable to design faults (carelessness and negligence), 40% to construction errors (professional incompetence and fraudulent practices), and 10% product failure. It can be thus be seen that the above-mentioned professional deficiencies have greatly tarnished the professional of the role of satisfying the needs of the general public.

And also as described in above, those emphasize the challenges placed on the quantity surveyor’s liabilities. As well they make evident that quantity surveyor cannot disregard his liability in terms of cost. Scrutinizing the literature this study identifies the following faults made by quantity surveyors.

- Misleading pre-contract estimate and advice
- Failure to take prompt action or response
- Failure to inform Client on matters with a significant cost implication
- Inaccurate determinations in price adjustment
- Inappropriate advice on selection of contractors/ sub-contractors/ suppliers
- Omission of important clauses in Conditions of Contract
- Errors in Bills of Quantities
- Loss of documents or data
- Mistakes in bid pricing
- Inaccurate Information
- Fraudulent misrepresentation
- Misstatement
- Unfair treatment to contractors in tender negotiations
- Inadequate compliance with standards
- Lack of information regarding quality assurance and quality control
- Arithmetic errors
- Incorrect valuation of construction work
- Errors in claim assessment
- Inappropriate advice to clients and contractors on contractual matters
- Late certifications and non-certifications

- Lack of monitoring or controlling the cost of work in progress
- Unfair treatment to contractors in final account negotiations

Following subsections discuss each fault in detail.

2.8.1 Misleading Pre-Contract Estimate and Advice

It is obvious that accurate construction cost predictions have become a necessary tool in the design and construction process and cost prediction clearly was intended to be a rough estimate, based on rule of thumb costs for square foot of area or cubic foot of volume or major construction systems, or comparison with similar projects (Reiss, 1993). Further Elhag, Boussabaine, and Ballal (2005) advocated realization and understanding of cost determining factor enhance the competence of cost estimators, and thus along with decent techniques for cost forecasting, provide more reliable and correct cost estimates. In case, a cost estimate prepared by a quantity surveyor is found that the value is considerably lower than the bids received, then a question may arise as to how and where the pre-estimate has gone wrong (Jayalath, 2011). Further same author (2011) noted that if there is no a solid reason to support the correctness of the estimate, the quantity surveyor must admit the error and update the cost estimate compatible with the market trends so that the bids can be truly comparable. However as mentioned in *Taylor V. Hall (1870)* (as cited in Bohari, 2009), there is a lack of authority on the care and standard of skills owed by the quantity surveyor for his client. However, the same court case states, that the occasional mistake or error may not be sufficient to justify the allegation against for quantity surveyor's negligence.

Further, in the case of *Ralphs v Francis Horner & Sons (1987, unreported)*, (as cited in Murdoch & Hughes, 2001) the architect underestimated the extent of work to be required to reinstate an old property. As a result of the client, having purchased the property, could not afford to refurbish it. However, Flanagan & Norman (1983) suggested that the quantity surveyor must regularly monitor the performance of estimates, in order to ascertain any patterns quickly that may emerge, when forecasting of the bid price at the design stage for a proposed building.

2.8.2 Failure to take Prompt Action or Response

As described by Murdoch & Hughes, (2001) the contract administrator be obliged a duty of reasonable care and standard of skill to the client and if breach of duty is occurred, the contract administrator will be liable for damages to the client for any loss resulted.

This happens in *West Faulkner Associates v London Borough of Newham (1994) 71 BLR 1* (as cited in Ramus et al., 2007; as cited in Murdoch & Hughes, 2001), where a contractor was in serious breach of the obligation to maintain regular and diligent progress. In the case, West Faulkner who was a firm of architects found to be in breach of their contract administration duties when it failed to give the contractor a notice that he was failing to proceed regularly and diligently with the work. It was set out as an express term of the JCT63 contract that, provided the contractor was obliged with the necessary notice under clause 25(1), the client (Newham) was entitled to terminate the contract if the contractor failed to proceed regularly and diligently. West Faulkner failed to serve the notice. The client brought an action against the architect. The Court of Appeal held that the architect should have served a notice determining the contractor's employment, and was liable to the client for various losses flowing from the fact that no such notice was served. The same obligations apply to the behavior of the quantity surveyor, although in this case, it was not an issue under consideration.

2.8.3 Failure to Inform Client on Matters with Significant Cost Implication

However, an inaccurate estimate will not provide the client with a right of redress. The client must prove that the quantity surveyor has ensured the accuracy of the estimate and the estimate was unrealistic because of incompetence of the quantity surveyor and as a result, the client has suffered loss (Jayalath, 2011).

2.8.4 Inaccurate Determinations in Price Adjustment

Fluctuation is the mechanism by which the contract sum may validly be adjusted (Murdoch & Hughes, 2001). However in the case of *Nye Saunders and Partners v Bristow (1987) 37 BLR 92* (as cited in Ramus et al., 2007) in preparing project cost estimates, the architect completely ignored the impact of inflation. The client was forced to abandon the project again. In this case, it was held that the architect was not entitled to any fees because their work was of no value to the client.

2.8.5 Inappropriate Advice on Selection of Contractors/ Sub-Contractors/ Suppliers

As discussed in the previous subsection, tendering and subcontract administration are the duties of the quantity surveyor. Hence quantity surveyor may well advise the client on the appointment of particular contractors or sub-contractors, likely where a tendering process has taken place. In such circumstances, a duty of care is owed. This can be seen in *Pratt v*

George J Hill Associates (1987) 38 BLR 25 (as cited in Murdoch & Hughes, 2001) where the architect recommended a particular contractor as ‘very reliable’, the architect was held liable for losses suffered by the client when the contractor executed defective work and then became insolvent. Therefore it can be argued that same obligation also applies to the action of a quantity surveyor.

This can be explained again in the case of *Partridge v Morris (1995) CILL 1095* (as cited in Ramus et al., 2007), where a householder involved an architect to prepare the designs for a house alteration. The architect (Morris) also assisted the tendering process and suggested a contractor to the householder (Partridge). Unfortunately, the proposed contractor was on the verge of bankruptcy, which affected the quality of the work executed. The householder terminated the contractor’s service and subsequently incurred considerable extra cost in getting the works finished. Because he was insolvent, getting these costs of the original contractor was meaningless. Therefore, Partridge tried to recover damages from the architect, part of the claim was that Morris should have reviewed the contractor’s financial status before recommending the acceptance of their tender.

Although the agreement between Partridge and Morris did not explicitly require the architects to carry out financial inspections, the court referred to a RIBA publication that outlined the responsibilities of the architect where it was specified that an architect should carefully examine the financial status of the firms providing a tender. Therefore, in this case, the court’s decision was that the architect bears the implicit responsibility to study the contractor's financial status and violate the obligation.

Sometimes clients ask the quantity surveyors to provide advice on contractor selection and appointment. In this case, it is important to understand what liabilities may be related to the advice provided.

2.8.6 Omission of Important Clauses in Conditions of Contract

In *William Tompkinson and Sons Ltd v Parochial Church Council of St Michael in the Hamlet (1990) CLJ 319* (as cited in Bohari, 2009), the architect under a JCT minor works contract did not advise the client to take out insurance for the works. As a result, when damage to the works caused losses far in excess of the contract value, the client had no insurance protection. The architect was held liable for negligence for the client’s losses.

2.8.7 Errors in Bills of Quantities

According to the finding of the research of Sunday and Afolarin (2013), errors in the bill of quantity might happen due to lack of adequate documentation, negligence of the professional and poor communication between the professional and the client.

2.8.8 Loss of Documents or Data

In one of Australian case, *Bains Harding Construction & Roofing (Aust) Pty Ltd v. McCredie Richmond & Partners Pty Ltd (1988)* (as cited in Bohari, 2009), the allegation made by the client towards the quantity surveyor for the missing pages in the tender documents. The defendant is a quantity surveyor engaged by plaintiff to prepare a quantity breakdown for a purpose of pricing a tender. However, the bill prepared by the defendant appeared to have missing pages causing BHC to underbid. Plaintiff claimed its loss from the defendant and it was successful.

2.8.9 Mistakes in Bid Pricing

According to Chigara et al. (2013), the contractors sometimes low price tenders due to inexperience and other related factors, thereby increasing their chances of winning tenders or inexperienced estimators inaccurately estimate the value of works to be executed. However, inaccurate estimates may cause to disrupt construction and budget programs; for instance, the contractor was unable to complete the works at its bid price because of a critical mistake in bid pricing.

2.8.10 Inaccurate Information

Providing inaccurate information can be seen in the case of *J Jarvis v Castle Wharf Developments (2001) 4 Ll Rep 308* (as cited in Ramus et al., 2007). This case related to the design and build project within the preservation area where there were strictly planning requirement. But certain aspects of the client's proposal had not been fully agreed with the planning authorities and that information were not clearly informed to the tenders by Gleeds, who was a quantity surveying firm, who was liable to provide the bid documents to the bidders. Jarvis was the successful bidder and had difficulties in reaching an agreement with the planning authorities on the proposals. Finally, an enforcement notice was issued to stop the work which was carried out until Jarvis conformed to the planning requirements and therefore, Jarvis wanted to recover the cost of delayed revisions by the client and quantity surveyors. In the first instance, Jarvis succeeded; the court found that Gleeds was negligent

in its representations to the bidder and violated his responsibilities. Nevertheless, the court's judgment was overturned in the appeal, which clearly shows that Jarvis depended on the very limited information provided and this lack of reliance removed one of the cornerstones of successful behaviors resulting from negligence misstatements. Though the initial decision was overturned on appeal, the message is still clear that if a quantity surveying firm neglect to provides statements that the other party relies on, they may be sued for financial losses because of negligent misrepresentations.

2.8.11 Fraudulent Misrepresentation

For example, an architect who fraudulently gives inaccurate information at the pre-tender stage will be liable to the contractor. This is so even if the contract provides that the contractor must not rely on any representation contained in the plans. This can be seen in the case of *S Pearson & Son Ltd v Dublin Corporation [1907] AC 351* (as cited in Bohari, 2009) where Dublin Corporation furnished Pearson's drawings, plans & specifications relating to the construction of sewer work. Pearson & Son Ltd entered into a contract to undertake this work based on this information. Some of the information was false causing Pearson to incur extra expense. Pearson performed contract but sought damages. Dublin claimed they were protected from liability due to a clause in the contract which stated that Pearson must not rely on any representation made in the plans or elsewhere but must verify and determine the facts for themselves. The court held that a party may not avoid liability for his own fraudulent statements by inserting a clause in the contract that the other party shall not rely on them.

2.8.12 Misstatement

There is a court case render negligence of the architect, who liable for a misstatement that is negligent rather than fraudulent. It was a New Zealand case *Day v Ost [1973] 2 NZLR 385* (as cited in Ramus et al., 2007), where the architect who negligently assured a contractor that he would receive full payment from the client for certain work. The contractor relied on this assurance in completing the job and, when the client failed to pay, the architect was held liable.

2.8.13 Unfair Treatment to Contractors in Tender Negotiations

Jayalath (2011) pointed out that in general, on private projects; the project owners have no legal obligation to disclose tender prices to the bidders, but explained this situation by giving example; that is, there were four bids; the lowest bid was approximately 2 million and the

second low bid was 4.5 million. The private project owner refused to disclose the bid prices, doubted it was wrong, but said that the bid was lower than the owner's estimate.

Nevertheless, the bidder confirmed the correctness of the bid and signed the contract. Due to a critical error in bid pricing, the contractor faced the difficulties of completing the project with its bid price. The contractor sued the project owner for fraudulent use of a known error in a bid. The owner believed that he is not obliged to disclose the bid price, but he used the opportunity to review and confirm its bid price. However, Jayalath (2011) contradicted and contended that ethically, client's quantity surveyor should indicate it or rejected the bid based on the unrealistic figures that are long-term unsustainable since it falls to unjust enrichment.

2.8.14 Inadequate Compliance with Standards

Noncompliance with standards can be seen in the case of *Townsend's (Builders) Ltd v Cinema News Property Management Ltd [1959] 1 All ER 7* (as cited in Ramus et al., 2007), where a contractor had been held liable to the client for certain breach of the statute (installation of toilets in contravention of a by-law, and failure to serve notices). The Court of Appeal held that, since the architect had led the contractor to rely on him to serve the relevant notices and ensure compliance with the by-laws, the contractor was entitled to recover from the architect the damages that he had to pay the client.

2.8.15 Lack of Information regarding Quality Assurance and Quality Control

The case of *Florida Hotels Pty Ltd v Mayo (1965) 113 CLR 588* (as cited in Ramus et al., 2007), is rendered the limited nature of an architect's obligation to monitor work is in any event. In this case, Florida Hotels decided to construct a pool at the rear of one of its hotels. Mayo was retained as the architect to design the pool. Florida Hotels did not engage a builder but instead engaged tradesmen and laborers to carry out the work. Mayo did some supervising of the works. Cooks, an employee of Florida Hotels, was injured when a concrete slab fractured. The fracture was caused by the faulty placement of reinforcing mesh. Mayo owed a duty of care to properly supervise the construction of the pool. The evidence showed that Mayo had failed to properly supervise the construction of the pool.

In *Clay v AJ Crump Ltd, [1964] 1 QB 533*, the owner of a garage made agreement with an architect, a demolition contractor, and a building contractor to repair it. The owner asked the architect to leave a particular wall standing to prevent people from entering the premises during the construction. The architect did so without inspecting the wall. The wall collapsed,

and killing two men and injuring Clay who was in a nearby building constructed by the building contractors. The court held that the architect was accordingly liable in negligence to the claimant, because he should have inspected the wall before leaving it up, the demolition contractors are liable because they should have inspected it and realized that it needed to be demolished, and the building contractors are liable as they were the client of the plaintiff and should have exercised reasonable care for his safety and failed to do so by building the structure close to the unsafe wall without inspecting it first.

2.8.16 Arithmetic Errors

The mere fact that the mistake in question may be a simple mathematical error will not be sufficient to rebut an allegation of negligence. In *Tyrer V. District Auditor of Monmouthshire (1974)* (as cited in Ramus et al., 2007) there were a number of successful claims against the quantity surveyor, including the allegation that the quantity surveyor had accepted ridiculously high rates for work from a contractor, which led to irrecoverable overpayments to the Contractor and had also made an arithmetical error when issuing an interim certificate. The judge found that the error could have happened at any time, but "the obligation was on the appellant to ensure that adequate checks were made".

2.8.17 Incorrect Valuation of Construction Work

An error in billing can mean a knock-on effect on the cash flow. Interim valuations are estimated based on the contract for the purpose of quickly assess the amount paid to the contractor (Jayalath, 2011). Jayalath (2011) further added the amount included in the interim valuations have no impact on the final settlement of final accounts and each interim valuation is a subject of the next valuation. Therefore, corrections and withholding clauses grant the absolute power to the quantity surveyor in case of incapacity of the engineer or engineer's representative to correct any error in the previous certificate (to increase or to omit a work done already certified) and to withhold any interim certificate, if any part of the work was not executed satisfactorily of the client according to the contract. In this regard, the quantity surveyor may detect an error in the previous valuation and correct the payment certificate. Therefore, its purpose is to avoid any incorrect payment continuity due to under/over measurement and pricing (Jayalath, 2011).

Nevertheless, in *London School Board V. Northcroft Son & Neighbour (1889)* (as cited in Ramus et al., 2007) case, the liability of quantity surveyor in calculations and overpayments

was discussed. The client brought an action against the quantity surveyors, because of clerical errors in the calculation that led to negligence, resulting in overpayments to the contractor. It was held that the quantity surveyor not liable since the quantity surveyor had engaged a skilled clerk who had made a large number of calculations correctly.

2.8.18 Errors in Claim Assessment

The certifier cannot bind his client under the contract unless authorized to him and usually only validate contractual claims related to time and money and issue variation orders (Jayalath, 2011). Although in the case of *Pacific Associates v. Baxter (1988)* (as cited in Bunni, 2005), Pacific who was contractor entered into a contract with the ruler of Dubai for the work of dredging in the Persian Gulf using FIDIC conditions of contract. Halcrow was the engineer. The delay was occurred due to the presence of hard materials and Pacific claimed additional expenses and extension of time, which were rejected by Halcrow. After the arbitral procedure begins, ruler agreed to pay Pacific some £10 million in full and final settlement of all claims against him. Then Pacific made claim against Halcrow £45 million being the unrecovered balance. The court of appeal dismissed Pacific's appeal and upheld the judge's decision arguing that Halcrow was not careful in certifying or in making decisions under clause 67 of the conditions.

2.8.19 Unfair Determination for Variations & Claims

As mentioned above, in the case of *Tyrer V. District Auditor of Monmouthshire (1974)* (as cited in Ramus et al., 2007), an extra payment to the contractor which arose due to the acceptance of unreasonably high rates for works by the quantity surveyor.

Further, an unfair determination can be seen in the case of *Clusky v Chamberlain (1994)* where the payment on a day work basis was discussed. In this case, the court of appeal held that the judge in lower court was wrong to go beyond the timesheets to establish an entitlement as to quantum. It was at no time suggested that the time sheets were wrong. There is no entitlement to argue that the workmen did not work as expeditiously as they might. The quantity surveyor has no power to alter hours which he considers to be excessive on a signed day worksheet. That is the payment on a day work basis is established a day worksheet has been signed by, for example, the architect, it is not for the quantity surveyor to reduce the hours on the grounds, that he considers them excessive.

2.8.20 Inappropriate Advice to Clients and Contractors on Contractual Matters

In the case of *Waghorn V. Wimbledon Local Board (1877)* (as cited in Bohari, 2009) case, when the quantity surveyor is aware regarding the client's monetary constraints on a particular project, then the responsibility to exercise the reasonable care that he considers whether it is possible to exceed the limit and to aware or notify the client in advance.

Although in the case of *Sutcliffe V. Thackrah (1974)* (as cited in Ramus et al., 2007) the defendant was an architect, the same obligation can be applied to the action of a quantity surveyor. In this case, two valuations had been prepared by the quantity surveyor based on the work which was defective and quantity surveyor have not been advised of the defects by the architect. It was held that the general rules of professional negligence applied to all aspects of an architect's duties and he should act impartially in carrying out his duties. The same responsibilities apply to the behavior of the quantity surveyor, although it was not an issue under consideration in this case.

2.8.21 Late Certifications and Non-Certifications

Poor cash flow management has always been the number one reason for contractors' failure and they can suffer significant financial difficulties if the client fails to pay on time. Further, previous studies on trends in project relationships and contracting practice carried out by Kumaraswamy (1997, as cited Mbachu, 2011) found that the prevalence of conflicts, claims and disputes in the construction industry hinged on payment-related issues.

In *Royden (M) Sdn Bhd v Syarikat Pembinaan Yeoh Tiong Lay Sdn Bhd* (as cited Judi & Rashid, 2010), payment was defined as "the value of any work, materials or goods comprised in the contract". In other words, payment is the consideration, in terms of money, for the work that a contractor has carried out in accordance with the contract plus the materials delivered to the site. Contractually, the said money must be paid promptly and fully unless there are specific reasons for delaying or withholding it (Judi & Rashid, 2010).

2.8.22 Lack of Monitoring or Controlling the Cost of Work in Progress

The quantity surveyor's role includes reporting to the client, at stages during the course of the project, about the project's financial liability. This task might be relatively straightforward at the outset but becomes more complex as the works proceed. Care should

be taken in order to identify an estimation of the likely time and cost implications in respect of events which might increase the cost of the project (RICS, 2012).

2.8.23 Unfair Treatment to Contractors in Final Account Negotiations

The final account of the project in construction contracts is defined as the agreed statement of the amount to be paid at the end of the contract by the owner to the contractor. Other problems with the closing of final accounts occur during justification of rates (work price changes) as well as due to the ignorance of contract administrator staff in justifying the rates on time. (Zakaria, Ismail, & Yusof, 2012)

2.9 Causes of Professional Faults & Negligence

As depicted by Flanagan and Norman (1983), the errors may arise because of the non-availability of crucial information. Further same authors (1983) identified few reasons for errors of a quantity surveyor, which may be occurred when forecasting of the tender price at the pre-contract stage for a proposed building,

- Forecasting construction prices are heavily based on the availability of historic price data, professional capability, and judgment.
- The historic price data may be defective due they are dependent on tender amount rather than the amount in the final account. Also, the sample buildings from which the data derived is not completely compatible with the proposed building.
- At the early design stage, there is limited information available about the proposed building and quantity surveyor must rely upon assumed or default values.
- Limited information on the proposed building in the first stage building
- The supposition that forecasts will be accurate if only the quantities and unit price rates can be determined precisely ignores the variability of unit price rates contained in bills of quantities.

This is supported by Sunday and Afolarin (2013) through their surveys which found that the causes of errors in construction documents in Nigerian construction industry, are professionals' inexperience, non-availability or lack of detailed information, lack of adequate documentation, poor cost control method, lack of quality management, negligence of professionals, insufficient planning and design work, design error and employing the

wrong procurement method. In the studies of Oyewande (as cited Odusami & Ameh, 2010) have shown that 50% of building failure cases in Nigeria due to carelessness and negligence and 40% due to professional incompetence and fraudulent practices. Andrew (1998), based on surveys establishes 'time pressures' (a global factor) and 'education and training' (a primary factor) are considered highly influential on human error. As per findings of the research of Cheung & Tsang (1997) in Hong Kong, inadequate time and information for the preparation of bills of quantities have affected to make the errors in bills of quantities.

Summarizing the above-mentioned review this study identifies the following reasons for professional faults & negligence.

- Non-availability or lack of detailed information
- Inaccurate Data
- Professionals' inexperience
- Professional incompetence
- Lack of adequate documentation
- Poor cost control method
- Lack of quality management
- Negligence of professionals
- Insufficient planning and design work
- Design error
- Employing the wrong procurement method
- Inadequate time
- Human Error
- Fraudulent practices of professionals

2.10 Effects of Professional Faults and Negligence

In general, there is an obligation upon the professionals to provide the necessary guidance and information for their client to make an accurate and informed decision (Jayalath, 2011). Otherwise, that could badly affect their client as well as their organization.

This is supported by Chinwokwu (as cited Ameh & Odusami, 2010) through this survey, which found that although many factors are responsible for building collapses in Nigeria about 37% of these collapses is because of carelessness and greed on the part of construction professionals and 22% are traceable to design faults. Further, the findings of the research of

Rahman et al. (2007) indicate that unethical acts of professionals have a direct negative effect on the quality of constructed projects and cause to undermine the client and users of those projects.

Mansfield, Ogwu, & Doran (1994) were of the opinion that poor project management during construction not only creates the deficiencies in the project planning and cost controlling, but also affects the expected outcomes of customers, contractors and consultants throughout the development process. Hicks (1992) revealed that accurate cost estimation at an early stage is the key to avoid cost overrun in projects. Further Doloji (2013) suggested that estimation of project costs at the early stages of the design process and the ability to manage these costs throughout the construction phase is paramount to a project's overall success. Further, Jayalath (2011) stated that the contractor will also suffer from a mistake in billing and it might mean a knock-on effect on the cash flow of the contractor.

In addition, Sunday and Afolarin (2013) identified the effects of errors in the construction documents on building projects in Nigerian construction industry. They are respectively abandonment of project, delays, rework, dissatisfaction by project owners, lack of confidence in consultants, the reputation of consultant office, frustration on stakeholders, lack of concentration on other projects, discourages investment and designer's profit.

Further, Ameh and Odusami (2010) suggested the impacts due to Professional ethical lapses are lead to project abandonment, capital flight & huge economic loss in the form of additional cost of projects (which runs, between 40 and 60% of awarded contract sum), additional costs often result from rework, contractual claims, litigation cost and lead to the collapse of building. And also Rahman et al. (2007) mentioned it will affect the reputation of the construction industry. Othman (2012) depicted that the construction professionals' unethical behavior, especially quantity surveyors, has negatively impacted on the reputation of the construction industry and its professionals and also the loss of public trust.

Summarizing the above-mentioned review this study identifies the following effects of professional faults and negligence to the organization and their client.

- Risk to stakeholders in achieving targets
- Negative effect on the quality of the projects
- Cost and time overrun in projects
- Negative effect on contractor's cash flow

- Lead to project abandonment
- Capital flight, and economic loss in the form of additional cost of projects
- Additional costs for rework
- Dissatisfaction by project owners
- Lack of confidence in consultants
- Loss of reputation of consultants
- Frustration on stakeholders
- Lack of concentration on other projects
- Discourages investment
- Loss of designer's profit
- Derives the contractual claims
- Increase litigation cost
- Lead to the collapse of the structures

Therefore quantity surveyor need to enjoy the uniqueness and ubiquitous expertise in construction cost management to generate value for client's money throughout the construction process and other duties wherever adaptable (Alfred, 2007).

2.11 Measures to Mitigate the Effects

According to the past studies they have shown that 50% of building failure cases in Nigeria is traceable to design faults because of carelessness and negligence of construction professionals, 40% of construction faults because of professional incompetence and fraudulent practices and 10% of product failures (Oyewande, as cited by Ameh & Odusami, 2010). Therefore it seems that there is a need to manage and mitigate these risks otherwise affects professionals' business performance and the project performance.

As per Cheung & Tsang (1997), the methods of reducing the liability exposures of construction professionals are institutional control over professional practice, statutory control over professional qualification, internal quality assurance system, conservative design, material and technology and legal advice. And also Linda et al. (2001) were of the opinion that one common measure in controlling professional ethics is the code of conduct.

Further, Houtte (1990) suggested that insurance is considered gradually to be an adequate solution for liability problems in the construction industry.

Summarizing the foregoing review this study identifies the following measures to be used as the mitigation of the effects.

- Internal quality assurance system
- Institutional control over professional practice (Code of Conduct)
- Litigation
- Alternative dispute resolution methods
- Contingency allowance
- Professional indemnity insurance system

Following subsections briefly discuss each mitigating measures.

2.11.1 Internal Quality Assurance System

Sriskandan (as cited in Andrew, 1998) reported that to avoid mistakes and errors, technologists prone to advocate measures related to the individual, e.g. improving the education, training, and selection of personnel. Further, Reason (as cited in Andrew, 1998) pointed out that errors are an integral part of mental function and cannot be eliminated through training. The same author further suggested to control the effect of errors that will be more productive.

2.11.2 Institutional Control over Professional Practice

Professional institutions have a crucial role to play in minimizing ethical lapses in the construction industry (Ameh & Odusami, 2010). Surveys conducted by researchers in Australia (Vee & Skitmore, 2003) identified several unethical conducts and ethical dilemmas in the construction industry such as negligence, bid cutting, corruption, collusive tendering, frontloading, underbidding, cover pricing, bid shopping, withdrawal of tender, conflict of interest, payment game and bribery. It is evident that there exist significant areas of concern pertaining to the ethical conducts practiced by the construction professionals.

Hence, Ameh and Odusami (2010) suggested that it is suitable to recommend that professional institutions/associations should give priority to consider the ethical discourse such as professional responsibility to the profession and the society, liabilities, negligence, and other contemporary ethical issues at technical sessions, public lectures, and seminars.

2.11.3 Litigation

Litigation is a general court procedure for resolving disputes as a general case. It involves courts and derives their authority from the law of the country (Hibberd & Newman, 1999). The courts do not require to establish contract terms for the jurisdiction. Litigation involves the resolution of the judge, who is responsible for the state and not all parties that appear before him. The result of litigation can be immediately enforced by the state agency and is the last resort after the parties to the court have nowhere to go (Redmond, 2001). But litigation is considered a more time-consuming and expensive method of resolving disputes (Hibberd & Newman, 1999). Jones (2006) in opined that litigation is “arcane, long-drawn-out, expensive, and not really the most efficient way of getting a dispute resolved, let alone achieving that nirvana sometimes called ‘justice’.” The stages of civil litigation were listed by Jones (2006) as follows:

- A demand letter is issued by the plaintiff giving details of the claim and its amount. A plaint, giving more details of the plaintiffs claim, is served within 14 days of the issue of the demand letter.
- The defendant then has to prepare his defense.
- Discovery then takes place, which is a process in which every document relevant to the case possessed by the other party has to be shown to the other.
- Expert witnesses are appointed at any stage in the litigation process to provide light on technical and complex issues.
- The trial occurs, following which a judgment is delivered on the case.

2.11.4 Alternative Dispute Resolution Methods

According to Teo and Aibinu (2007) over the last few decades, the construction industry has led to the growing preference for Alternative Dispute Resolution (ADR) methods due to perceived shortcomings of construction dispute litigation, with its attendant costs, delays, and adversarial relationship. ADRs include negotiation, conciliation, mediation, adjudication, and other hybrid processes (Cheung, Suen and Lam, 2002; Bunni, 2000). As discussed by Cheung and Suen (2002b) ADR methods are characterized by speed, voluntary participation, privacy, involvement of a neutral third party, binding or non-binding decision, cost-effectiveness, lesser degree of formality, preservation of business relationship, higher degree of control by parties, consensus, flexible procedure to suit dispute and confidentiality of dispute resolution process.

2.11.5 Contingency Allowance

The use of contingency in construction industry provides a clear and tacit recognition of the persistent problem of cost overruns in the delivery of construction projects (Afetornu & Edum-Fotwe, 2005). Afetornu and Edum-Fotwe (2005) further opined that the cost overrun of a project depends to a large extent on the skills and experience of project team leaders; managerial system and the procedures adopted during the construction process.

According to Touran (2003), estimating a reasonable contingency budget to allocate to handle the uncertainties is critical in cost management of construction. The same author further explained a most preferred way of estimating the amount for contingency is to consider the percentage of estimated budget seeing the previous experience with projects of similar nature. Estimation of indeterminacy is the most common way to consider one percent of the estimate based on prior experience with similar projects.

2.11.6 Professional Indemnity Insurance (PII) System

The word insurance means “a contract whereby one undertakes to indemnify another or pay or allow a specified or ascertainable amount or benefit upon determinable risk contingencies”. Houtte (1990) suggested that insurance is considered gradually to be an adequate solution for liability problems in the construction industry. The same author further depicts, several legislators tend to make insurance mandatory for construction contracts with one or more of the parties. Because of the failure to pay sufficient attention to this aspect of the works could lead to severe financial difficulties (Ramus et al., 2007).

PII is designed to provide coverage in respect of legal liability arising from the conduct of professional practice and it will indemnify the policyholder against claims made during the policy period for a breach of professional duty or any negligent performance of service (FIDIC, 2004; Ramus et al., 2007; RICS, 2009). Murdoch and Hughes (2001) indicated that professional consultants are required by their institutions to take out and maintain a specified level of indemnity insurance and failure to do so would be a breach of the professional's code of conduct. For example, the RICS insist that their members carry PII if they are offering a professional service under their chartered status (RICS, 2009). Further, industry professionals have developed many ways to supplement contract provisions and administration procedures for indemnifying the damages through the insurance. The

condition of the contract makes extensive provision for PII and shown in Table 2.4 can be reviewed as an example of such provisions.

Table 2.4: Provisions in Condition of Contract

Condition of Contracts	Relevant Clauses
<p>FIDIC Client / Consultant Model Services Agreement, 1998</p>	<p><u>Duty of Care and Exercise of Authority</u> 5. (I) The Consultant shall exercise reasonable skill, care and diligence in and exercise the performance of his obligations under the Agreement.</p> <p><u>Liability between the Parties</u> 16. Liability of the Consultant 16.1 The Consultant shall only be liable to pay compensation to the Client arising out of or in connection with the Agreement if a breach of Clause 5(i) is established against him.</p> <p><u>Insurance for Liability and Indemnity</u> 19. The Client can request in writing that the Consultant (i) insures against his liability under Clause 16.1, (ii) increases his insurance against liability under Clause 16.1 over that for which he was insured at the date of the Client's first invitation to him for a proposal for the Services.</p>
<p>Standard bidding document (SBD 4 (Design and build contracts) - Section III condition of contracts</p>	<p><u>18.4 Insurance for Professional Indemnity</u> The Contractor shall effect professional indemnity insurance, which shall cover the risk of professional negligence in the design of the Works. This insurance shall be for a limit of not less than that stated in the Contract Data. The Contractor shall use his best endeavors to maintain the professional indemnity insurance in full force and effect from Start Date until Completion of the Works. The Contractor undertakes to notify the Employer promptly of any difficulty in extending, renewing or reinstating this insurance.</p>

As suggested by Murdoch and Hughes (2001), the various construction professional members will each have their own insurance policy to indemnify them against liability for professional negligence. Ramus et al. (2007) were also of the same opinion that if surveyors, architects, contractors, etc., agree to take the professional responsibility or a design, they will need to establish a PII.

Following are the common practices of PII (Ashworth et al., 2013; Murdoch & Hughes, 2001; Ramus et al., 2007; RICS, 2009).

- Professional must also be arranged to continue paying for a considerable time for this cover, after completing the work and until their legal liability has ceased.
- PII will have a monetary limit imposed upon the level of indemnity it provides.
- The policy covers claims that are made during the period when the policy is effective, regardless of when the alleged negligence took place. Claims that occur once the policy has expired, even though the alleged event took place some time previously, will not be covered. Therefore a sole practitioner is well advised to maintain such a policy for some time after retirement. The period required to maintain run-off cover for RICS members is six years after they retire, to cover just such eventualities.

Ashworth et al. (2013) were of the opinion that it has always been prudent for quantity surveyors to protect themselves against possible claims from their negligence, for which they may be used. The RICS by laws and regulations make it compulsory for practices, firms or companies to be properly insured against claims for professional negligence. Most clients insist on implementing an effective professional liability insurance system to enable professionals to compensate if a loss occurs to the client due to professional negligence and errors (Murdoch & Hughes, 2001).

According to the above literature, it seems that if the architect, engineer, quantity surveyor, contractors, etc., accept a design or other professional responsibility, they will need PII. And also, it should be considered the services provided by the insurer in a careful manner and the claim against the insured have fallen within the scope of the policy, because there may be a loss due to failure to do so. Same situation is clearly illustrated in the case of *JCS Cost Management Limited v SR Johnson & QBE Insurance (International) Ltd* (as cited in Bryant, 2015), where the dismissing a claim for civil liability coverage under a professional indemnity policy on the basis the claim made against the insured was not in connection with his professional business practice. Hence, it highlights the need for insured to consider carefully the nature of the services they provide, and whether their policy covers all of their business activities. Therefore, this study focuses to identify the significant liabilities to be covered under PII.

2.12 Chapter Summary

Quantity Surveyor is one of the vital professionals involved in the construction industry, dealing with the problems related to construction cost, construction management and construction communication, on behalf of the client, and a cost expert whose prime task is to ensure that the project is kept within the agreed budget and that the client obtains value for money. However, the duties of professionals in the construction industry are subject to various uncertainties and risks such as professional faults, project safety or performance problems, and quality expectations since the professionals are expected to provide their professional services to their best performance and avoid professional negligence and errors. Nevertheless, there were few cases has been reported in several countries regarding the quantity surveyor's liabilities.

The methods of reducing the liability exposures of construction professionals are institutional control over professional practice; statutory control over professional qualification, internal quality assurance system, conservative design, material and technology, legal advice, controlling professional ethics is the code of conduct and insurance system. Finally, this chapter clearly emphasizes the maintaining of insurance system is considered gradually to be an adequate solution for liability problems in the construction industry.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

In the previous chapter, theoretical background of the area of study have been established and this chapter explains the methodological framework adapted for capturing the data needed to achieve the aim and the objectives of the research. Accordingly, this chapter includes the process of the research, including research approach, data collection, and data analysis techniques.

3.2 Research Process

As stated by Tan (2002), research design consider as the process of carrying the research problem to the conclusion. After that, the same situation was observed from different perspectives by Adams, Khan, Raeside, and White (2007); described the design of the research as a master plan for stipulating the process of collecting and analyzing the information needed. Therefore, simply stating, research design is a blueprint for bring to an end of the research objectives and answering research questions. Therefore, research design is the basic plan for the study and it includes four main concepts, such as what strategy to follow, in which framework, collect data from whom, and how to collect and analyze data (Punch, 2005). In this study, the design of the research process is shown in Figure 3.1.

3.2.1 Background Study

As illustrated in Figure 3.1, within the background study, it has been done a preliminary study, research problem identification and a literature review on the selected area. Although various research has been carried out within the area of ‘professional liabilities in the construction industry’, a few numbers of studies have been carried out on ‘professional liabilities of quantity surveyors’. However, the professional liabilities of quantity surveyors in Sri Lanka have not been identified adequately, leading to a situation of challenge the job security of quantity surveyors. Therefore this research intended to explore the measures available to mitigate the professional faults and negligence of quantity surveyors with special emphasis to PII. With the intention of getting an understanding of existing practices and knowledge on quantity surveyors’ professional liabilities, books, journals, and other

publications were studied. Accordingly, aim and objectives were established with regard to the research problem within the limited scope.

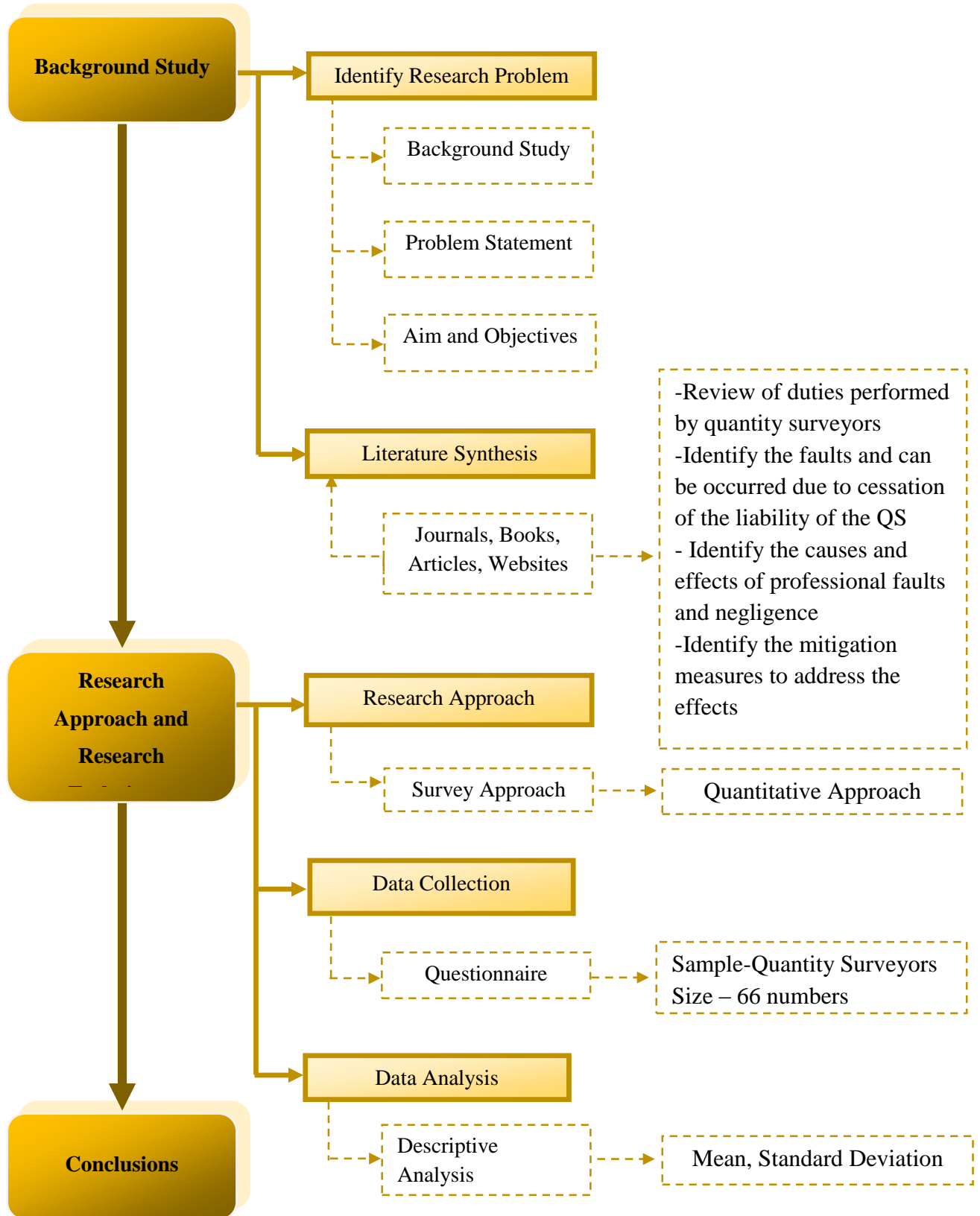


Figure 3.1: Research Design

3.2.1.1 Identification of Research Problem

According to Yin (2009), identifying the research question may be the most important step in the study. Thus, along with the particular research area, this research intended to explore the measures available to mitigate the professional faults and negligence of quantity surveyors with special emphasis to PII. A comprehensive literature review was carried out to support the aforementioned problem.

3.2.1.2 Literature Synthesis

To acquire knowledge on professional liabilities of quantity surveyors, a comprehensive literature survey was carried out in order to address the aforementioned research problem. It was found within the literature survey, professional liabilities of quantity surveyors around the world, as well in Sri Lanka, and faults and negligence due to the cessation of the liabilities of quantity surveyors. Subsequently, the causes and effects of faults and negligence were studied in order to identify the measures to be used to mitigate the effects with special emphasis to PII.

3.2.2 Research Approach

Various research approaches are available for carrying out a research, such as experiments, surveys, ground theory, ethnography, case study research, and action researches (Senarathna, 2005). Accordingly, based on the several justifications, survey approach was selected among them.

3.2.2.1 Questionnaire Survey

Research approaches are categorized mainly into two as Quantitative and Qualitative. Among them, the quantitative approach has a tendency of relating to positivism and seek out to collect factual data and to study the relationships between facts and how such facts and relationships accord with theories and the outcomes of any research executed previously (Fellows and Liu, 2003). Survey research and experimental research are comprised of such characteristics, therefore, basically coming under quantitative approach. Questionnaires can easily measure the opinions of many people. The data collected through the questionnaire is also very easy to compare between participants because they answer the same questions with a limited number of responses.

As mentioned in the first chapter, the aim of this study is to explore measures that can be used to mitigate the professional faults and negligence of quantity surveyors. Therefore, since survey approach provides an opportunity to *'gather factual data and to study relationships between facts and how such facts and relationships accord with theories and the findings'*, for this research, it was basically selected survey approach. According to Tan (2002), surveys are suitable for exploratory and descriptive studies, when answering the questions about 'what', 'how much' and 'how many'. Since this research is addressing the problem of *'What are the professional liabilities of quantity surveyors, causes, and effects of professional faults and negligence and measures available to address the effects with special emphasis on PII?'*, again it is convenient to be used survey approach for this research study.

Structure of the Questionnaire

The questionnaire was designed to capture data on the research problem. Therefore questions were developed based on the objectives of the research, which were needed to be achieved.

The questionnaire consisted of five sections. In the introductory session, the respondent is being questioned about his general information related to the questionnaire. Accordingly, section A consists four queries, including designation, types of the organization and experience in the field of Construction. Section B provides five questions which bring forth the perspective of the quantity surveyor regarding the duties performed by quantity surveyors, faults and negligence can be occurred due to the cessation of the liability of the quantity surveyors, causes and effects of quantity surveyor's faults and negligence and mitigation measures to address the effects. Section C contains three questions where this brings forth the quantity surveyors' point of view regarding the necessity of the professional indemnity insurance for the service rendered by him. Section B, C, and D are configured based on five – points likert scale (Refer the Appendix B). Accordingly, the questionnaire was designed to assess the views of a wider range of the quantity surveyors in connection with the construction industry.

Sample Selection

The concept of the sample is intrinsic to survey research (Kelley et al., 2003). Selecting a sample from a population is called as Sampling (Tan, 2002). Usually, it is impractical and uneconomical to collect data from every single person in a given population; thus, a sample

of the population has to be selected (Bowling, 2002). Selecting the most appropriate sample for the research is quite difficult (Tan, 2002); where the sampling can be done in two ways; selecting the sample randomly or non-randomly. Random sampling is employed when quantitative methods are used to collect data, i.e. questionnaires. Meanwhile, non-random sampling is commonly applied when qualitative methods are used to collect data (Kelley et al., 2003). Therefore, simple random sampling was selected as the appropriate method of selecting a sample for this study. Accordingly, the quantity surveyors from client's, consultant's and the contractor's parties were randomly selected.

Sample Size

There is no definitive sample size recorded to be considered for a survey. However, as Kelley et al. (2003) pointed out, large samples with rigorous selection are more powerful as they will yield more accurate results, but data collection and analysis will be proportionately more time consuming and expensive. Hence he further explained three main factors essential to be considered, when determining the size of the sample; the resources available, the aim of the study and the statistical quality needed for the survey. Considering the above factors, 120 numbers of quantity surveyors were randomly selected as the sample; among the clients', consultants' and the contractors' total quantity surveyors population.

3.2.3 Data Collection

Data collection for a research should be done in a rigorous and ethical manner (Kelley et al., 2003), since it is important, as an evidence of the study conducted. As the same author, further illustrated, there are three common survey or data collection methods; postal questionnaires, face-to-face interviews and telephone interviews. Postal questionnaires involve in sending questionnaires to a large sample of people covering a wide geographical area. Although this method is 'cold' and may be no contact between researcher and the respondent, it is less expensive and time-consuming than the remaining methods; where this study considered sending questionnaires to the selected sample in order to gather data. Therefore structured questionnaires which are also adaptable to being distributed by hand, post or email were used.

3.2.4 Data Analysis

After the questionnaire was drawn up, responses emerging from the results were identified from the respondents for moving into analysis stage. As stated by Kelly et al. (2003), the

reason behind the analysis of data is to review collected data, to make it easy to understand and provide answers to the original research questions. The method of research data analysis depends on the survey design. If it is a qualitative survey, it should be analyzed using established methods such as content analysis. If it is a quantitative survey, suitable statistical tests can be applied (Kelly et al., 2003).

Considering above, as it was collected the quantitative data through the survey, the analysis of the research was done using quantitative data analysis techniques. For that purpose, this study used descriptive statistics to analyze the data of this research. Descriptive statistics analysis uses means, frequencies, standard deviation, and percentages for presenting the finding of the survey. These techniques were used for analyzing data relating to the characteristics of respondents, their organizations and open-ended questions relevant to liabilities of quantity surveyors. Graphical techniques such as bar charts, pie charts, and tables were used for presenting the findings of these analyses with the help of Excel. Opinions of Subject matter expert's (SMEs) are used to validate and extend the research findings obtained from the questionnaire survey (Refer the Appendix C).

3.3 Chapter Summary

This chapter has discussed the research methodology implemented for conducting research. A quantitative approach was figured out as the best research approach for the research study. This involves a comprehensive literature review followed by questionnaire survey among quantity surveyors, in order to achieve the aim and objectives defined. The data generate from the survey was analyzed using statistical methods including descriptive statistics with the aid of Excel.

CHAPTER FOUR

4.0 RESEARCH FINDINGS

4.1 Introduction

This chapter presents the results, obtained using questionnaires administered to quantity surveyors in the construction industry and analyses the survey responses in relation to the following main themes: profile of the research participants, prevailing competencies/ duties of the quantity surveyors in the construction industry, quantity surveyors' perception regarding the common faults made by them, resultant effects could occur due to common faults of quantity surveyors, most suitable mitigation measures that could be used to address the above effects and extent of the success of professional indemnity insurance (PII).

4.2 Profile of the Survey Participants

The questionnaires administered to quantity surveyors who were working in three major sectors such as client, consultant, and contractor and working as at various capacity and working in local and international construction industry. The questionnaire was sent via email and by hand. The email contacts of quantity surveyors were graduate qualified from universities of Sri Lanka and graduate or associate members who were registered with the professional institute of quantity surveying in Sri Lanka.

A total of 120 questionnaires were sent out and from which 82 were received. However, only 66 valid responses were considered for analysis after the data clearance, representing 55% response rate. Figure 4.1 shows the rate of responses from the selected sample.

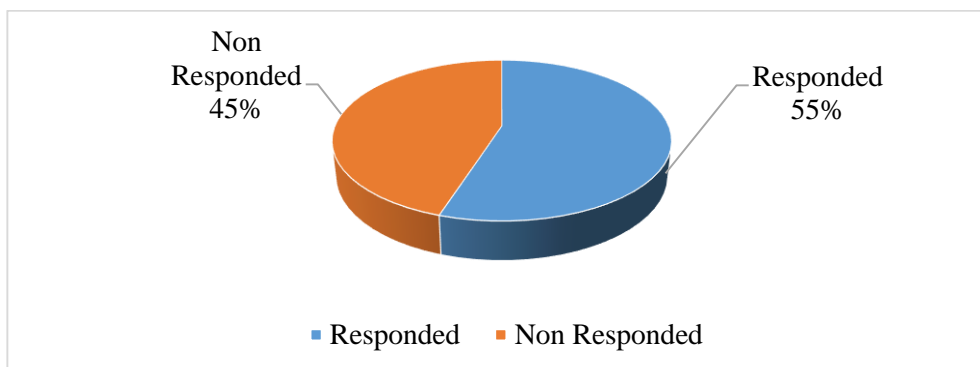


Figure 4.1: Rate of responses

As first of the survey, the questionnaire collected the information about the participants' demographic details such as sub-sector group they belong to, designation/position, number of years of experience, and location they have experienced in the field of construction. Table 4.1 provides a summary of the demographic information obtained from participants.

Table 4.1: Demographic Profile of Participants

Demographic information		Number	Percentage										
Major category of Services	Client	12	<table border="1"> <tr><td>Contracting</td><td>23%</td></tr> <tr><td>Consultancy</td><td>59%</td></tr> <tr><td>Client</td><td>18%</td></tr> </table>	Contracting	23%	Consultancy	59%	Client	18%				
	Contracting	23%											
	Consultancy	59%											
Client	18%												
Consultancy	39												
Contracting	15												
Position/ Designation	Contract Manager	8	<table border="1"> <tr><td>Contract Manager</td><td>12%</td></tr> <tr><td>Chief Quantity Surveyor</td><td>9%</td></tr> <tr><td>Senior Quantity Surveyor</td><td>35%</td></tr> <tr><td>Quantity Surveyor</td><td>27%</td></tr> <tr><td>Other</td><td>17%</td></tr> </table>	Contract Manager	12%	Chief Quantity Surveyor	9%	Senior Quantity Surveyor	35%	Quantity Surveyor	27%	Other	17%
	Contract Manager	12%											
	Chief Quantity Surveyor	9%											
	Senior Quantity Surveyor	35%											
	Quantity Surveyor	27%											
Other	17%												
Chief Quantity Surveyor	6												
Senior Quantity Surveyor	23												
Quantity Surveyor	18												
Other	11												
Years of experience in the field of construction	5 -10 years	23	<table border="1"> <tr><td>More than 25 years</td><td>15%</td></tr> <tr><td>21 - 25 years</td><td>14%</td></tr> <tr><td>16 - 20 years</td><td>24%</td></tr> <tr><td>11 -15 years</td><td>14%</td></tr> <tr><td>5 - 10 years</td><td>35%</td></tr> </table>	More than 25 years	15%	21 - 25 years	14%	16 - 20 years	24%	11 -15 years	14%	5 - 10 years	35%
	More than 25 years	15%											
	21 - 25 years	14%											
	16 - 20 years	24%											
	11 -15 years	14%											
5 - 10 years	35%												
11 -15 years	8												
16 - 20 years	16												
21 - 25 years	9												
More than 25 years	10												
Experience related to quantity surveying in terms of location	Local	13	<table border="1"> <tr><td>Both Local & International</td><td>73%</td></tr> <tr><td>International</td><td>6%</td></tr> <tr><td>Local</td><td>21%</td></tr> </table>	Both Local & International	73%	International	6%	Local	21%				
	Both Local & International	73%											
	International	6%											
Local	21%												
International	4												
Both Local & International	49												

A breakdown of the major groups of the client, consultancy, and contracting quantity surveyors is indicated in Table 4.1. An 18% (12 out of 66) were working in client organization while 59% (39 out of 66).for consultancy organization. Participants with contracting organization came to 23% (15 out of 66).

Above 35% (23 out of 66) were working as senior quantity surveyor while other 27% each of them were working as a quantity surveyor. Another 18% (12 out of 66) was categorized as others which included professionals such as directors, cost controller, proprietor, commercial manager, etc. Over 74% (49 out of 66) of respondents have worked in both locally and internationally. 20% (13 out of 66) of respondents have experienced only locally while 6% (4 out of 66) have only international experience.

In order to ascertain the reliability of the data collected, the questionnaire survey sought information regarding respondent's years of experience in construction-related fields. Hence, participants were also required to give an indication of the number of years' experience in the industry. The distribution of the participants' experience in the industry illustrated that 35% (23 out of 66) of them had 5-10 experience while another 24% and 12% have worked 15-20 years and 10-15 years in the industry respectively. While another almost an equal % of over 14% of them have experienced 20-25 years and more than 25years.

In terms of the above profile information indicated, the majority of participants (53%) has over 15years experienced and has a wide variety of experience with quantity surveying profession. Therefore, in general, this profile data of research participants provides an indication that the findings of the study are reliable.

4.3 Duties of Quantity Surveyors in Construction Industry

The duties performed by quantity surveyors were identified by referring to the various professional association for quantity surveying profession established in countries such as RICS, IQSSL, AIQS, NZIQS, CIQS, ICEC, ASAQS etc. Those duties were presented to participants and required to indicate the frequency of their involvement in those duties on a scale of 1 (Not at all) to 5 (Very highly).

The calculated mean and standard deviation for those duties are presented in Table 4.2. As observed from the results, the participants have highly involved in interim valuations and payments, valuation of variations, contract administration, monitoring, and exercising cost control over the project, forecasting costs to complete and preparing financial statements, preparing of variation and claims, final account preparation and agreement, preliminary cost estimates and advice, evaluating and settling contractual claims, preparing tender documents, advice on cost limit & budget, negotiating contract prices and preparing contract documents, selection of contractors or sub-contractors or suppliers with the mean value of above 3.6.

Table 4.2: Duties of Quantity Surveyors

Duties of quantity surveying professionals	N	Mean	St Dev
Interim valuations and payments	66	4.390	0.780
Valuation of variations	66	4.290	0.700
Contract administration	66	4.120	0.790
Monitoring, and exercising cost control over the project	66	4.080	0.920
Forecasting cost to preparing financial statements	66	3.970	0.960
Preparing of variation and claims	66	3.950	1.160
Final account preparation and agreement	66	3.890	0.990
Preliminary cost estimates and advice	66	3.790	0.940
Evaluating and settling contractual claims	66	3.730	0.940
Preparing tender documents	66	3.710	0.920
Advice on cost limit & budget	66	3.700	0.860
Negotiating contract prices and preparing contract documents	66	3.650	1.090
Selection of contractors or sub-contractors or suppliers	66	3.610	0.990
Advice on contractual dispute	66	3.520	1.100
Preparing budgets and cash flow forecasts	66	3.440	0.980
Cost planning and cost checking	66	3.420	0.910
Estimating contract price for use in benchmarking tenders	66	3.380	1.200
Advising on contract strategies and procurement systems	66	3.290	0.990
Subcontract administration	66	3.200	1.180
Value management/ value engineering	66	2.950	0.900
Tendering for winning job	66	2.680	1.370
Project management	66	2.620	1.220
Settlement of payment disputes and giving expert evidence in arbitrations and disputes	66	2.440	1.310
Investment appraisal/ feasibility studies	66	2.380	1.170
Risk Management	66	2.330	1.110
Due diligence auditing	66	2.150	1.220
Insurance valuation	66	2.050	1.070
Sustainability advisor	66	1.920	1.010
Property consulting and development services	66	1.880	1.130
Asset valuation & management	66	1.770	0.960
Facilities management	66	1.670	1.010
Capital allowances	66	1.580	0.930
Corporate recovery and insolvency	66	1.500	0.920

On the other hand, participants have very limited experienced and involvement in duties such as, settlement of payment disputes and giving expert evidence in arbitrations and disputes, investment appraisal/ feasibility studies, risk management, due diligence auditing, insurance valuation, sustainability advisor, property consulting and development services, asset valuation & management, facilities management, capital allowances and corporate recovery and insolvency.

In addition to above duties, participants were asked to indicate any other duties they have performed while working as a quantity surveyor in the local or international construction industry. According to the participants, quantity surveyors have involved in quantity verification of the material importation for BOI approvals, project coordinating, client management, construction technologies, health and safety, depreciation, tax calculation, adjudication, arbitration and refer Table 4.3 for further detail.

Table 4.3: Other Duties of Quantity Surveyors

No	Respondent ID	Duties
1	RID9	Advising control/ monitoring for a bill of material, quantity verification of the material importation and the BOI approvals, Valuation of due insurance claims.
2	RID13	Client management
3	RID16	Project coordinator
4	RID23	Data management, client care, construction technologies, health, and safety.
5	RID25	Life cycle costing evaluation
6	RID31	Cost auditing, reviewing bidding documents, evaluation of bids and evaluation reports
7	RID39	Accuracy of quantities
8	RID 50	Conciliation, Adjudication, Arbitration
9	RID57	Adjudication
10	RID61	Depreciation, tax calculation and advice, coordination, industry search for a suitable vendor, subcontractor, and contractor, budget approval, EOT assessment, project scheduling, etc.

4.4 Faults and Negligence of Quantity Surveyors

In view of the increasing claims in relation to professional practice, it is of practical interest to have the view of the industry regarding the situations where they have failed to discharge their responsibilities or negligence in delivering services or professional conduct which is less than the level of skill, care, and diligence of the profession at large. Even the most established experts can sometimes make mistakes. Therefore, subsequently, participants were asked to indicate the faults that are commonly committed by them in performing the above duties. A five-point Likert scale (where 1= Never to 5 = Very frequently) was used to obtain the responses.

The calculated mean and standard deviation for those common faults and negligence are given in Table 4.4. As observed from the results, the common faults averagely committed by quantity surveyors are errors in bills of quantities i.e. errors in quantities, rates or description, late certifications and non-certifications, misleading pre-contract estimate and advice, lack

of information regarding quality assurance and quality control, failure to take prompt action or response (e.g. failure to notify the contractor on insufficient speed of work), lack of monitoring or controlling the cost as work in progress, omission of important clauses in conditions of contract, failure to keep client informed on matters with significant cost implication, incorrect valuation (for construction work, variations, claims, etc.), unfair determination of variations and claims, errors in claim assessment, inaccurate determinations in price adjustment, and inappropriate advice to client & contractor in contractual matters with the mean value of above 2.5. On the hand, fraudulent misrepresentation is either never or rarely made fault by quantity surveyors while they are delivering their services.

Table 4.4: Faults and Negligence of Quantity Surveyors

Faults and Negligence of Quantity Surveyors	N	Mean	St. Dev
Errors in bills of quantities i.e. errors in quantities, rates or description	66	3.606	0.990
Late certifications and non-certifications	66	3.045	1.156
Misleading pre-contract estimate and advise	66	2.955	0.952
Lack of information regarding quality assurance and quality control	66	2.924	1.114
Failure to take prompt action or response (eg. Failure to notify the contractor on insufficient speed of work)	66	2.909	0.972
Lack of monitoring or controlling the cost of work in progress	66	2.742	1.168
Omission of important clauses in conditions of contract	66	2.712	0.924
Failure to keep client informed on matters with significant cost implication	66	2.667	1.043
Incorrect valuation for construction work	66	2.667	0.883
Unfair determination of variations and claims	66	2.606	1.122
Errors in claim assessment	66	2.591	0.960
Inaccurate determinations in price adjustment	66	2.576	1.039
Inappropriate advice to client and contractor on contractual matters	66	2.576	1.138
Mistakes in bid pricing	66	2.485	1.056
Inappropriate advice on selection of contractors/ sub-contractors/ supplies	66	2.424	1.024
Inaccurate information	66	2.409	0.859
Inadequate compliance with standards (eg. Non-compliance with government procedure guidelines)	66	2.409	1.095
Arithmetic errors	66	2.394	0.677
Unfair treatment to contractors in final account negotiations	66	2.379	1.064
Loss of documents or data (eg. Preparation of a tender document with some important pages missing)	66	2.227	0.908
Unfair treatment to contractors in tender negotiations	66	2.212	1.060
Misstatements	66	2.076	0.865
Fraudulent misrepresentation	66	1.576	0.498

Apart from above, participants were given an opportunity to indicate any other faults that could be committed by quantity surveyors while performing their professional duties.

According to participants, quantity surveyor's faults not listed in above are the unnecessary and inappropriate documents are included in the tender documents; basically, this is due to copying from other projects preparation of non-balance risk, conflict of interest situations, defects in contract formation and refer Table 4.5 for further detail.

Table 4.5: Other Faults and Negligence of Quantity Surveyors

No	Respondent ID	Other Faults and Negligence of Quantity Surveyors
1	RID9	Quantity surveyor's working on behalf of client not for fair and reasonable for other parties involved in the contract.
2	RID12	Conflict of Interest situations.
3	RID31	Missing items in the BOQ, Wrong determination on the appropriate Form of Contract to be used
4	RID33	Unnecessary and inappropriate documents are included in the tender documents; basically, this is due to copying from other projects, Not a risk balance contract documents produced by quantity surveyors.
5	RID49	Documentation errors, misrepresentation, calculation error, Defects in contract formation

4.5 Causes of Quantity Surveyors' Faults and Negligence

It is very important to be aware of the causes that could contribute to failure to discharge the quantity surveyors' responsibilities. Thus, participants were asked to indicate the extent of affecting the number of causes identified from literature for the causes of professional faults & negligence on a five-point Likert scale (1-Never to 5- Very highly) based on their experiences. The calculated mean and standard deviation for those causes are shown in Table 4.6.

As observed from the results, the causes highly affected to commit the professional faults and negligence are professionals' inexperience, professional incompetence, non-availability or lack of detailed information, inaccurate data and poor cost control method, inadequate time, fraudulent practices of professionals, lack of quality management, design error, insufficient planning and design work, negligence of professionals, lack of adequate documentation with the mean value of above 3.5.

Further, employing the wrong procurement method and human error were considered as averagely affected to made quantity surveyor's faults and negligence with the mean value of below 3.5.

Table 4.6: Causes of Quantity Surveyor's Faults and Negligence

Causes for Professional Faults & Negligence	N	Mean	St. Dev
Professionals' inexperience	66	4.227	1.020
Professional incompetence	66	4.091	0.924
Non-availability or lack of detailed information	66	4.061	0.857
Inaccurate Data	66	4.030	0.944
Poor cost control method	66	4.015	1.222
Inadequate time	66	3.970	0.911
Fraudulent practices of professionals	66	3.970	1.022
Lack of quality management	66	3.818	1.136
Design error	66	3.758	1.068
Insufficient planning and design work	66	3.712	1.092
Negligence of professionals	66	3.636	1.474
Lack of adequate documentation	66	3.606	1.021
Employing the wrong procurement method	66	3.576	1.124
Human Error	66	3.303	1.150

As part of the question, which required participants to indicate any other causes affect to commit the faults and negligence by quantity surveyors. Four participants expressed their views regarding other causes and they are unnecessary and inappropriate documents are included in the tender documents (due to copying the documents from other projects), not to have or define their boundaries of works and responsibility, working without taking a break and within allocated working time, working under pressure, not priorities the works correctly, persons are not honesty and having poor negotiation and influencing skills. The respondents' views are presented in Table 4.7.

Table 4.7: Other Causes of Quantity Surveyors' Faults and Negligence

No	Respondent ID	Causes for Quantity Surveyors' Faults and Negligence
1	RID33	Copying from other projects when preparing contract document.
2	RID39	Honesty is not there
3	RID61	Having poor negotiation and influencing skills
4	RID64	Not to have or define their boundaries of works and responsibility, working without taking a break and within allocated working time, work under presser, not priorities the works correctly.

4.6 Effects of Quantity Surveyors' Faults and Negligence

This section presents an analysis of the resultant effects that could occur due to the faults of quantity surveyors. Participants were required to indicate the frequency of occurring the effects to the employer or company, due to the cessation of liabilities of quantity surveyor as per their experience on a scale of 1 (Not at all) to 5 (Very highly).

The calculated mean and standard deviation for those common faults are given in Table 4.4. As observed from the results, it seems that participants were of the similar opinion in line with the effect to the employer and the faults committed by surveyors. Accordingly, participants were identified as the effects that could occur due to quantity surveyors faults and negligence are cost and time overrun in projects, derives to contractual claims, negative effect on contractor's cash flow, dissatisfaction by project owners, risk to stakeholders in achieving targets, loss of reputation of consultants, increase litigation cost, lack of confidence in consultants, frustration to stakeholders, additional costs for rework, negative affect on the quality of the projects, lack of concentration on other projects and discourages investment with the mean value of above 2.5.

On the other hand, participants were of the opinion that capital flight, and economic loss in the form of additional cost of projects, loss of designer's profit and lead to project abandonment are the rarely occurred due to quantity surveyors' faults and negligence. The result obtained from the analysis is presented in Table 4.8.

Table 4.8: Effects of Quantity Surveyors' Faults and Negligence

Effects of Quantity Surveyors' Faults and Negligence	N	Mean	St.Dev
Cost and time overrun in projects	66	3.636	1.062
Derives to contractual claims	66	3.545	1.139
Negative effect on contractor's cash flow	66	3.470	1.180
Dissatisfaction by project owners	66	3.106	1.111
Risk to stakeholders in achieving targets	66	3.015	1.030
Loss of reputation of consultants	66	2.909	1.048
Increase litigation cost	66	2.894	1.083
Lack of confidence in consultants	66	2.848	1.070
Frustration to stakeholders	66	2.833	1.046
Additional costs for rework	66	2.788	0.920
Negative effect on the quality of the projects	66	2.682	1.010
Lack of concentration on other projects	66	2.652	0.850
Discourages investment	66	2.606	1.135
Capital flight, and economic loss in the form of additional cost of projects	66	2.515	1.056
Loss of designer's profit	66	2.470	1.041
Lead to project abandonment	66	2.333	0.934

As part of the question, participants were given the opportunity to indicate any other effects that could occur due to faults and negligence of quantity surveyor. Six participants expressed their views, such as reputational damage to the quantity surveying profession, harm to the dignity of the profession, cost overrun leads the cost cutting and it effects the

supervisions and administration of the project, employers' increased business risk, loss of projects' commercial feasibility and is presented in Table 4.9.

Table 4.9: Other Effects of Quantity Surveyors' Faults and Negligence

No	Respondent ID	Other Effects of Quantity Surveyors' Faults and Negligence
1	RID12	Lack of coordination by others
2	RID13	Reputational damage to the quantity surveying profession
3	RID32	Harm to the dignity of the profession
4	RID35	Cost overrun leads the cost cutting and it effects the supervisions and administration of the project
5	RID36	Failure in timely send notice to claim/ adhere to notice requirement (eg Sub-Clause 1.9 - FIDIC) Failure in conflict/dispute negotiation and drag the case to next level of DR
6	RID49	Employers' increased business risk/Loss of projects' commercial feasibility

4.7 Mitigation Measures to Address the Effects

It is very important to be aware of the suitability of a number of mitigation measures that could be used to address the effects. There are many ways that may be used to resolve cases of professional faults and also to limit the consequences of professional liability. Thus, respondents were asked to indicate the suitability of the number of mitigation measures identified from the literature on a five-point Likert scale based on their experiences. A weight in a scale from 1 to 5 was given for each of the five frequencies with a weight of 1 for “highly unsuitable”, 2 for “unsuitable”, 3 for “Suitable but risky”, 4 for “Suitable” and 5 for “Most suitable”. The calculated mean value and standard deviation of the data are given in Table 4.10. In terms of mitigation measures, internal quality assurance system, institutional control over professional practice, and professional indemnity insurance system and these are equally demanded by the participants with the mean value of above 4.0.

Table 4.10: Mitigation Measures to Address the Effects

Mitigation Measures	N	Mean	St Dev
Internal quality assurance system (eg. Providing education and training)	66	4.364	0.871
Institutional control over professional practice	66	4.197	0.964
Professional Indemnity Insurance system	66	4.030	0.764
Alternative dispute resolution methods	66	3.773	0.873
Adequate contingency allowances	66	3.621	0.855
Litigation	66	2.439	0.994

92% of quantity surveyors regard internal quality assurance system as suitable or most suitable mitigation method in the organization to mitigate the effects due to professional negligence cases. In addition to providing education, awareness program, and training program for the professional work, good office management procedures can help to prevent claims of negligence from arising.

As per the result, 85% the quantity surveyors agreed that the conduct of the quantity surveyor in performing professional services should be governed by the ethics and codes of professional practice of the quantity surveying profession.

68% of them think that alternative dispute resolution methods and adequate contingency allowances are either suitable or most suitable method. The findings show that 58% of the respondents think that litigation is either an unsuitable or highly unsuitable way or 26% of them think litigation is a suitable way but risky for settling professional negligence cases. The process of litigation is slow, expensive and involves a lot of publicity which may be injurious to the reputation of the professional. As such, it is not a favoured way of settling disputes and may only be used as a last resort in the event of all else fails. These findings point to the suitability and relevance of professional indemnity insurance in the construction industry.

82% of participants regard professional indemnity insurance system is either suitable or most suitable mitigation measure to address the bad effects due to professional faults and negligence cases. Professional indemnity insurance policies undertake to compensate the insured for any sums he may undertake to compensate the insured for any sums he may become legally liable to pay in the ordinary course of his business due to any negligent act, error or omission committed.

Hence, it is evident from these results that professional negligence claims against quantity surveyors arise very infrequently, and as a result, PII policies have not been used very much in the settlement of claims that arise from the negligence of the professionals working in the construction industry.

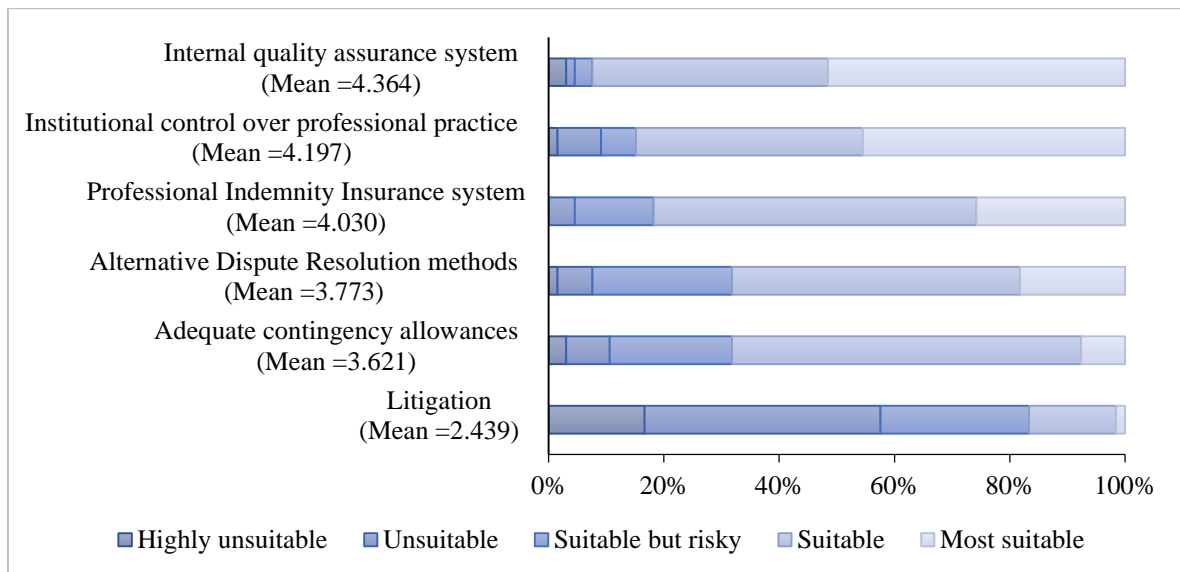


Figure 4.2: Suitability of Measures to Mitigate the Effects

As part of the question which required participants to indicate any other mitigation measures to address the effects or whether there are any other strategies to be used to avoid or reduce the quantity surveyors' faults. Twelve participants expressed their suggestions and they are listed below and presented in Table 4.11.

- Appoint a highly qualified competent quantity surveyors
- Establish a proper checking system
- Provide a pleasant working environment (officers shall not be overloaded or demotivated)
- Proper project management practice
- Assign duties properly
- Enhance the quality of quantity surveyors' education and close and effective regularity mechanism from the Professional institution
- Follow Buddhism and grow qualities of the person and
- Improve the industry standards.
- Good knowledge about the project by the project team,
- Proper and effective communication system within the project team
- Appoint a design coordinator who is responsible for the entire project
- Frequent design coordination
- Maintaining quality assurance workshop by the project team
- Use standard formal professional practice of each and every individual professional with adequate time involvement for the requirement of the projects.

Table 4.11: Suggestions to mitigate the Quantity Surveyor’s Faults and Negligence

No	Respondent ID	Suggestions to Avoid or Reduce the Quantity Surveyors’ Faults and Negligence
1	RID10	Establish a proper checking system, provide a pleasant working environment (officers shall not be overloaded or demotivated), proper project management practice, assign duties properly, proper communication practice
2	RID13	Enhance the quality of QS education and close and effective regularity mechanism from the Professional institutions.
3	RID15	Hiring competent professionals who fit for the purpose
4	RID 25	Having one QS with lesser experience will be another cause for these type of errors. Therefore having QS team (at least 2 people) with well experienced one will be good solution.
5	RID31	Sending the documents through a thorough internal checking process before issuing (As part of Internal quality assurance system)
6	RID33	Appoint a Highly Qualified Competent Quantity Surveyors.
7	RID36	Improve attitudes via workshops, training, etc
8	RID39	Following Buddhism and grow qualities of the person
9	RID49	Have third party checkers for documentation accuracy.
10	RID50	Training, CPD, Forum need to be maintained by professional institute to update the professionals, professionals should limit their services.
11	RID51	Industry Standard should be improved.
12	RID52	Good knowledge about the project by project team, Proper and effective communication system within the project team and Appoint a design coordinator who is responsible for entire project.

4.8 Requirement of PII for Indemnifying the Damages

It is very important to be aware of the maintaining PII for indemnifying the damages caused by the faults of quantity surveyors. Participants were asked to indicate the requirement of maintaining a PII to indemnify the policyholder against claims made for a breach of professional duties and the requirement was indicated using a scale of 1 (Not at all) to 3 (Always). A detailed scrutiny of Figure 4.3 shows that around 17% of respondents ‘Always’ require the PII while another 77% of them ‘sometimes’ require the PII. Balance 6% of participants indicated that the requirement of PII is ‘Not at all’.

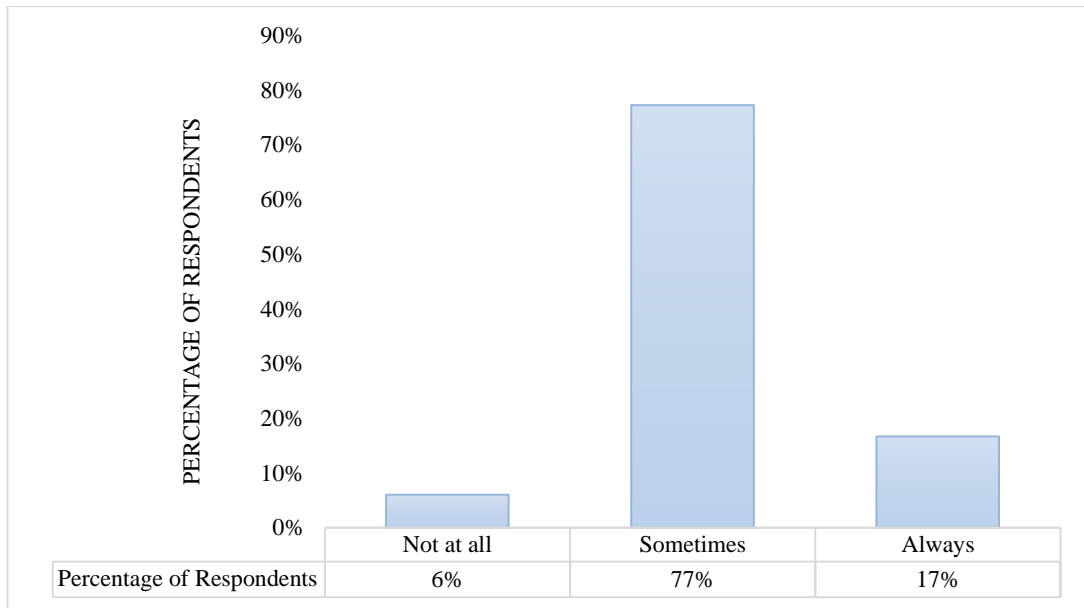


Figure 4.3: Requirement of PII for Indemnifying the Damages of Quantity Surveyors

4.9 Significant Liabilities of Quantity Surveyors to be Covered under PII

This section of the questionnaire covered significant liabilities to be covered under PII. As highlighted in section 4.8, the requirements of the PII are commonly noted, but in this study, the requirement of the PII considered at each liabilities separately since nowadays, for many contracts the possession of a valid professional indemnity insurance policy is a pre-requisite for handling both consultancy and construction work. Hence, identifying the significant liabilities of quantity surveyors to be covered under PII will assist to arrange proper, adequate insurance system. 4 respondent out of 66 were of the opinion that PII is not required to indemnify the damages caused by the above faults of quantity surveyors. Hence 62 participant (out of 66) responded to this question.

Twenty-three common faults were identified from the literature. Participants were given the scale of 1 (Not at all) to 3 (Always) to indicate the need for PII coverage the following liabilities. The calculated mean value and standard deviation of the data are given in Table 4.12. As observed from result, quantity surveyors indicated errors in bills of quantities, misstatements, inappropriate advice in contractual matters to client and contractor, loss of documents or data, misleading pre-contract estimate and advise, inaccurate information, misreading of tender document, absence of important clauses in conditions of contract, fraudulent misrepresentation and arithmetic errors are the significant liabilities of quantity surveyors to be covered under PII.

Table 4.12: Significant Liabilities of Quantity Surveyors to be covered under PII

Significant Liabilities of Quantity Surveyors	N	Mean	St. Dev
Errors in Bills of Quantities i.e. errors in quantities, rates or description	62	2.387	0.610
Misstatements	62	2.371	0.659
Inappropriate advice to client and contractor on contractual matters	62	2.210	0.577
Loss of documents or data (eg. Preparation of a tender document with some important pages missing)	62	2.194	0.649
Misleading pre-contract estimate and advise	62	2.161	0.682
Inaccurate information	62	2.161	0.632
Mistakes in bid pricing	62	2.145	0.623
Omission of important clauses in Conditions of Contract	62	2.129	0.799
Fraudulent misrepresentation	62	2.065	0.539
Arithmetic errors	62	1.984	0.640
Inaccurate determinations made for price adjustment	62	1.968	0.511
Late certifications and non-certifications	62	1.935	0.597
Failure to keep client informed on matters with significant cost implication	62	1.935	0.624
Errors in claim assessment	62	1.903	0.593
Inadequate compliance with standards (eg. Non-compliance with government procedure guidelines)	62	1.903	0.646
Incorrect valuation of construction work	62	1.871	0.495
Unfair treatment to contractors in final account negotiations	62	1.855	0.674
Lack of information regarding quality assurance and quality control	62	1.855	0.596
Unfair determination of variations and claims	62	1.855	0.674
Lack of monitoring or controlling the cost of work in progress	62	1.661	0.700
Inappropriate advice on selection of contractors/ sub-contractors/ supplies	62	1.597	0.689
Failure to take prompt action or response (eg. Failure to notify the contractor on insufficient speed of work)	62	1.516	0.671
Unfair treatment to contractors in tender negotiations	62	2.387	0.610

4.10 Reasons for Non-Possession of PII in Organization for Quantity Surveyors

The participants were asked to indicate the reasons for the non-possession of the PII in their organization and thirteen participants expressed their views. The aim was to identify the barriers to practice PII for quantity surveyors effectively in Sri Lanka. According to the participants, management decisions, difficulties in finding an adequately covered policy, exemption from the requirement of maintaining a PII in public sector in Sri Lanka and management has less knowledge about the PII, exclusion of provision for PII in consultancy contracts, no friendly insurance cover available in Sri Lanka, lack of confidence about Insurance, maintaining an insurance system is very expensive and not affordable are the reasons for non-possession of the PII for quantity surveyors. The views are presented in Table 4.13.

It is evident from these views that claims made for the breach of professional duties, against quantity surveyors arise very infrequently, and as a result, PII policies have not been used very much in the settlement of claims that arise from the faults or negligence of the quantity surveyors in the construction industry.

Table 4.13: Reasons for Non-Possession of PII in Organization for Quantity Surveyors

No	Respondent ID	Reasons for non-possession of PII in Organization for Quantity Surveyors
1	RID2	Management decision
2	RID6	Generally in Sri Lanka each and every seller and buyer agreement covered by consumer act.
3	RID15	No cover available
4	RID18	Finding of adequately covered policy is difficult
5	RID19	There is no any recognition for professional quantity surveyors in NWSDB.
6	RID31	Being a public sector organization, we are exempted from the requirement to obtain PII.
7	RID49	Exclusion in consultancy contracts
8	RID50	Not required since the alternative options are provided and allow to top management to take a decision.
9	RID51	PII is taken on project basis and no individual basis
10	RID52	No friendly insurance cover, Lack of confidence about Insurance
11	RID53	Good rapport with the design/ construction team, Find collective solutions instead make someone accused and always assist the clients in securing project interest
12	RID60	Very expensive and not affordable
13	RID61	Less knowledge about these insurances of the management.

CHAPTER FIVE

5.0 DATA ANALYSIS AND RESULTS – SMEs INTERVIEWS

5.1 Introduction

This chapter presents the results and analyses of the data gathered through semi-structured interviews conducted among subject matter experts (SMEs). Opinions of SMEs were sought to validate and extend the research findings obtained from the questionnaire survey. Interviews were conducted with the indicative questions prepared based on the research findings obtained so far and the research objectives (Refer the Appendix C). The indicative questions used for the interviews with SME are provided in Appendix 1(B). The chapter begins with a profile of the SMEs interviewed and then goes on to present their views under each of the sub-sections. The chapter concludes with a highlight of the key points emanating from the interviews.

5.2 Profile of Subject Matter Experts (SMEs)

The seven numbers of SMEs were selected to interview with due consideration of their involvement with quantity surveying profession, the experience of the field of the construction industry in Sri Lanka. The information about the interviewees used for the profiling included; designation/position held in their organizations, nature of work involved, and years of experience etc. Table 5.1 provides the profile of interviewees. Most of the SMEs were in higher positions and were involved in various quantity surveying related activities. All the SMEs had more than 21 years of experience in their field of construction industry. The interviewer's profile information helps to assure their opinions and ensures data reliability.

Table 5.1: Profile of interviewees

Interviewees	Representative organization	Position	Profession	Work Experience (years)
I 01	Client	Contract Manager	Quantity Surveyor	> 25years
I 02	Consultancy	Chief Quantity Surveyor	Quantity Surveyor	21-25years
I 03	Consultancy	Director	Quantity Surveyor	> 25years
I 04	Consultancy	Director	Quantity Surveyor	> 25years
I 05	Contracting	Proprietor	Quantity Surveyor	21-25years
I 06	Contracting	Contract Manager	Quantity Surveyor	21-25years
I 07	Contracting	Contract Manager	Quantity Surveyor	> 25years

5.3 Views of SMEs - Duties Performed by Quantity Surveyors

The duties arranged as per the descending order of the mean values which were calculated from the responses were presented to participants and required to give their opinion regarding the quantity surveyors' involvement in those duties based on their experience.

The same opinion was given by the SMEs (I01-I07) validating the findings of survey, that the quantity surveyors have highly involved in interim valuations and payments, valuation of variations, contract administration, monitoring, and exercising cost control over the project, forecasting costs to complete and preparing financial statements, preparing of variation and claims, final account preparation and agreement, preliminary cost estimates and advice, evaluating and settling contractual claims, preparing tender documents, advice on cost limit & budget, negotiating contract prices and preparing contract documents and selection of contractors or sub-contractors or suppliers. Further, they (I02, I03, and I05) stated that in recent years, quantity surveyors have a tendency on the area of resolving disputes on the contractual matter.

Furthermore, the interviewees (I01-I07) explained validating the results obtained from the survey, the quantity surveyors have very limited involvement in settlement of payment disputes, giving expert evidence in arbitrations and disputes, investment appraisal/ feasibility studies, risk management, due diligence auditing, insurance valuation, sustainability advisor, property consulting and development services, asset valuation & management, facilities management, capital allowances and corporate recovery and insolvency. They further contended that the quantity surveyors should face the challenges of carrying out these specific duties since there may be competencies in near future.

According to the views of the SMEs, the findings of the questionnaire survey were further established.

5.4 Views of SMEs - Faults and Negligence of Quantity Surveyors

Subsequently, the interviewees were asked to comment on the faults made by quantity surveyors arranged as per the descending order of the mean values which were calculated from responses obtained for the questionnaire survey as per their point of view.

The SMEs were given a contrasting opinion with the findings of the questionnaire survey. All of the interviewees said that professional faults and negligence claims could arise at any

time. According to the survey, quantity surveyors either never or rarely make faults when performing their duties. Nevertheless, the SMEs (I01-I07) were of the opinion that the faults or negligence could occur at any time. Further, they emphasized that it is impossible to occurring fault either rarely or never and pointed out to the unreported cases in Sri Lanka related to the faults committed by quantity surveyors.

According to their views, the quantity surveyors commonly commit the faults and negligence in performing the duties were errors in bills of quantities, late certifications and non-certifications, misleading pre-contract estimate and advice, lack of information regarding quality assurance and quality control, failure to take prompt action or response, lack of monitoring or controlling the cost as work in progress, failure to keep client informed on matters with significant cost implication, incorrect valuation for construction work, variations, claims, etc., unfair determination of variations and claims, errors in claim assessment, inaccurate determinations in price adjustment, and inappropriate advice in contractual matters to client and contractor, mistakes in bid pricing, inappropriate advice on selection of particular contractors/ sub-contractors/ supplies, inaccurate information, inadequate compliance with standards, arithmetic errors, unfair treatment to contractors in final account negotiations, loss of documents or data, unfair treatment to contractors in tender negotiations and misstatements.

The interviewee (I03) stated that,

Providing wrong valuations for the issuance of interim or final certificates is one of the faults made by quantity surveyors. Because the duty of the quantity surveyor is measuring the work done on site, goods, and materials for the payment of the contractor. And also provide an estimate for the client of the cost of the works, the quantity surveyor does not have to present the exact figure of construction cost. The estimate, however, should not be grossly misstated.

The SMEs (I01-I04, I05, and I07) also commented that fraudulent misrepresentation is rarely made fault by quantity surveyors, while one of the interviewees (I06) was of the opinion that it has never happened.

Further one of the SMEs (I04) indicated that the reported professional negligence claims were very few in Sri Lanka since every dispute does not result in a legal action and a court

case and some are settled privately and insurers reluctant to disclose information regarding the settled claims.

5.5 Views of SMEs - Causes and effects of Professional Faults and Negligence

To establish the findings of the questionnaire survey, the interviewees required to give their opinion regarding the causes that could contribute to failure to discharge the quantity surveyors' responsibilities and lead to occur the professional faults and negligence.

SMEs' views (I01-I07) confirmed that the causes highly affected to commit the professional faults and negligence are professionals' inexperience, professional incompetence, non-availability or lack of detailed information, inaccurate data and poor cost control methods.

Further, the interviewee (I02) stated that working under pressure and limited time period also highly affected to commit the faults. In addition, the interviewees I02, I03, and I04 explained the situation which was come out from the survey, that is; when preparing a tender document, quantity surveyors have the habit of copying the previous documents of other projects and it is leading to arise unnecessary and inappropriate documents and cause to arising dispute between parties.

The interviewee (I04) stated that,

“Errors in bills of quantities is one of the major faults made by the quantity surveyor when preparing the bills of quantities. In doing so, he should exercise such care and skill to ensure that the document is prepared well”.

The one of the SMEs (I06) also opined the carrying out of professional work in as careful a manner as possible is another useful way of limiting professional liability. In addition to paying attention to detail when performing office or professional work, good office management procedures can help to prevent claims of negligence from arising.

One aspect of the interview questions covered the effects that could occur due to the faults of quantity surveyors. The Interviewees were required to comment on responses obtained from the questionnaire survey. A large majority of interviewees (5 out of 7), stated and confirmed the results of the survey that cost and time overrun in projects, derives to contractual claims, negative effect on contractor's cash flow, dissatisfaction by project owners, risk to stakeholders in achieving targets, loss of reputation of consultants, increase litigation cost, lack of confidence in consultants, frustration to stakeholders, additional costs

for rework, negative effect on the quality of the projects, lack of concentration on other projects and discourages investments. Further, all of the interviewees (I01-I07) are indicated that so far, a project has not been abandoned due to the faults and negligence of quantity surveyors. The SMEs (I02-I06) also opined that the faults of quantity surveyors could not be affected for the loss of designer's profit.

5.6 Views of SMEs - Mitigation Measures to address the Effects

Subsequently, the SMEs were asked to comment on the suitability of mitigation measures that could be used to address the effects which were arranged as per the descending order of the mean values which were calculated from responses obtained the survey.

The SMEs (4 out of 7) stated that most of the organization utilized several methods to reduce or avoid the effects and confirmed that the internal quality assurance system is the most preferred method by the organization since there is a high maintenance cost incurred for PII.

The interviewee I01 commented that professionals are reluctant to go for litigation to settle the claims against them since the litigation process is slow, expensive and involves a lot of publicity which may be injurious to the reputation of the professionals. The interviewee I03 and I06 further added litigation is not a favoured way of settling disputes and may only be used as a last resort in the event of all else fails.

All the SMEs were of the opinion that alternative dispute resolution methods are arbitration suitable than the litigation for settling professional negligence cases since the arbitration has an added advantage; the decision made by the arbitrator is binding on the parties. The interviewee I05 and I07 suggested that mediation and private settlement are also suitable which are less formal and less binding on the parties than the arbitration is. The SMEs (6 out of 7) were of the view that allowing a contingency amount for unforeseen risks is a very risky method since it leads to exceeding the contract sum. Then the company will lose the projects of the competitive biddings.

Further, the interviewees (4 of 7) were agreed that the possessing of the PII policy is a suitable mitigation measure to cover the damages or claims raised against quantity surveyors. And also they were of the view that PII has not been utilized to its full potential in Sri Lanka and its use should be given more importance. The SME (I04) emphasized that lack of knowledge by the professionals on the use and merits of PII was one of the reasons for lack

of its optimal utilization by professionals. The SMEs, therefore, suggested that there is a need for more awareness on professional indemnity insurance in the construction industry.

Further, the SME (I05) said that PII policies will be useful and suitable for the Sri Lankan construction industry because the possession of a valid PII policy will need to keep the relationship between the client and consultant. Hence, their use needs to be more greatly encouraged.

One of the SME (I01) explained about PII as follows,

“PII undertakes to compensate the insured for any sums he may undertake to compensate the insured for any sums he may become legally liable to pay in the ordinary course of his business due to any negligent act, error or omission committed and further he suggested that PII should be made mandatory by law for all practicing firms in construction industry since this is a useful method of limiting the effects of professional liability”.

The SMEs explained that lack of knowledge by the client has also allowed some of the professionals to get away with acts of professional negligence. Some professionals thought that the law should be made stricter on this issue. Others claimed that clients’ ignorance is a contributing factor to the few cases of professionals being held liable for professional negligence. Some of the professionals indicated that the use of PII should not absolve the consultant from performing professional work meticulously and thoroughly.

All the SMEs stated that the possession of a valid PII policy is a pre-requisite for handling the consultancy work for many contracts nowadays. Further, they added that some of the firms that did not possess the policies were small (both in size and in the magnitude of work handled) and complained that the policies were too expensive for them. One of the SMEs (I02) was of the opinion that the PII is not effective for the small organization.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Following on the analyses and the discussion of the survey responses in the previous chapter, this chapter intended to focus on figuring out conclusions and recommendations based on the findings of the study. The first section of the chapter is a summary of the study and then explains the conclusions of the study through the survey results. The conclusions present the accomplishments of objectives set out in the study. Subsequently, this chapter provides the recommendations made from the study and finally, further research directions are discussed and elaborated.

6.2 Conclusions

This study was mainly focused to explore the measures that can be used to mitigate the professional faults and negligence of quantity surveyors with special emphasis on PII. In this regard, the study established the four objectives which were highlighted in chapter one. A multi-method approach consisting of literature review, a questionnaire survey and validation interviews using subject matter experts (SMEs) was employed. Firstly, the literature review was carried out to establish the background for the research. The next stage, a questionnaire survey was conducted to ascertain the views of 66 numbers of quantity surveyors who were engaged in client, consultancy and contracting organization. Data analysis was done by using the descriptive statistical analyzing method. And the non-arithmetical answers were subscribed to achieve a general view of the participants. Further, this study has identified the significant liabilities of quantity surveyors to be covered under PII and the reasons for lack of utilization the PII among the quantity surveyors for indemnifying the damages caused by professional faults and negligence. Finally, the study sought SMEs opinions in order to validate and extend the all prior findings. Following subsections presents the way in which each objective was achieved in detail. In the data collection process, a triangulated approach was used to achieve these objectives.

Objective 1: Duties Performed by Quantity Surveyors

The first objective of the study was to review the duties carried out by quantity surveyor in the construction industry since the quantity surveyors should hold the liability of the service

that they are given as professionals. The analysis revealed that among the duties identified by the established professional association for quantity surveying profession (see section 2.3.3), the most of the quantity surveyors have highly involved in interim valuations and payments, valuation of variations, contract administration, monitoring, and exercising cost control over the project, forecasting costs to complete and preparing financial statements, preparing of variation and claims, and so on (see section 4.3) which were in line with the findings of literature (see Table 2.3). On the other hand, participants have very limited experienced and involvement in duties such as, sustainability advisor, property consulting and development services, asset valuation & management, facilities management, capital allowances and corporate recovery and insolvency and so on (see section 4.3). In addition to above duties, project coordinating, client management, construction technologies, health and safety, depreciation, tax calculation are the duties carried out by the quantity surveyors. The general findings from the literature and questionnaire surveys were validated by the SMEs interviewed for the study.

Objective 2: Faults and Negligence of the Quantity Surveyors

The objective two investigated the faults and negligence can be occurred due to the cessation of the liability of the quantity surveyors. The analyses of the questionnaire survey found that the faults which were identified through the extensive literature review (see section 2.8), were either averagely or rarely made by quantity surveyors while performing their duties. However, one could argue this would result in bias responses as they may not reveal their faults and negligence. The last stage of the investigation involved verifying and amplifying the findings using SMEs who have experienced above 21years. However, the SMEs were given a contrasting opinion with the findings of the questionnaire survey and this could be due their experience compare to sample who responded to the questionnaire survey. They were of the opinion that the faults or negligence could occur at any time. Further, they emphasized that it is impossible to occurring fault and negligence rarely and pointed out to the unreported cases in Sri Lanka related to the quantity surveyor's faults and negligence. According to the view of the SMEs, the faults and negligence made by quantity surveyors while delivering their services can occur highly or very highly. Such as errors in bills of quantities, late certifications and non-certifications, misleading pre-contract estimate and advice, lack of information regarding quality assurance and quality control, failure to take prompt action or response, and so on (see section 4.4). On the other hand, fraudulent

misrepresentation is either never or a rarely made fault by quantity surveyors while performing their duties and confirmed with the SMEs opinion.

Objective 3: Causes and effects of Quantity Surveyor's Faults and Negligence

As an extension to objective two, objective three was to investigate the causes and effects of professional faults and negligence. The analyses of survey results along with SMEs' views confirmed that the causes identified through literature review (covered in section 2.9) and the highly affected causes to commit the professional faults and negligence are professionals' inexperience, professional incompetence, non-availability or lack of detailed information, inaccurate data and poor cost control methods and so on (see section 4.5).

The part of this objective of the study was to recognize the effects that could occur due to faults and negligence of quantity surveyors and achieved through the triangulated approach of literature review, a questionnaire survey, and interviews with experts. The research found that most occurring effects due to quantity surveyor's faults and negligence among the effects shown in section 2.10 of literature review are cost and time overrun in projects, arising the contractual claims, negative effect on the cash flow of the contractor, dissatisfaction by project owners, risk to stakeholders in achieving targets, and so on (see section 4.6). On the other hand, participants were of the opinion that capital flight, and economic loss in the form of additional cost of projects, loss of designer's profit and lead to project abandonment are the rarely happened due to quantity surveyors' faults and negligence.

Objective 4: Mitigation measures to address the effects

This objective relates to the aim of this research which identifies the measures available to mitigate the effects with special emphasis to PII. To fulfill this objective, the study used a similar triangulated approach as in previous objectives. The literature reviewed for the study gives a list of different mitigation measures (see section 4.8) used to address the effects in the construction industry. The survey reveals that majority of the quantity surveyors in the construction industry feel that internal quality assurance system, institutional control over professional practice and PII are very well suited for limiting professional liability. Few professional firms do possess PII policies, proving the PII is in seldom used by quantity surveyors against possible claims made for a breach of professional duty or professional negligence. However, there is evidence for the need of PII to settling claims from cases of

quantity surveyors' negligence in Sri Lanka underlining their importance to the industry. These findings were verified and extended by the SMEs interviewed after the survey analyses.

Suggestions provided by industry practitioner to avoid or reduce the quantity surveyors' faults and negligence of quantity surveyors were appoint a highly qualified competent quantity surveyors, establish a proper checking system, provide a pleasant working environment, assign duties properly not overloaded, proper project management practice, and so on (see section 4.7). The survey had also identified the causes for lack of maintaining PII for quantity surveyors in Sri Lanka. They are, management decisions, difficulties in finding an adequately covered policy, exemption from the requirement of maintaining a PII in public sector in Sri Lanka and management has less knowledge about the PII, exclusion of provision for PII in consultancy contracts, no friendly insurance cover available in Sri Lanka, lack of confidence about Insurance, maintaining an insurance system is very expensive and not affordable (see section 4.10). According to SMEs' opinions, PII is effective but certain areas need to be improved.

Currently, for many contracts, the possession of a valid PII policy is a pre-requisite for handling both consultancy and construction work. Hence, identifying the significant liabilities of quantity surveyors to be covered under PII will assist to arrange proper, adequate insurance system. The research found that, significant liabilities of the quantity surveyors to be covered under PII are errors in bills of quantities, misstatements, inappropriate advice in contractual matters to client and contractor, loss of documents or data, misleading pre-contract estimate and advise, inaccurate information, misreading of tender document, absence of important clauses in conditions of contract, fraudulent misrepresentation and arithmetic errors (see section 4.9).

6.3 Recommendations

Considering the results obtained from the study, the followings are the recommendations with regard to minimization of effects due to professional faults and negligence cases and the use of PII in the construction industry in Sri Lanka. The recommendations led to cover significant liabilities of quantity surveyors without any party being suffered or disadvantaged seriously.

According to the current practices, PII cover for professionals will be a requirement for a number of regulatory bodies and governing associations. Also, the vast majority of larger organizations and all forms of government or local authority work will not be awarded to a firm which does not have the necessary level of cover in place. Hence, PII policies should be incorporated into the construction contracts and the law such that it is mandatory for practicing professionals to possess valid policies before they commence any consultancy work for construction projects and it will be a way of encouraging the use of PII in the construction industry in Sri Lanka

However, there is a need for greater awareness among the participants in the construction process (clients and professionals especially) about the use of PII policies. The professional institute/associations should undertake to aware their members on the provisions of PII policies using various methods, perhaps by organizing seminars regarding PII as part of the continuous professional development (CPD) programs for their professionals.

It was recommended that since there are several types of errors made by quantity surveyors when preparing contract documents, employers should always allow adequate time for the works that there would be comprehensive information to use for the preparation of construction documents.

6.4 Limitations

Initially, the research gathered perceptions of quantity surveyors who have experienced above 5 years on professional liabilities of quantity surveyors, causes, and effects of professional faults and negligence and measures available to address the effects. However one could argue this would result in bias responses as they may not reveal their faults and negligence. Subsequently, a validation exercise was carried out with the quantity surveyors who have experienced above 21years to confirm the findings of the questionnaire survey. However, it was observed a difference in opinion of SMEs regarding the faults and negligence made by quantity surveyor and this could be due their experience compare to sample who responded to the questionnaire survey. Therefore, the study recommends to address this in future research which was mentioned in Section 6.5.

6.5 Further research directions

- The research gathered only the perceptions of quantity surveyors in relation to the professional practice of quantity surveying. As mentioned in section 6.4, it could be conducted a research to gather the views of other professionals in construction industry, construction clients, and other end users on the subject of this study.
- A research can be carried out to determine the ways in which the awareness about PII among construction clients and professionals in the construction industry can be enhanced.
- This research has come up with the conclusion that there are few cases reported for professional negligence of quantity surveyors in Sri Lanka. Therefore the study can be conducted to establish the reasons for this.

REFERENCES

- Afetornu, C., & Edum-Fotwe, F. T. (2005). Characterising Project Contingency Budget in Construction. *Association of Researchers in Construction Management, I*, 259-268.
- Alfred, O. O. (2007). Conflict of Interest within Construction Practitioners: Quantity Surveying, Case Study. *Surveying and Built Environment, 18*(1), 35-50.
- Ameh, O., & Odusami, K. (2010). Professionals' Ambivalence toward Ethics in the Nigerian Construction Industry. *Journal of professional issues in engineering education and practice, 136*(1), 9-16.
- Andrew, A. (1998). Human error in the management of building projects. *Construction Management and Economics, 16*, 339-349.
- Ashworth, A., Hogg, K., & Higgs, C. (2013). *Willis's practice and procedure for the quantity surveyor* (13th ed.). West Sussex: John Wiley & Sons, Ltd.
- Association of South African Quantity Surveyors [ASAQS]. (2015). *What is a Quantity Surveyor?* Retrieved 10 28, 2015, from The Association of South African Quantity Surveyors: http://www.asaqs.co.za/?page=what_is_QS
- Australian Institute of Quantity Surveyors (AIQS). (2011). *What is a Quantity Surveyor.* Retrieved from <http://www.aiqs.com.au/site.php?id=26>
- Bains Harding Construction & Roofing (Aust) Pty Ltd v. McCredie Richmond & partners Pty Ltd, 13 (Supreme Court of new South Wales 1988).
- Burchell J., 1994. *Principles of Delict*, Cape Town, Juta.
- Bohari, A. A. (2009). *Quantity surveyor's liability during pre tender stage.* Master's thesis, University Teknologi, Malaysia. Retrieved from <http://eprints.utm.my/18501/>
- Brennan, T. (1995). Construction Insurance: A General Perspective. *The Construction Lawyer, 15*(1), 42-52.
- Bryant, C. G. (2015, 12 17). *Articles: JCS Cost Management Ltd v QBE Insurance (International) Ltd [2015] NZCA 524.* Retrieved from Hesketh Henry Website:

http://www.heskethhenry.co.nz/Articles/x_post/jcs-cost-management-ltd-v-qbe-insurance-international-ltd-912015-nzca-524-00230.html

- Bunni, N.G., 2005. *The FIDIC forms of contract*. 3rd ed. London: Blackwell Publications Ltd.
- Canadian Institute of Quantity Surveyors (CIQS). (2013). *Available Services*. Retrieved from <http://www.ciqs.org/english/available-services>
- Chan, E. H. (2005). Contract Strategy for Design Management in the Design and Build System. *International Journal of Project Management*, 1-30.
- Cheung, S.O., Suen, H.C.H. and Lam, T.I., 2002. Fundamentals of Alternative Dispute Resolution Processes in Construction. *Journal of construction engineering and management*, 128 (5), 409-417.
- Cheung, S.O., and Tsang, K. (1997). Professional liabilities in construction: exposures and responses. *13th Annual ARCOM Conference*. 2. King's College, Cambridge: Association of Researchers in Construction Management.
- Chigara, B., Moyo, T., & Mudzengerere, F. (2013). An Analysis of Cost Management Strategies Employed by Building Contractors on Projects in Zimbabwe., *International Journal of Sustainable Construction Engineering & Technology*, 4(2).
- Contributory Negligence as a Defence Contract. (1993). London: The Law Commission.
- Cunningham, T. (2011). *Professionalism and Ethics: A Quantity Surveying Perspective*. Arrow. Dublin Institute of Technology.
- Doloi, H. (2013). Cost overruns and failure in project management: Understanding the roles of key stakeholders in construction projects. *Construction Engineering and Management*, 139, 267-279. doi:10.1061/(ASCE)CO.1943-7862.0000621.
- Elhag, T., Boussabaine, A., & Ballal, T. (2005). Critical Determinants of Construction Tendering Costs: Quantity surveyors' Standpoint. *International Journal of Project Management*, 23, 538-545.

- Flanagan, R., & Norman, G. (1983). The accuracy and monitoring of quantity surveyors' price forecasting for building work. *Construction Management and Economics*, 1(2), 157-180. doi:10.1080/01446198300000012
- Greeno, R. (2013). *Principle of Construction* (2nd ed.). New York: Routledge.
- Hicks, J. (1992). Heavy Construction Estimates, With and Without Computers. *Journal of Construction Engineering and Management*, 118(3), 545-560.
- Hoffmeister, K. (2011). A perspective on effective mentoring in the construction industry. *Leadership & Organization Development Journal*, 32(7), 673-688. doi:10.1108/01437731111169997
- Houtte, V. (1990). Professional Liability in Construction before and After 1992. *International Business Lawyer*, 211(18).
- Hussin, A., & Omran, A. (2009). Roles of professionals in construction industry. *The International Conference on Administration and business*. Romania: ICEA-FAA Bucharest.
- Construction Industry Development Authority [CIDA]. (2007). *Standard bidding document for procurement of works- CIDA/SBD/02*, 2nd ed. Colombo: Institution for construction training development (CIDA).
- Construction Industry Development Authority [CIDA]. (2002). *Standard Conditions of Engagement - parts I & II* (1st ed.). Sri Lanka: Ministry of Housing and Plantation Infrastructure.
- Construction Industry Development Authority [CIDA]. (2002, November). Standard Conditions of Engagement- Part I & II. *Form of Agreement, 1*. Institute for Construction Training and Development (CIDA).
- Institute of Quantity Surveyors Sri Lanka [IQSSL]. (2016, August 12). *Code of Professional Conduct and Ethics – Principles*. Retrieved from Institute of Quantity Surveyors Sri Lanka Web site: <http://www.iqssl.lk/index.php/code-of-professional-conduct>
- Institute of Quantity Surveyors Sri Lanka [IQSSL]. (2011). *Assessment of Professional Competence*. Retrieved from Institute of Quantity Surveyors Sri Lanka Website: <http://www.iqssl.lk/index.php/code-of-professional-conduct>

- International Cost Engineering Council [ICEC]. (2011, January 11). *Resources-What are Cost Engineering, Quantity Surveying, and Project Management?* Retrieved from A Worldwide Confederation of Cost Engineering, Quantity Surveying and Project Management Societies: <http://www.icoste.org/category/resources/>
- International Federation of Consulting Engineers [FIDIC]. (1998). *Client / Consultant Model Services Agreement*. Switzerland: International Federation of Consulting Engineers [FIDIC].
- International Federation of Consulting Engineers [FIDIC]. (2004). *Professional Indemnity Insurance and the insurance of project risks*. Switzerland: International Federation of Consulting Engineers [FIDIC].
- International Federation of Consulting Engineers [FIDIC]. (2011). *Professional Risk and Responsibilities*. Retrieved from FIDIC: <http://fidic.org/node/759>
- Jayalath, C. (2011, May 31). *Dealing with Ethical Issues Related to Quantity Surveying Profession*. Retrieved from Articalsbase: www.articlesbase.com/ethics-articles/dealing-with-ethical-issues-related-to-quantity-surveying-profession-4840372.html
- Jones, D., 2006. Construction project dispute resolution: options for effective dispute avoidance and management. *Journal of professional issues in engineering education and practice*, 132 (3), 225-235.
- Judi, S. S., & Rashid, R. A. (2010). Contractor's Right of Action for Late or Non-Payment by the Employer. *Journal of Surveying, Construction & Property*, 1(1), 65-95.
- Kelley, K., Clark, B., Brown, V., & Sitzia, J. (2003). Good Practice in the Conduct Reporting of Survey Research. *International Journal for Quality in Health Care*, 15(3), 261-266.
- Linda, F. A., Christabel, H. O., & Vincent, N. G. (2001). A study of quantity surveyors' ethical behaviour. *Construction Management and Economics*, 19, 19-36.
- Lupton, S. (2013). *Cornes and Lupton's Design Liability in the Construction Industry* (5th ed.). West Sussex, United Kingdom: Wiley Blackwell.

- Maidin, A. J., & Sulaiman, S. S. (2011). Importance of Legal Education for Quantity Surveying Professionals: A Proposal for Developing a Legal Studies Module for Malaysian System. *Journal of Applied Sciences Research*, 7(13), 2249-2256.
- Male, S. (1990). Professional Authority,' Power and Emerging Forms of 'Profession' in Quantity Surveying. *Construction Management and Economics*, 8, 191 -204. doi:10.1080/014461990000000016
- Mansfield, N., Ogwu, O. O., & Doran, T. (1994). Causes of delay and cost overruns in Nigerian construction projects. *International Journal of Project Management*, 12(4), 254-260.
- Mbachu, J. (2011). Sources of contractor's payment risks and cash flow Sources of contractor's payment risks and cash flow problems in the New Zealand construction industry: project team's perceptions of the risks and mitigation measures. *Construction Management and Economics*(29), 1027–1041.
- Murdoch, J., & Hughes, W. (2001). *Construction Contracts Law and Management* (3rd ed.). London: Spon.
- New Zealand Institute of Surveyors (NZIQS). (2015). *What is a Quantity Surveyor*. Retrieved from <http://www.nziqs.co.nz/about/whatis.html>
- Nkado, R., & Meyer, T. (2001). Competencies of professional quantity surveyors:a South African perspective. *Construction Management and Economics*, 19, 481-491.
- Ojo, Eyitope, A., Akinradewo, & Olusola, F. (2012). The Contractual and Tortious Liabilities in Employer-Consultant Agency Relationship in Construction Contracts in Nigeria. *Journal of Law*, 8, 39-49.
- Othman, A. A. (2012). An Innovative Protocol for Improving the Ethical Behaviour of the Quantity Surveying Profession in South Africa. *International Journal of Construction Management*, 12, 43-62. doi: 10.1080/15623599.2012.10773194
- Pheng, L., & Ming, K. (1997). Formulating a strategic marketing mix for quantity surveyors. *Marketing Intelligence & Planning*, 15(6), 273-280.
- Potts, K. (1995). *Major Construction Works: Contractual and Financial Management*. Eastbourne: Longman group limited.

- Rahman, H. A., Karim, S. B., Danuri, M., Berawi, M., & Wen, Y. (2007). Does professional ethics affect construction Quality? *Quantity Surveying International Conference*. Kuala Lumpur, Malaysia: University of Malaya.
- Rahman, H. A., Wang, C., & Yap, X. W. (2010). How professional ethics impact construction quality: Perception and evidence in a fast developing economy. *Scientific Research and Essays*, 5(23), 3742-3749.
- Ramus, J., Birchall, S., & Griffiths, P. (2007). *Contract Practice for Surveyors* (4th ed.). London: Taylor & Francis Group. Retrieved October 6, 2015, from [https://books.google.lk/books?id=4-8JBAAQBAJ&pg=PA413&lpg=PA413&dq=London+School+Board+V.+Northc+roft+Son+%26+Neighbour+\(1889\)&source=bl&ots=I85BtAzYys&sig=xXu8C8effSs_zr9j55fSV0-IJWY&hl=en&sa=X&ved=0CCAQ6AEwAWoVChMI2-XQI720yAIVBwSOCh0BfwDS#v=onepage&q=Lo](https://books.google.lk/books?id=4-8JBAAQBAJ&pg=PA413&lpg=PA413&dq=London+School+Board+V.+Northc+roft+Son+%26+Neighbour+(1889)&source=bl&ots=I85BtAzYys&sig=xXu8C8effSs_zr9j55fSV0-IJWY&hl=en&sa=X&ved=0CCAQ6AEwAWoVChMI2-XQI720yAIVBwSOCh0BfwDS#v=onepage&q=Lo)
- Redmond, J., 2001. *Adjudication in construction contracts*. Oxford: Blackwell Publishing.
- Reiss, R. B. (1993). The Design Professional as Predictor of Construction Cost: Has Liability Kept Pace with Construction Reality? *The Construction Lawyer*, 9, 9-21.
- Royal Institution of Chartered Surveyors [RICS]. (1971). *The Future Role of the Quantity Surveyor*. London.
- Royal Institution of Chartered Surveyors [RICS]. (2007, June 04). *Rules of Conduct for Members*. Retrieved from Royal Institution of Chartered Surveyors.
- Royal Institution of Chartered Surveyors [RICS]. (2009). *Construction insurance RICS guidance note* (1st ed.). UK: Royal Institution of Chartered Surveyors (RICS).
- Royal Institution of Chartered Surveyors [RICS]. (2012). Conflict avoidance and dispute resolution in construction. In *RICS Professional Guidance* (1st ed.). UK: Royal Institution of Chartered Surveyors.
- Royal Institution of Chartered Surveyors [RICS]. (2013). *Risk, Liability and Insurance in Valuation Work*. Royal Institution of Chartered Surveyors.

- Royal Institution of Chartered Surveyors [RICS]. (2014). *Assessment of Professional Competence Quantity Surveying and Construction Pathway guide*. London: Royal Institution of Chartered Surveyors.
- Royal Institution of Chartered Surveyors [RICS]. (2015). *Ethics & professional standards*. Retrieved November 28, 2015, from Royal Institution of Chartered Surveyors: <http://www.rics.org/lk/regulation1/compliance1/ethics--professional-standards/>
- Seeley, I. H. (1997). *Quantity Surveying Practice* (2nd ed.). London: Macmillan Press Ltd.
- Sunday, D., & Afolarin, A. O. (2013). Causes, effects and remedies of errors in Nigerian construction documents. *Organization, Technology and Management in Construction*, 5(1), 676-686. doi:10.5592/otmcj.2013.1.4
- Teo, E.A.L. and Aibinu, A.A., 2007. Legal framework for alternative dispute resolution: examination of the Singapore national legal system for arbitration. *Journal of professional issues in engineering education and practice*, 133 (2), 148-157.
- Touran, A. (2003). Calculation of contingency in construction projects. *IEEE Transactions on Engineering Management*, 50(2), 135–140. doi:10.1109/TEM.2003.810824
- Turner, C. (2007). *Contract Law* (2nd ed.). Kirby Street: Hodder Education.
- Usman, N., Inuwa, I., & Iro, A. I. (2012). The Influence of Unethical Professional Practices on The Management of Construction Projects in North Eastern States of Nigeria. *International Journal of Economic Development Research and Investment*, 3(2), 124-129.
- Vee, C., & Skitmore, R. (2003). Professional ethics in the construction industry. *Engineering Construction and Architectural Management*, 10(2), 117-127.
- Wiktionary. (2015, October 17). *Wiktionary*. Retrieved November 28, 2015, from Wiktionary, the free dictionary: <https://en.wiktionary.org/wiki/role>
- Zakaria, Z., Ismail, S., & Yusof, A. M. (2012). Cause and Impact of Dispute and Delay the Closing of Final Account in Malaysia Construction Industry. *Journal of Southeast Asian Research*. doi:10.5171/2012.975385

Zwikael, O. (2009). Critical planning processes in construction projects. *Construction Innovation*, 9(4), 372-387. doi:10.1108/14714170910995921

APPENDIX A

Associations/ authors	Role of QS
Royal Institute of Chartered Surveyors [RICS](2014)	<ul style="list-style-type: none"> • Commercial management of construction or Design economics and cost planning • Contract practice • Construction technology and environmental services • Procurement and tendering • Project financial control and reporting • Quantification and costing of construction works • Building information modelling (BIM) management • Capital allowances • Commercial management of construction or Design economics and cost planning (whichever is not selected as a core competency) • Contract administration • Corporate recovery and insolvency • Due diligence • Insurance • Programming and planning • Project evaluation • Risk management • Conflict avoidance, management and dispute resolution procedures • or Sustainability
Institute of Quantity Surveyors Sri Lanka [IQSSL], (2011)	<p>AREA 1 – COST MANAGEMENT</p> <p>1.1 Provide cost advice at pre-feasibility stage and provide input to the development of project brief.</p> <p>1.2 Advise on cost and benefits of construction projects and prepare cost benefit analysis.</p> <p>1.3 Collection of cost data, cost analysis, establishing data, storing system and implement updating procedure.</p> <p>1.4 Establish objectives and parameters of cost planning, prepare and analyze required inputs and prepare cost plans.</p> <p>1.5 Provide advice to Clients on estimate, cost alternatives and cost plan.</p> <p>1.6 Prepare development budget for the project, coordinate client's cash flow and advice on financing of the project.</p> <p>AREA 2 – COST ESTIMATION</p> <p>2.1 Cost data collection, storing and establish updating system required for estimation.</p> <p>2.2 Preparation of procedure for estimation and preparation of estimates.</p> <p>2.3 Advice on tendering including critical evaluation of various documents included in the tender.</p>

	<p>2.4 Assist and advice on accuracy of cost estimate and cost audit reporting.</p> <p>2.5 Establish estimate review system and conduct reviews on estimates.</p> <p>AREA 3 – CONTRACT ADMINISTRATION</p> <p>3.1 Interim valuation.</p> <p>3.2 Prepare progressive financial reporting during construction phase and monitoring.</p> <p>3.3. Variation process up to finalization of variation accounts.</p> <p>3.4 Initiation of contractual correspondence and interpretation of contract.</p> <p>3.5 Data collection, prepare contractual cost and time related claims, negotiation and finalization.</p> <p>3.6 Prepare project implementation and procurement plan.</p> <p>3.7 Final accounts and reporting</p> <p>3.8 Advice on contractual and extra contractual claims.</p> <p>AREA 4 – COST REPORTING</p> <p>4.1 Establish cost monitoring procedure including contractor's budget and analysis of pricing for cost value reconciliation and interpretation.</p> <p>4.2 Turnover, profit and lost forecasting cash flow forecasting and coordinate with client's/ contractor's cash flow.</p> <p>4.3 Control and management of sub contract accounts.</p> <p>4.4 Advice on procurement or resource including materials, <u>labour</u> and plants.</p> <p>4.5 Preparation of insurance claims, presentation, negotiation and finalization.</p> <p>4.6 Resource analysis and management including resource usage, productivity reports, interpretation and reconciliation.</p> <p>AREA 5 – PROCUREMENT ADVICE</p> <p>5.1 General <u>advise</u> on tender process considering constructability, delivery systems and time limitations.</p> <p>5.2 Initiate, prepare documents, evaluation criteria and evaluation of pre-qualification process.</p> <p>5.3 Recommendation and agree on all inputs required for preparation of Bills of Quantities</p> <p>5.4 Prepare Bills of Quantities, undertake checking required and prepare necessary addenda.</p> <p>5.5 Preparation of tender documents including compilation and tender action.</p> <p>5.6 Tender evaluation, negotiation and award.</p> <p>1.7 Specification writing</p> <p>AREA 6 – CONSTRUCTION TECHNOLOGY AND BUILDING SERVICES</p> <p>6.1 Acquire knowledge of construction process, technologies, building materials, and its suitability to the project climate.</p>
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<p>6.2 Acquire knowledge of the principals of the design and the science of construction.</p> <p>6.3 Acquire knowledge of the principals of construction.</p> <p>6.4 Interpretation of drawings, specification and other documents.</p> <p>AREA 7 – SPECIALIZED AREAS</p> <p>7.1 Financial auditing of construction projects.</p> <p>7.2 Feasibility studies.</p> <p>7.3 Life cycle cost analysis.</p> <p>7.4 Provide value management services.</p> <p>7.5 Use of computer application relevant to quantity surveying services.</p> <p>7.6 Risk management</p> <p>7.8 Acquire knowledge on regulations and guidelines related to construction in relation to government and local authorities, statutory bodies and donor funded projects</p>
Australian Institute of Quantity Surveyors [AIQS](2011)	<ul style="list-style-type: none"> • Feasibility stage - use the knowledge of construction methods and costs to advise the owner on the most economical way of achieving his requirements. establish a project budget • Design stage - ensures that the design remains on budget through Cost Management. • Completion of design stage - prepare a Bill of Quantities, prepare tenders, and may price alternatives for consideration • Construction stage - Value progress payments at regular intervals, value changes to design or quantities, monitoring claims for progress payments and additional work • Completion stage - Produce depreciation schedules of the various project components and advise on realistic insurance replacement costs
New Zealand Institute of Surveyors [NZIQS](2015)	<ul style="list-style-type: none"> • Managing the finances for any kind of construction project. • Working to keep the project on time. • Working to keep the project within the budget. • Making sure that construction costs and production are managed as efficiently as possible. • Resolving disputes between contracting parties. • Preparing insurance replacement estimates for all kinds of buildings. • Provide cash flow data to client for arranging the finances needed for each stage of the project. • Prepare a statement of final account, which records the actual costs for all sections of the job
Canadian Institute of Quantity Surveyors [CIQS](2013)	<ul style="list-style-type: none"> • Establishing budgets from information provided at the feasibility stage, which may be limited to a schedule of net area requirements before any drawings are produced;

	<ul style="list-style-type: none"> • Controlling costs through the design stage to maintain the integrity of the established budget and to ensure that the owner receives the best value; • Evaluating the cost effectiveness of alternative building shapes, component specifications, and various materials and in addition the provision of cost checks at various key stages throughout the design process. • Reviewing a project using systematic and creative effort directed at analyzing the functional requirements of a project for the purpose of achieving essential functions at optimum costs. • Analyzing the proposed budget to ensure inclusion of items associated with a project of its kind, as well as confirming that the budget is adequate to complete the project; • Periodic progress draw reviewing of the request for funds to determine that it is reasonable and to confirm that the remaining budget is adequate to complete the project; • Advising on the budget for indirect costs such as design, legal, marketing, leasing etc. • Providing independent advice, including practical experience in many facets of the industry, as well as a working knowledge of the arbitration process and related law. • Assisting legal counsel and appearing as an expert witness at trial. • Life Cycle Cost Plans, Reserve Fund Studies, Property Conditions Reports, Risk Analysis, Insurance Replacement Cost Assessment, Project Management, Project Scheduling, Construction Management, Construction and Project Cash Flows, Material Take-offs
<p>International Cost Engineering Council [ICEC], (2011)</p>	<ul style="list-style-type: none"> • To provide independent, objective, accurate, and • reliable capital and operating cost assessments usable • for investment funding and project control • To analyze investment and development for the guidance of owners, financiers and contractors. • estimates of capital or asset costs including development costs • estimates of operating and manufacturing costs through an asset's life cycle • risk assessment and analysis • trending of scope and cost changes

	<ul style="list-style-type: none"> • decision analysis • financial analysis (eg. net present value, rate of return, etc) • project cost control • appraisals of existing assets • project analyses, databases, and benchmarking • planning and scheduling • productive and investment needs assessment • facility management needs assessment • project feasibility and budget assessment • cost management • procurement management • contract administration • whole-life appraisals • quality audits • value management • dispute resolution
<p><u>Greeno</u> (2013)</p>	<ul style="list-style-type: none"> • Estimating and cost advice ✓ Estimates and cost advice during all stages of the development of a project are essential if the correct decisions with full awareness of their financial implications are to be made. ✓ Sophisticated techniques, extensive cost data banks and an intimate knowledge of building and construction economics enable quantity surveyors to provide reliable cost advice. • Cost planning ✓ Clients want to know that they are receiving value for money, not only with regard to the capital cost but also in respect of the running and maintenance cost of a project. ✓ Cost planning enables decisions on various design alternatives to be made with actual costs being constantly monitored against original budgets. • Property development advice ✓ A building should meet the functional dimensional and technological requirements for which it was designed, should be aesthetically pleasing and meet the cost limits of the client's budget. ✓ A quantity surveyor is able to provide pre-design feasibility studies involving technical and/or economic investigations thereby enabling a client to decide whether, and in what form, to proceed. • Advice on tendering procedures and contractual arrangement ✓ The choice of an appropriate form of contract for any given project will depend on the nature of the project, the circumstances under which the work is to be carried out and the particular needs of the client.

	<ul style="list-style-type: none"> ✓ Quantity surveyors, in collaboration with architects are able to advise their clients on the most advantageous procurement methods available, including: Contracts incorporating bills of quantities, provisional bills of quantities and schedules of rates. ✓ Negotiated, lump-sum, managed and cost plus contracts, Package deals, turnkey offers, etc. While Bills of Quantities are generally regarded as the most economical and best method of obtaining a competitive price, the alternative methods and types of tender documentation available need to be carefully examined in consultation with the quantity surveyor, architect, etc. before a final decision is made • Financial control over contracts • Valuation of work in progress • Cash flow budgets Final account in respect of the contract. ✓ The quantity surveyor's duty is essentially one of cost control. They measure and value work in progress, determine the value of variations ordered by the architect or engineer and ensure that a fair and equitable settlement of the cost of the project is reached in accordance with the contract conditions. In conjunction with the architect and other consultants the quantity surveyor will ensure that the financial provisions of the contract are properly interpreted and applied. • Act in disputes, etc. ✓ Quantity surveyors possess knowledge and expertise in the fields of costs and contracts which equip them to prepare valuations for fire insurance, to advise in the settlement of insurance claims and to be called as expert witnesses or act as arbitrators in any court or arbitration on building disputes. • Material list and values • Quantity surveying services in respect of civil, mechanical, and electrical work • Property economics • Project management • Fast track construction
Ashworth et al.(2013)	<p>Traditional role</p> <ul style="list-style-type: none"> • Single rate approximate estimates • Cost planning • Procurement advice • Measurement and quantification • Document preparation, especially bills of quantities • Cost control during construction • Interim valuations and payments • Financial statements • Final account preparation and agreement

	<ul style="list-style-type: none"> • Settlement of contractual claims <p>Evolved role</p> <ul style="list-style-type: none"> • Investment appraisal • Advice on cost limits and budgets • Whole life costing • Value management • Risk analysis • Insolvency services • Cost engineering services • Subcontract administration • Environmental services measurement and costing • Technical auditing • Planning and supervision • Valuation for insurance purposes • Project management • Facilities management • Administering maintenance programmes • Advice on contractual disputes • Planning supervisor • Clients' agent • Programme management • Cost modeling • Sustainability Advisor
(Pheng & Ming, 1997)	<p><u>Feasibility study</u></p> <p>Initial cost indications based on similar and recently completed buildings</p> <p>Cost implications of site conditions</p> <p><u>Outline proposals</u></p> <p>Preparation of rough estimates based on client's requirements</p> <p>Assist client in setting cost limit or budget</p> <p><u>Preliminary design</u></p> <p>Preliminary estimates and preparation of initial cost plan</p> <p>Group element cost targets established</p> <p>Comparison with client's cost limit or budget</p> <p><u>Detailed design</u></p> <p>Detailed estimate</p> <p>Preparation of elemental cost plan and amplified cost plan</p> <p>Elemental cost targets established</p> <p>Comparison with client's budget and earlier estimates</p> <p>Cost checks to obtain best solution in each element as drawings are produced</p> <p><u>Final design</u></p> <p>Preparation of tender documents</p> <p>Continue cost checks and obtain quotations from specialists</p> <p>Pre-tender estimate</p>

	<p><u>Tender period</u> Attend to tenderers' queries Issue corrigendum</p> <p><u>Tender evaluation</u> Evaluate tender Prepare reconciliation statement and compare tender sum with estimated costs Advise on course of action to be taken Prepare cost analysis</p> <p><u>Award of contract</u> Prepare letter of acceptance after client has approved tender Compile documents and prepare for contract documentation</p> <p><u>Construction</u> Prepare valuations for payments on account at the intervals stated in the contract and agree with contractor's quantity surveyor Plot payments on account on "rate of spend" graph and report to architect on any significant divergence Advise architect, if requested, on expenditure of provisional sums, measure and value work carried out by the main contractor against provisional sums (except where lump sum quotations have been accepted) and adjust Prepare estimates of likely cost of variations on receipt of copies of architect's instructions Later measure and value, check and price <u>daywork</u> voucher Advise architect, if requested, on expenditure of prime cost sums, check nominated sub- contractors' and nominated suppliers' final accounts and adjust contract sum accordingly Prepare financial reports for architect and client at the same time as interim payments Check main contractor's claims for increase in costs of <u>labour</u>, materials, levies, contributions and taxes, etc. if applicable. Alternatively, apply price adjustment indices to amounts included in interim valuations Measure projects based on schedules of rates or on bills of approximate quantities as the work proceeds, either on site or from architect's drawings, and value at contract rates Advise architect, if requested, on contractor's claims (if any) for loss and expense payments. If accepted, negotiate claims with contractor</p> <p><u>Completion of project & defects liability Period</u> Advise on extension of time and imposition of liquidated damages Finalize project accounts Feedback on cost data and prepare cost analysis of completed projects. Contribute to cost database for use in future project.</p>
--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

APPENDIX B

Survey on Professional Practice of Quantity Surveyors and Need of Professional Indemnity Insurance for Quantity Surveyors

Dear Participants,

I am L.G. Manuja, student of the MSc in Construction Law and Dispute Resolution conducted by the Department of Building Economics, University of Moratuwa. As a requirement of the course it is mandatory to carry out a research and submit a report on a topic related to Construction Law and Dispute Resolution. I have chosen to study the professional practice of quantity surveyors, faults made the Quantity Surveyors and the possible mechanism of using Professional Indemnity Insurance to rectify the effects.

The survey consists of 19 questions and each question would take less than a minute to answer and completely anonymous. Therefore please take a few minutes of your valuable time to express your genuine views on or before 20th October 2017.
Your participation in this survey is highly appreciated.

Thank you for your support.

L. G. Manuja

Section A: General Information of Research Participants

1. Indicate the major category of services provided by your organization

Mark only one oval.

- Client
- Consultancy
- Contracting

2. Please indicate your position/designation in your organization

Mark only one oval.

- Contract Manager
- Contract Administrator
- Chief Quantity Surveyor
- Senior Quantity Surveyor
- Quantity Surveyor
- Assistant Quantity Surveyor
- Other: _____

3. Indicate your level of education and/ or professional qualification

Check all that apply.

- Certificate
- Diploma
- Degree
- Post Graduate
- Charter
- Other: _____

4. Please indicate the years of experience in the field of construction

Mark only one oval.

- Less than 5 years
- 6 -10 years
- 11 -15 years
- 16 - 20 years
- 21 - 25 years
- More than 25 years
- Other: _____

5. Indicate your experience related to quantity surveying in terms of location.

Mark only one oval.

- Local
- International
- Both Local & International

Section B: Perception of quantity surveying profession

Note: This section of survey covers following aspects: Competencies/ duties of quantity surveying professionals, Common faults made by quantity surveyors, Causes for professional faults and negligence, Effects that could occur due to faults of quantity surveyors and Mitigation measures to address those effects.

6. Followings are identified duties as per the established professional association for quantity surveying profession. Please indicate the degree of your involvement in the following duties of quantity surveying professions according to your experience.

Mark only one oval per row.

	Not at all	Low	Moderately	Highly	Very highly
Preliminary cost estimates and advice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investment appraisal/ feasibility studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Value management/ value engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advising on contract strategies and procurement systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estimating contract price for use in benchmarking tenders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preparing tender documents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tendering for winning job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selection of contractors or sub-contractors or suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Negotiating contract prices and preparing contract documents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preparing budgets and cash flow forecasts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contract administration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interim valuations and payments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monitoring, and exercising cost control over the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forecasting costs to complete and preparing financial statements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preparing of variation and claims	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Valuation of variations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluating and settling contractual claims	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advice on cost limit & budget	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subcontract administration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advice on contractual dispute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Final account preparation and agreement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Settlement of payment disputes and giving expert evidence in arbitrations and disputes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilities management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Property consulting and development services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Due diligence auditing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asset valuation & management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insurance valuation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Capital allowances	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Corporate recovery and insolvency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability advisor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Please specify any other you may feel that could be a role and responsibility of quantity surveyors.

8. Consider the following common faults made by quantity surveyors and indicate the degree of making the faults according to your experience

Mark only one oval per row.

	Never	Rarely	Average	Frequently	Very frequently
Misleading pre-contract estimate and advise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Failure to take prompt action/ response (eg. Failure to notify the contractor on insufficient speed of work)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Failure to keep client informed on matters with significant cost implication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inaccurate determinations made for price adjustment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inappropriate advice on selection of particular contractors/ sub-contractors/ supplies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Absence of important clauses in conditions of contract	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Errors in bills of quantities i.e. errors in quantities, rates or description	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loss of documents or data (eg. Preparation of a tender document with some important pages missing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mistakes in Bid pricing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inaccurate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fraudulent misrepresentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Misstatements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair treatment to contractors in tender negotiations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate compliance with standards (eg. Non-compliance with government procedure guidelines)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of Information regarding Quality Assurance and Quality Control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Arithmetic errors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incorrect valuation (for construction work, variations, claims, etc...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Errors in claim assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair determination of variations and claims	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inappropriate advice in contractual matters to client and contractor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Late certifications and non-certifications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of monitoring or controlling the cost as work in progress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair treatment to contractors in final account negotiations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Please specify any other you may feel that could be a fault of quantity surveyors.

10. Consider the following causes for professional faults and indicate the degree of effect of this causes to commit the above faults of by quantity surveyor.

Mark only one oval per row.

	Never	Low	Moderately	Highly	Very highly
Non-availability or lack of detailed information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inaccurate Data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professionals' inexperience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional incompetence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of adequate documentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor cost control method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of quality management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Negligence of professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient planning and design work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design error	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employing the wrong procurement method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Error	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fraudulent practices of professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working under pressure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Please specify any other you may feel that could be a cause for making faults by quantity surveyors

12. Please indicate the degree of following effects that could occur due to faults of quantity surveyors

Mark only one oval per row.

	Not at all	Low	Moderatly	Highly	Very highly
Put the target outcomes expected by clients, contractors, and consultants in the overall development process at risk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Negative affect on the quality of the projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost and time overrun in projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Negative effect on the cash flow of the contractor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lead to project abandonment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Capital flight, and huge economic loss in the form of additional cost of projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Additional costs for rework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dissatisfaction by project owners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of confidence in consultants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loss of reputation of consultant office	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Frustration on stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of concentration on other projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discourages investment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loss of designer's profit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Arising the contractual claims	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase on litigation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Please specify any other effects you may feel that could occur due to faults of quantity surveyor.

14. Please indicate the most suitable mitigation measures that could be used to address the above effects.

Mark only one oval per row.

	High unsuitable	Unsuitable	Suitable but risky	Suitable	Most Suitable
Internal quality assurance system (providing education and training)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institutional control over professional practice (Code of Conduct)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Litigation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alternative dispute resolution methods (Arbitration, mediation, conciliation, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adequate contingency allowances	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional indemnity insurance system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Please specify any other measures you may feel that could be a way of addressing the above effects.

Section C: Professional Indemnity Insurance as a mitigation measure for professional faults.

Note: This section of survey covers the need of a Professional Indemnity Insurance (PII) as a mitigation measure for professional faults of quantity surveyors.

16. In your opinion, do you think that Professional Indemnity Insurance (PII) is required to indemnify the damages caused by the above faults of quantity surveyors.

Mark only one oval.

- Not at all
- Sometimes
- Always

17. If, your answer is "Sometimes" or "Always" please indicate the need of PII coverage for the following faults

Mark only one oval per row.

	Not at all	Sometimes	Always
Misleading pre-contract estimate and advise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Failure to take prompt action/ response (eg. Failure to notify the contractor on insufficient speed of work)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Failure to keep client informed on matters with significant cost implication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inaccurate determinations made for price adjustment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inappropriate advice on selection of particular contractors/ sub-contractors/ supplies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Absence of important clauses in conditions of contract	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Errors in bills of quantity i.e. errors in quantities, rates or description	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loss of documents or data (eg. Preparation of a tender document with some important pages missing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mistakes in Bid pricing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inaccurate information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fraudulent misrepresentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Misstatements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair treatment to contractors in tender negotiations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate compliance with standards (eg. Non-compliance with government procedure guidelines)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of Information regarding Quality Assurance and Quality Control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Arithmetic errors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incorrect valuation (for construction work, variations, claims, etc....)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Errors in claim assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair determination of variations and claims	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inappropriate advice in contractual matters to client and contractor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Late certifications and non-certifications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of monitoring or controlling the cost as work in progress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair treatment to contractors in final account negotiations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Are there any damages due to professional quantity surveyor's faults are covered by an insurance system in your Organization.

Mark only one oval.

- Yes
 No

19. If "No" Indicate the reasons.

APPENDIX C

Subject Matter Experts' (SME) Interview

Research Title: A Study of Professional Liabilities and Need for Professional Indemnity Insurance (PII) for Quantity Surveyors.

Research Objectives:

- Review on the duties of quantity surveyors
- Identify the faults can be occurred due to the cessation of the liability of the quantity surveyors while performing the duties
- Ascertain the causes of professional faults and negligence
- Identify the effects of the faults to the client and the organization.
- Recommend the measures to be used to mitigate the effects with special weight emphasis to PII.

Section A: Participant's profile

a) Designation:

b) Nature of business:

d) Number of years of experience in the industry:

Section B: Views of the Participants

01. Based on your experience could you give your opinion regarding the answers arranged as per the descending order of the mean values which were calculated for the question of; *“Followings are identified duties as per the established professional association for quantity surveying profession. Please indicate the degree of your involvement in the following duties of quantity surveying professionals according to your experience.”*

Competencies/ duties of quantity surveying professionals	N	Mean
Interim valuations and payments	66	4.390
Valuation of variations	66	4.290
Contract administration	66	4.120
Monitoring, and exercising cost control over the project	66	4.080
Forecasting costs to complete and preparing financial statements	66	3.970
Preparing of variation and claims	66	3.950
Final account preparation and agreement	66	3.890
Preliminary cost estimates and advice	66	3.790
Evaluating and settling contractual claims	66	3.730
Preparing tender documents	66	3.710
Advice on cost limit & budget	66	3.700
Negotiating contract prices and preparing contract documents	66	3.650
Selection of contractors or sub-contractors or suppliers	66	3.610
Advice on contractual dispute	66	3.520
Preparing budgets and cash flow forecasts	66	3.440
Cost planning and cost checking	66	3.420
Estimating contract price for use in benchmarking tenders	66	3.380
Advising on contract strategies and procurement systems	66	3.290
Subcontract administration	66	3.200
Value management/ value engineering	66	2.950
Tendering for winning job	66	2.680
Project management	66	2.620
Settlement of payment disputes and giving expert evidence in arbitrations and disputes	66	2.440
Investment appraisal/ feasibility studies	66	2.380
Risk Management	66	2.330
Due diligence auditing	66	2.150
Insurance valuation	66	2.050
Sustainability advisor	66	1.920
Property consulting and development services	66	1.880
Asset valuation & management	66	1.770
Facilities management	66	1.670
Capital allowances	66	1.580
Corporate recovery and insolvency	66	1.500

02. What is your point of view according to your experience on the following faults made by quantity surveyors arranged as per the descending order of the mean values which were calculated from answers obtained for the question of;

“Consider the following common faults made by quantity surveyors and indicate the degree of making the faults according to your experience”

Common faults made by quantity surveyors	N	Mean
Errors in bills of quantities i.e. errors in quantities, rates or description	66	3.61
Late certifications and non-certifications	66	3.05
Misleading pre-contract estimate and advice	66	2.95
Lack of information regarding quality assurance and quality control	66	2.92
Failure to take prompt action/ response (eg. Failure to notify the contractor on insufficient speed of work)	66	2.91
Lack of monitoring or controlling the cost of work in progress	66	2.74
Absence of important clauses in conditions of contract	66	2.71
Failure to keep client informed on matters with significant cost implication	66	2.67
Incorrect valuation (for construction work, variations, claims, etc....)	66	2.67
Unfair determination of variations and claims	66	2.61
Errors in claim assessment	66	2.59
Inaccurate determinations made for price adjustment	66	2.58
Inappropriate advice in contractual matters to client and contractor	66	2.58
Mistakes in bid pricing	66	2.48
Inappropriate advice on selection of particular contractors/ sub-contractors/ supplies	66	2.42
Inaccurate information	66	2.41
Inadequate compliance with standards (eg. Non-compliance with government procedure guidelines)	66	2.41
Arithmetic errors	66	2.39
Unfair treatment to contractors in final account negotiations	66	2.38
Loss of documents or data (eg. Preparation of a tender document with some important pages missing)	66	2.23
Unfair treatment to contractors in tender negotiations	66	2.21
Misstatements	66	2.08
Fraudulent misrepresentation	66	1.58

03. The following causes of professional faults were found from answers obtained for the question of;

“Consider the following causes for professional faults and indicate the degree of effect of this causes to commit the above faults of by quantity surveyor.”

Please review these observations based on your experience.

Causes of Professional Faults & Negligence	N	Mean
Professionals' inexperience	66	4.23
Professional incompetence	66	4.09
Non-availability or lack of detailed information	66	4.06
Inaccurate Data	66	4.03
Poor cost control method	66	4.02
Inadequate time	66	3.97
Fraudulent practices of professionals	66	3.97
Lack of quality management	66	3.82
Design error	66	3.76
Insufficient planning and design work	66	3.71
Negligence of professionals	66	3.64
Lack of adequate documentation	66	3.61
Employing the wrong procurement method	66	3.3
Human Error	66	3.26

04. These are the effects that could occur due to faults of quantity surveyors, arranged as per the descending order of the mean values which were calculated from answers obtained for the question of;

“Please indicate the degree of following effects that could occur due to faults of quantity surveyors”

Please comment on this regard.

Effects that could occur due to faults of quantity surveyors	N	Mean
Cost and time overrun in projects	66	3.64
Arising the contractual claims	66	3.55
Negative effect on the cash flow of the contractor	66	3.47
Dissatisfaction by project owners	66	3.11
Put the target outcomes expected by stakeholders in the overall development process at risk	66	3.02
Loss of reputation of consultant office	66	2.91
Increase the litigation cost	66	2.89
Lack of confidence in consultants	66	2.85

Frustration on stakeholders	66	2.83
Additional costs for rework	66	2.79
Negative effect on the quality of the projects	66	2.68
Lack of concentration on other projects	66	2.65
Discourages investment	66	2.61
Capital flight, and huge economic loss in the form of additional cost of projects	66	2.52
Loss of designer's profit	66	2.47
Lead to project abandonment	66	2.33

05. What is your opinion about the following mitigation measures that could be used to address the effects arranged as per the descending order of the mean values which were calculated from answers obtained for the question of;

“Please indicate the most suitable mitigation measures that could be used to address the above effects.”

Mitigation measures	N	Mean
Internal quality assurance system (eg. Providing education and training)	66	4.36
Institutional control over professional practice (Code of Conduct)	66	4.20
Professional Indemnity Insurance system	66	4.03
Alternative Dispute Resolution methods (Arbitration, Mediation,...etc)	66	3.77
Adequate contingency allowances	66	3.62
Litigation	66	2.44

06. According to your experience, do you think Professional Indemnity Insurance (PII) is required to indemnify the damages caused by the following faults of quantity surveyors? Could you comment on this? My finding in respect of this as follows;

Significant liabilities of quantity surveyors to be covered under PII	N	Mean
Errors in bills of quantities i.e. errors in quantities, rates or description	62	2.39
Misstatements	62	2.37
Inappropriate advice in contractual matters to client and contractor	62	2.21
Loss of documents or data (eg. Preparation of a tender document with some important pages missing)	62	2.19
Misleading pre-contract estimate and advice	62	2.16
Inaccurate information	62	2.16
Mistakes in bid pricing	62	2.15
Absence of important clauses in conditions of contract	62	2.13
Fraudulent misrepresentation	62	2.13

Arithmetic errors	62	2.06
Inaccurate determinations made for price adjustment	62	1.98
Late certifications and non-certifications	62	1.97
Failure to keep client informed on matters with significant cost implication	62	1.94
Errors in claim assessment	62	1.94
Inadequate compliance with standards (eg. Non-compliance with government procedure guidelines)	62	1.90
Incorrect valuation (for construction work, variations, claims, etc....)	62	1.90
Unfair treatment to contractors in final account negotiations	62	1.87
Lack of information regarding quality assurance and quality control	62	1.85
Unfair determination of variations and claims	62	1.85
Lack of monitoring or controlling the cost of work in progress	62	1.85
Inappropriate advice on selection of particular contractors/ sub-contractors/ supplies	62	1.66
Failure to take prompt action/ response (eg. Failure to notify the contractor on insufficient speed of work)	62	1.60
Unfair treatment to contractors in tender negotiations	62	1.52

Thank you for giving me this opportunity to interview you. Your views are highly appreciated.