

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

Research methodology is systematic process dealing with identifying problem initially and thereafter towards data collecting, analyzing these data and reaching at a conclusion allowing the researcher to move forward towards the solutions for the problem and on the study's contribution towards theoretical framework. Research methodology describes the methods used to collect the data and analyze it by following the research design, sampling technique, measurement & instrumentation, data collection, data analysis and model formulation and its validation.

This study on construction of substations in UAE has three specific objectives of identifying the activity wise significant risks impacting contingency; its perception of different stakeholders of these significant risks and their impact on project performance in terms of cost & time and formulating & validating a contingency estimation model.

This chapter analyses the way in which the researcher answered the research questions related with the above objective, by evaluating the methodologic approach and research methods which are appropriate to the study. The choice of selecting the construction of substation in UAE being part of the Power Projects has already been justified in the Chapter 1, and hence is considered as part construed here.

3.1 Selection of Framework for Research

Research is undertaken in order to find out new things in a systematic way, thereby increasing the knowledge. It is also referred to as a logical and systematic search for new and useful information on a particular subject or field (Rajasekar, 2013). Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue (Creswell, 2012) and to describe, explain, understand, foresee, criticize and analyze already existing knowledge or phenomena in social sciences (Gronhaug, 2010).

Research can be classified in different means of its interpretation. The overall classification of research type from the view point of its Application, Objectives and Enquiry mode, as given by Kumar (1999) is shown in Fig. 3.1.

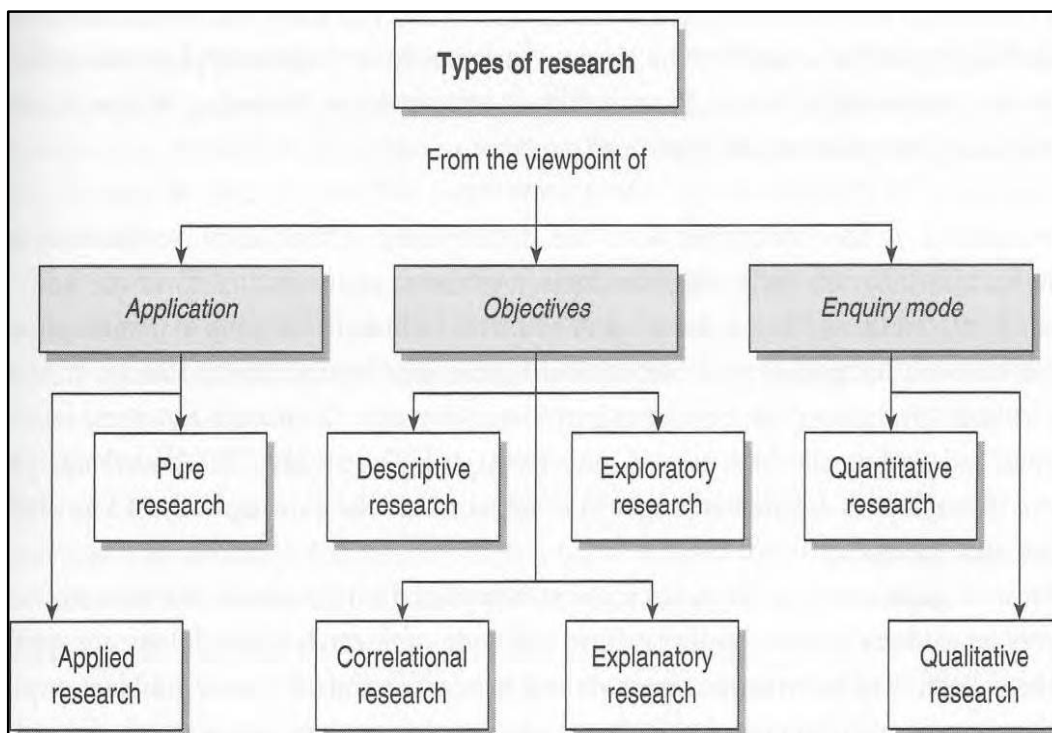


Fig. 3.1 – Overall Classification of Types of Research (Source: Kumar (1999))

A simple research classification base on their application is either Pure (also called as Basic or Theoretical) research or Applied research. A pure research is an investigation of basic principles and reasons for occurrence of a particular phenomenon while an applied research solves certain problems employing theories and principles. A comparison is as given in Fig. 3.2.

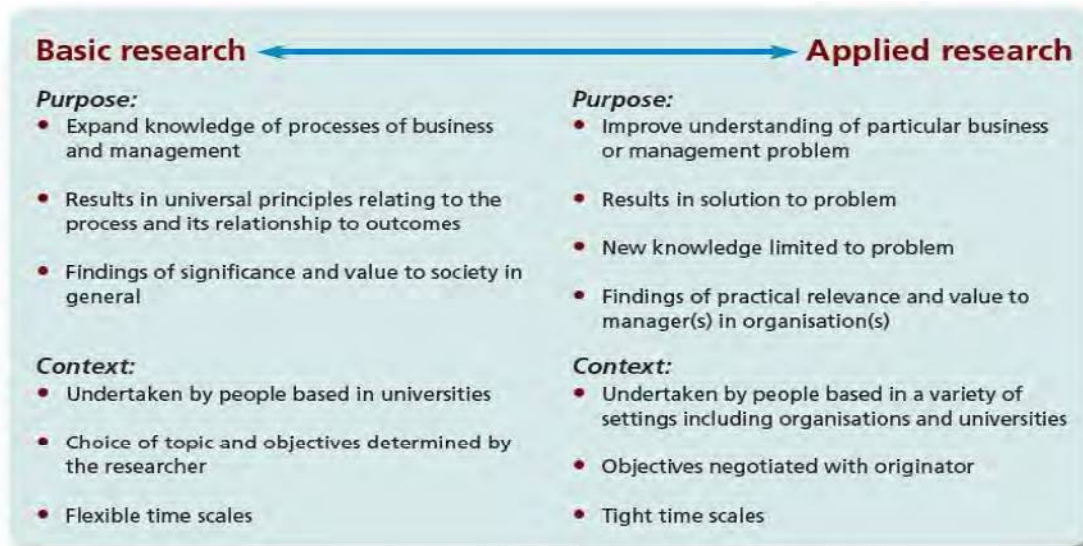


Fig. 3.2 - Basic and applied research (Sources: Easterby-Smith et al. 2008; Hedrick et al. 1993)

Furthermore, a research can also be classified into four types based on their objectives as shown above. Descriptive research designs help provide answers to the questions of who, what, when, where, and how associated with a particular research problem; a descriptive study cannot conclusively ascertain answers to why. Descriptive research is used to obtain information concerning the current status of the phenomena and to describe "what exists" with respect to variables or conditions in a situation. An exploratory research design is conducted about a research problem when there are few or no earlier studies to refer to or rely upon to predict an outcome. The focus is on gaining insights and familiarity for later investigation or undertaken when research problems are in a preliminary stage of investigation. Exploratory designs are often used to establish an understanding of how best to proceed in studying an issue or what methodology would effectively

apply to gathering information about the issue. Correlation research design is to establish the existence of a relationship or association or interdependence between two or more aspects of a situation, be it variable or different things. On the other hand Explanatory research design attempts to clarify why and how there is a relationship between two aspects of a situation or phenomenon and attempts to answer the ‘why’.

On the mode of enquiry or the information used for the research, a research can be classified as a Quantitative research or a Qualitative research. Comparison of Quantitative and Qualitative research design as noted by Minichiello et al. (1990) is given in Fig. 3.3

	Qualitative	Quantitative
Conceptual	Concerned with understanding human behaviour from the informant's perspective Assumes a dynamic and negotiated reality	Concerned with discovering facts about social phenomena Assumes a fixed and measurable reality
Methodological	Data are collected through participant observation and interviews Data are analysed by themes from descriptions by informants Data are reported in the language of the informant	Data are collected through measuring things Data are analysed through numerical comparisons and statistical inferences Data are reported through statistical analyses
<i>Source: Adapted from Minichiello et al. (1990, p. 5)</i>		

Fig. 3.3 – Comparison of Qualitative and Quantitative research (Source: Minichiello et al. (1990))

From the objective point of view in undertaking this research, it falls in the category of exploratory research; where this research is performed to explore the likelihoods of undertaking a larger research study (Kumar 1999). In case of an

exploratory research, a small-scale research is anticipated to select if it is feasible to do a comprehensive investigation (Lundmark & Patterson, 2010).

The classification based on information required and the connected use of qualitative or quantitative research where it will be elucidated which data collection method has been used for the research. In this research after exploratory research dealing with quantitative of variables impacting in output are assessed so it is quantitative research as well. As this research is exploratory and quantitative research, it should be viewed as a forerunner of a bigger project that could have as a goal to test the hypotheses, to see if they can be accepted or should be rejected. (Roy, N.C., 2014).

In this study, a detailed assessment of the risk in the construction phase of a substation projects in UAE is conducted. Factor Analysis is utilized for identifying the significant risk variables based on their factor loading. Subsequently, the significant risk variables were utilized for using Chi-Square hypothesis testing with SPSS as tool for 95% confidence level while Excel spreadsheet as tool for calculating 95% & 99% confidence level. In spite of having various methods for the model formulation, typically utilized Regression Analysis is utilized for arriving at the Model while subsequently utilizing the qualitative and quantitative data related to the significant risk variables and their categorization for finalizing the Model, which were utilized for validation using Excel spreadsheet by quantitatively.

3.2 Research Process

Research design is the research process that involves the overall assumptions of the research to the method of data collection and analysis (Creswell, 2009). Research design, according to Welman et al. (2005), is best described as the overall plan, according to which the respondents of a proposed study are selected, as well as the means of data collection or generation, while Babbie and Mouton (2008) describe research design as a plan or blueprint for conducting the research.

The research design also entails a detailed plan according to which research is undertaken. According to Mouton (1996), the main function of a research design is to enable the researcher to anticipate what the appropriate research decisions are likely to be, and to maximize the validity of the eventual results.

A research design focuses on the end-product and all the steps in the process to achieve that outcome. In this sense, a research design is viewed as the functional plan in which certain research methods and procedures are linked together to acquire a reliable and valid body of data for analyses, conclusions and model formulation. The research design thus provides the researcher with a clear research framework and it guides with the methods, decisions and sets the basis for interpretation, formulation and validation. As research design mainly deals with research purpose issues its choice is mainly grounded on the aims of current study discussed in the introduction section. A number of designs were described in the literature however researchers generally choose among three of them (Adopted from Saunders et al. (2007), Hair et al. (2003) and Ticehurst and Veal (1999)):

1. Exploratory studies are particularly used when the research area is not well established, when researcher need to ‘clarify the understanding of the problem’.
2. Descriptive studies require a clear picture of the research interest area in order to be able to develop hypothesizes and test them.
3. Explanatory studies deal with causal relationship between the variables. The main question considered here are patterns in data collected.

However as well as any researcher can use different strategies in his/her research, different research designs may be employed (Saunders et al., 2007).

Therefore, this research employs exploratory approach by analyzing the importance of risk variables from different stakeholder perspectives to identify the

significant risk variables. Explanatory design will be also involved since one of the objectives of this research is finding relationships between different variables in their influence on project success or project performance in terms of cost and time.

The research processes for the current study are shown in ensuing Fig. 3.4, Fig.3.5, Fig.3.6, and Fig. 3.7. Fig. 3.4 provides the details on the research process utilized for the initial stage of the study concurring with the preparation of questionnaire for taking up objective 1. Fig. 3.5 provides the details on the research process of data collection and analysis for objective 1 and objective 2 of this study. Fig. 3.6 provides the details on the research process of formulating and validating the contingency estimation model being objective 3 of this study. Fig. 3.7 provides the details on the research process of concluding and completing the research being the final stage.

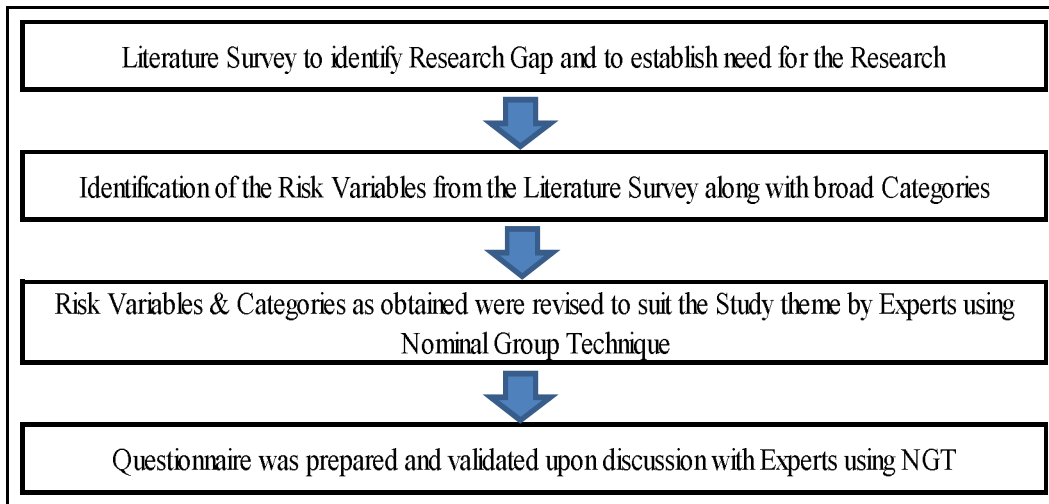


Fig. 3.4 - Research Process - Initial Stage

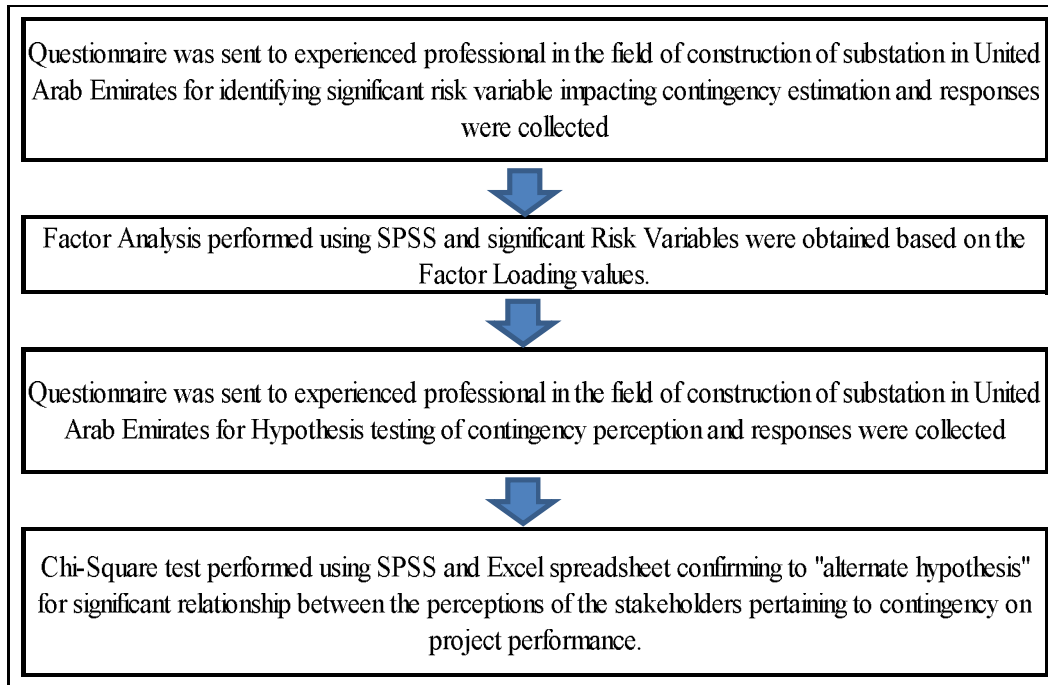


Fig. 3.5 - Research Process - Analysis Part of Objective 1 & Objective 2

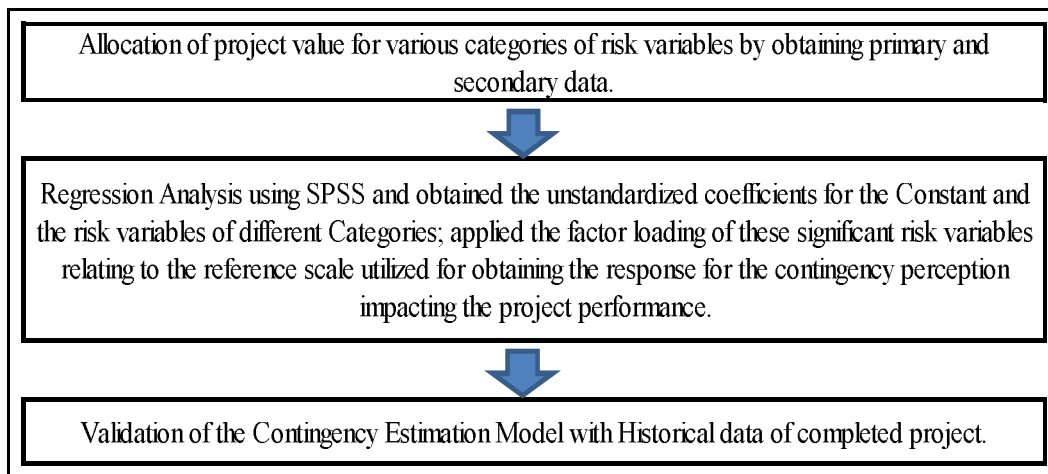


Fig. 3.6 - Research Process - Model Formulation & Validation (Objective 3)

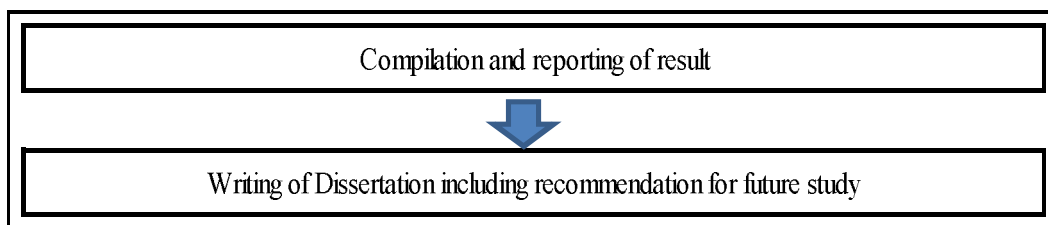


Fig. 3.7: Research Process - Final Stage

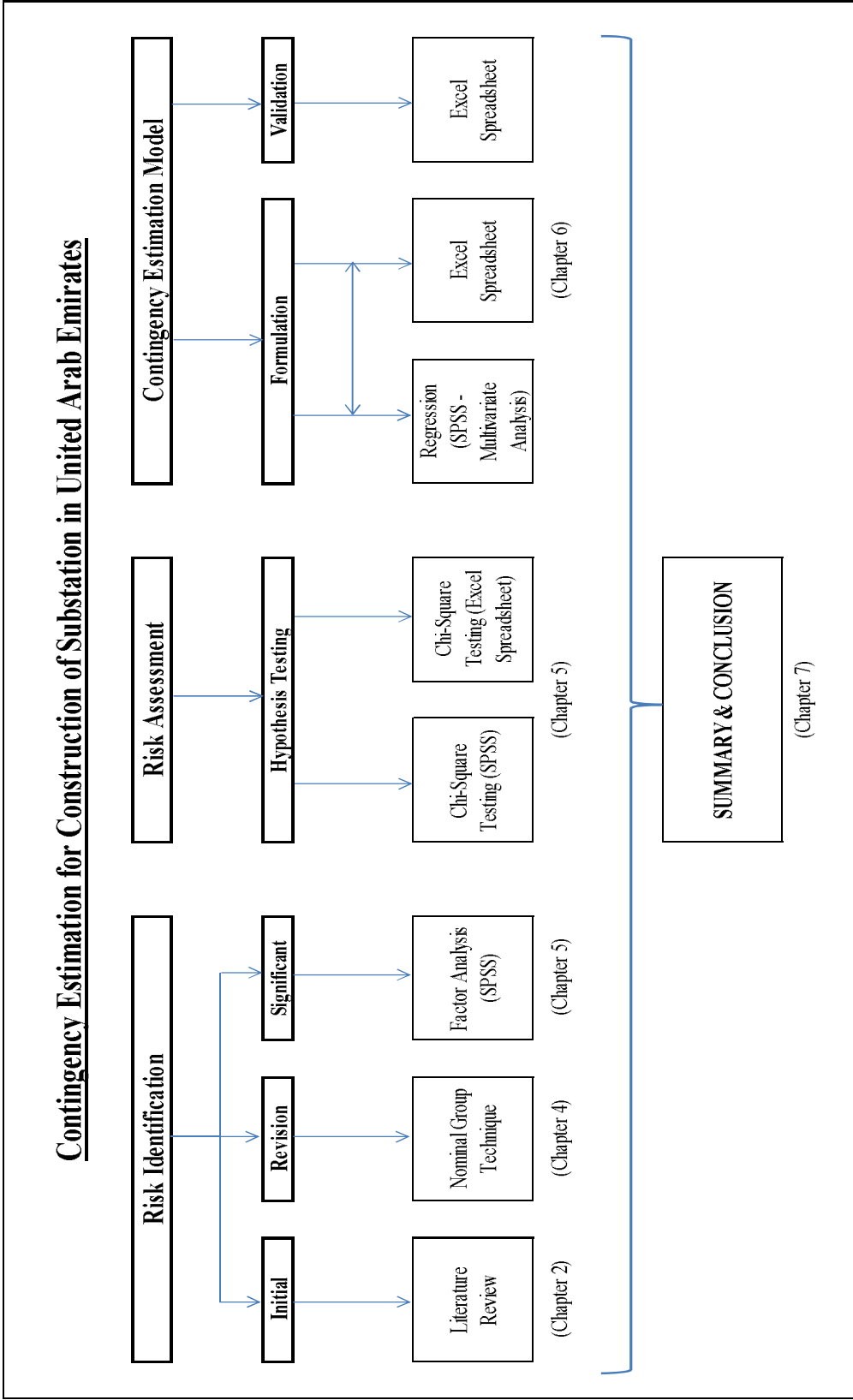


Fig 3.8 - Research Model for Current Research

The research model for the current study is shown in Fig. 3.8. This is segregated into three sections, i.e. Risk Identification being part of the Objective 1, Risk Assessment being part of Objective 2 and Contingency Estimation Model being Objective 3 of this study.

3.3 Aim of Research

The presently study is related to the field of construction of substation project in UAE. The aim of this study is to initially identify the project risk variables that are significant for contingency estimation. Upon identification of the significant risk variables, a detailed study is required to find out the impact of contingency perception of the significant risk variables by the project stakeholders and their significance to the project time & project cost; and finally a model to be suggested for contingency estimation purpose, which can be applied to the field of this research.

3.3.1 Research Question & Research Objectives

This section will examine the research process highlighting the methodological approach adopted and the specific research instruments used to investigate the research questions.

Research Question Q1: What are the risks, having impact on the contingency, for the construction of substation in UAE?

Research Question Q2: Do the contingency perceptions of stakeholders impact the project performance in construction of substation in UAE?

Research Question Q3: What kind of a model will be suitable for contingency estimation in construction of substation in UAE?

In order to answer the above questions, the following objectives are taken up for research.

Objective 1: To identify the activity wise significant risks impacting contingency applicable to construction of substations in United Arab Emirates.

Various risk variables along with their categorization relevant to construction projects identified through Literature review, then were revised by Nominal Group Technique while formulating the Questionnaire and then analyzed using Factor Analysis for segregating significant risk variables based on their factor loading. Research Design is exploratory research.

Sampling Design

- Non-probabilistic sampling
- Judgmental sampling due to limited expertise in the area

In order to answer this research objective, initially an exploration method based was utilized on the secondary data analysis of literatures for risk variables. Initially, this involves classifying of all the available risk variables identified, which resulted into 229 Nos. Risk Variables grouped in 16 Categories.

Since these risk variables are generic to construction projects, and to befit the objective of this study, these risk variables were taken and have been further analyzed using Nominal Group Technique formed with six professionals with vast experience in the construction of substations in UAE, who finally proposed with 185 Nos. Risk Variables grouped into 20 categories which are based on Work Breakdown Structure (Civil / Electrical / MEP / General) which relates to the relevant stakeholder.

Once the revised risk variables were identified, questionnaire was sent to various professionals having experience in the construction of substations in UAE for obtaining response for the categories relevant to their experience. The questionnaire were sent by means of e-mail, hand delivery of hard copies totaling to 3316 questionnaires being summation of all the categories sent and a total of

1267 filled out responses being summation of all the categories were collected by e-mail, hand delivery of responses and filling out of responses by telephonic reply. The responses of these professionals were further validated and their reliability verified using Cronbach's Alpha and sample adequacy by KMO test. Factor Analysis using SPSS was carried out and the significant risk variables identified from this analysis based on their factor loading were taken up for further utilization in this study.

Objective 2: To study the contingency perception of different stakeholders for the identified risk and their impact on project performance (in terms of cost and time) in construction of substations in United Arab Emirates.

Significant risk variables identified from Objective 1 were utilized in formulating the Questionnaire and the data received were utilized for Hypothesis testing using Chi-square test. Research Design is exploratory research.

Sampling Design

- Non-probabilistic sampling
- Judgmental sampling due to limited expertise in the area

For answering the second research objective, the 108 numbers of significant risk variables, as obtained from the objective 1 output were utilized for formulation of the questionnaire. The questionnaire was sent to various professionals having experience in the construction of substations in UAE to whom the earlier questionnaire was sent, for obtaining response for the categories relevant to their experience. The questionnaire were sent by means of e-mail, hand delivery of hard copies totaling to 3316 questionnaires being summation of all the categories sent and a total of 1017 filled out responses being summation of all the categories were collected by e-mail, hand delivery of responses and filling out of responses by telephonic reply. The responses of these professionals were utilized for calculating the chi-square value by Crosstabs using SPSS for 95% confidence

level and using Excel spreadsheet for 95% & 99% confidence levels using the below equation 3.1 :

Chi-Square Test

Degree of Freedom

$\chi^2 = \sum \frac{(Observed - Expected)^2}{Expected}$	$df = \text{degrees of freedom}$ $= (\#Rows - 1) \times (\#Columns - 1)$
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Eqn. 3.1 – Chi-Square Test and Degree of Freedom

The output for all the 108 number of Significant Risk Variables were tested for the below Hypothesis, providing the result as required for the objective 2 of this study.

H0 (Null Hypothesis)

There is no significant relationship between the perceptions of the stakeholder pertaining to contingency on project performance.

H1 (Alternate Hypothesis)

There is significant relationship between the perceptions of the stakeholder pertaining to contingency on project performance.

Objective 3: To formulate and validate a contingency estimation model for the construction of substation projects in United Arab Emirates.

Significant risk variables identified and their loading factor value from Objective 1 and the responses received for Objective 2 was utilized for the analysis towards formulation of the contingency estimation model, using both exploratory and quantitative research design. Validation of the model was done based on historical secondary data, using Quantitative research design.

Sampling Design

- Non-probabilistic sampling
- Judgmental sampling due to limited expertise in the area

The final objective of the current study aimed at formulation of a model which can be utilized for the estimation of the contingency suitable for the construction of substation projects in UAE. During the Literature review, it was noted that very limited research has been carried out for the substation projects and few articles are available towards the contingency estimation and associated model for their estimation. Even though there are limited articles, many estimating techniques were available for the contingency estimation which were applied in various construction projects and researches, but no model that can be utilized; and in more specific to the construction of substation projects that too in UAE.

Regression Analysis Technique has been identified for the model formulation considering the Objective 1 and Objective 2 of the study and the associated risk variables which were identified and the data as collected for the probability of occurrence and the impacts on the cost and time; which upon identifying the saturated co-efficient of the constant and saturated co-efficient of the significant risk variables that were identified as significant in the multivariate analysis using SPSS. In this process, the earlier identified 108 numbers of significant risk variables from the Objective 1 has further optimized to 35 numbers of risk variables which are considered part of the said model during formulation. Validation of the formulated model was carried out from the historical data of a completed project where the associated cost data were available.

3.3.2 Data Collection Methods

To attain the goals and objectives of the current research, the data as required be it the primary data or secondary data, have be to obtained which are to be taken up for further analysis. As per Roy N.C., (2014) the starting point of the research process should be the theory, after which the analysis can be defined and the

primary research designed, implemented and analyzed; hence, the secondary research will be discussed first, followed by the primary research.

3.3.2.1 Secondary Research

Secondary Research also known as Desk Research is a common research method which involves using information that others have gathered through primary research. All research should contain the secondary research since secondary data provides the researcher an overview of what has been explored before, which will not only help to select a research topic and place the research in context in the subject area, but is also vital for the decision on research design for the own research.

The sources for the literature review, consisted for the greater part, are of research papers from journals, articles and books about the construction project, projects in Middle East, projects in UAE, power projects, substation, project management, risk management, contingency and stakeholders. Other sources were books, articles and websites about energy sector, power sector, and risk management process in power sector and country specific review. The major sources of secondary data are:

- UAE Utilities (ADWEA / TRANSCO / DEWA / FEWA / SEWA / ADDC / AADC / ENEC / APC)
- Research Groups such as MEED, KPMG, AECOM, Delloite, PwC
- Scholarly journals / research papers / articles (such as PMJ from PMI (www.pmi.org) / IJPM from IPMA (www.impa.ch) / IJMPB / IJPOM, etc.)
- Various Books on Project Management, Research Methodology, etc.

3.3.2.4 Primary Research

Primary research is new research, carried out to answer specific questions or issues under current study. It will involve questionnaires, surveys or interviews

with individuals or small groups depending on the requirements. The methodology that has been used for the primary research is elaborated in the subsequent section where the details of method used for data collection. The sample will be discussed, and validity, reliability and representativeness will be examined.

The process of collection of Primary data is placed below:

- Initial risk variables, as obtained from the Literature review, were analyzed, discussed and revised, including prioritizing and distribution against various work breakdown and stakeholder-wise categories using Nominal Group Technique sessions by means of discussion and suggestions utilizing six project professional in the construction of substation in UAE.
- Response to questionnaires were obtained based on the risk variables obtained from the NGT session and were analyzed for identifying the significant risk variables from the responses received based on the scale of importance for each risk variables.
- Response to questionnaires was obtained based on the significant risk variables obtained from the Objective 1 and was analyzed by Hypothesis testing to confirm “There is significant relationship between the perceptions of the stakeholder pertaining to contingency on project performance”.
- The responses as received from Objective 2 and the analysis data of objective 1 were further utilized along with allocation of % of project value obtained by questionnaire, for formulation of the Model.

3.3.3 Sampling & Sample Size

Sampling is used to select members of a population in the study. There are different methods utilized for sampling as shown in Fig. 3.9 (Deming W. Edwards, 1990).

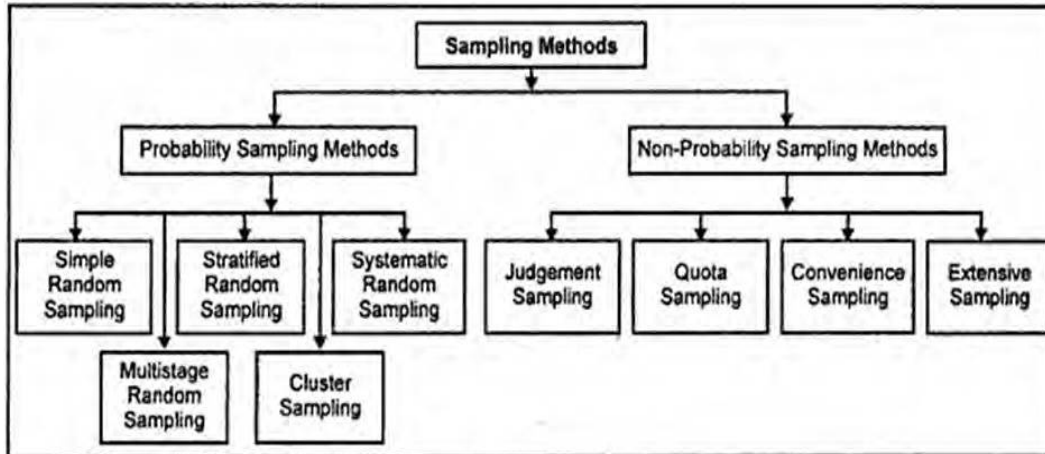


Figure: 3.9 - Sampling Methods (Source: <http://research-methodology.net/sampling/>)

There are two standard categories of sampling methods available. These two categories are called as Probability sampling and Non-probability sampling methods. Probability sampling is sometime called as random sampling while non-probability sampling is called as non-random sampling. The choice of method depends on the goal of the research. Probability samples can be rigorously analyzed to determine possible bias and likely error; while, non-probability sampling does not provide this advantage, but is useful for researchers to achieve any particular objectives of the research at hand.

The present study consists of a population which is involved in the construction of the substations in U.A.E. This population is too large to collect data directly. However, a set of members who are either involved in contingency estimation, planning or executing in the substation construction project in U.A.E. are targeted for obtaining their contribution to the study. Considering the above population and the specific requirement of involvement, Judgmental sampling technique is utilized in this study.

For the initial questionnaire finalization, Expert Judgement sampling technique is utilized. In this method, the researcher collects the samples in Nominal Group Technique session from a panel of individuals known to be having demonstrable experience and expertise in a field of current study.

Sample size provides the basis for the estimation of sample error and impacts on the ability of the model to be correctly estimated. As with any statistical method, the critical question is how large a sample is needed? Bentler and Chou (1987) suggest that in SEM the sample size requirements vary for measurement and structural models.

To test a measurement model, a ratio of ten responses per free parameters is required to obtain trustworthy estimates (Bentler and Chou 1987). Others suggest a rule of thumb of ten subjects per item in scale development is prudent (Flynn and Percy 2001). However, the number shall be increased to fifteen if the received data is found to be volatile (Bentler and Chou 1987; Hair, Black et al. 2006).

Questionnaire surveys typically involve only a proportion of the population in which the researcher is interested (Veal 1997). Although it is said that there are no set rules on how many questionnaires should be distributed, the aim should be to acquire a range of responses that is as representative as possible to allow the fulfillment of the objectives of the study and to present answers to key questions. In this research, it has been decided to send the questionnaires to all possible known professionals who are directly involved in the construction of substation projects in UAE.

For Nominal Group Technique session for review and revising the risk variables from literature review to the questionnaire, we were able to associate with 6 well experienced professional who are in-charge for complete project in construction of substation in UAE, the numbers fulfilling the Nominal Group Technique requirement. For the questionnaire 1, for identification of the significant risk variables being part of objective 1; 3316 questionnaires being summation of all the categories sent and a total of 1267 responses received. Similarly, for questionnaire 2 for hypothesis testing related to objective 2; 3316 questionnaires being summation of all the categories sent and a total of 1017 responses received, which is more than 30% response rate (Yamane, 1967).

For the validation of the Contingency Estimation Model, one project which was completed earlier and having all the required cost data was selected and the validation was made as detailed in chapter 6. Judgmental sampling was used for the study due to limited availability of experts in this area.

3.3.4 Reliability, Validity and Representativeness

As per Finn et al. (2000) each research and research method should be examined critically on its reliability, validity and representativeness. The reliability of a method is related to the consistency of the results obtained from that method. In the case of a questionnaire, the questions should obtain the same answer from a person each time it is asked. Finn et al. (2000) and Bell (2001) stated that to assure that the questions should obtain the same answer from a person each time it is asked; the questions should be simple and clearly worded. The rationality of a research mechanism indicates if it measures what it is supposed to measure and if the collected data really reflects the subject being studied (Veal 1997). Finally, the representativeness of a research's results indicates to what extent these results can be generalized.

To ensure the reliability of the results, sufficient care was taken to ensure that the questions were clear and easy to answer. Where needed, certain concepts were explained with help text to ensure that there could be no mistake to what was meant.

Cronbach's Alpha is a tool for assessing reliability developed by Lee Cronbach in 1951 (Tavakol & Dennick; 2011). The analysis result shows that for all the categories in the questionnaire, the alpha values are between 0.684 and 0.902. Since this lower end value is near to 0.700 and has been considered acceptable in general, the reliability of the questionnaire is found acceptable. This gives validity of the responses of the questionnaire survey. The physical verification of all the responses were also carried out which shows that the respondents gave the responses properly and upon identification of any vague detail which come across, that respondent response was removed from analysis.

The significant risk variables were obtained from the Questionnaire 1 and were analyzed after conformance of the data reliability and adequacy as detailed in Chapter 5. The contingency estimation model as formulated was further validated based on historical data taken from one of the completed project as given in Chapter 6, which are related to the construction of substation projects in UAE.

Therefore, the Contingency Estimation Model will probably not be reliable for all substations projects in all regions / countries or all type of substations construction projects. The researcher believes however, that in an exploratory research it is not that important that the sample is representative of whole as the main objective of the research is to establish if it is feasible to start a larger research; which in that case should indeed have a representative, or at least closer matched sample, that could be assured in this research.

3.3.5 Questionnaire Details

There are totally three set of questionnaires prepared for this study. The details are as below:

- Questionnaire # 1: Related to the Objective 1 of this study to identify the significant risk factors.
- Questionnaire # 2: Related to the Objective 2 of this study to test the Hypothesis.
- Questionnaire # 3: Related to the Objective 3 of this study to allocate % project value for the support categories.

All respondents received the same email with a cover letter and questionnaire in English so that the respondents could be comfortable to choose right answers based on their experience and their perception on the contingency estimation, probability of occurrence and their impact on the time and cost along with the requirement of risk variable categories allocation .

For identification of significant risk variable a semi structured questionnaire was prepared mentioned in Appendix A2 includes 185 risk variables with 5 point scale

of importance of the risk variables, i.e. Not important, Least important, important, More important and Most important are collected.

For the hypothesis testing using chi-square test, the probability of occurrence, cost impact and time impact in 5 point scale of Very Low, Low, Moderate, High & Very High as shown in Appendix A3 are collected while the reference range scale for the above was provided as part of the questionnaire which was taken from the detailed literature review, for 108 significant risk variables.

For the allocation of % project value of the various risk variable categories, a simple questionnaire was prepared asking the respondents to fill out the % of project value corresponding to the six risk variable general categories based on their experience as shown in Appendix A4, which was further utilized for the formulation of the contingency estimation model. The confidentiality of the respondent is kept with proper concern.

3.3.6 Respondents Details

The respondents were grouped based on the risk variable categories. The minimum number of 42 responses was received for 'Finance' during questionnaire 1 response while a maximum number of 70 responses received for 'Electrical works' during Questionnaire 1 response collection as shown in Fig. 3.10 and Fig. 3.11.

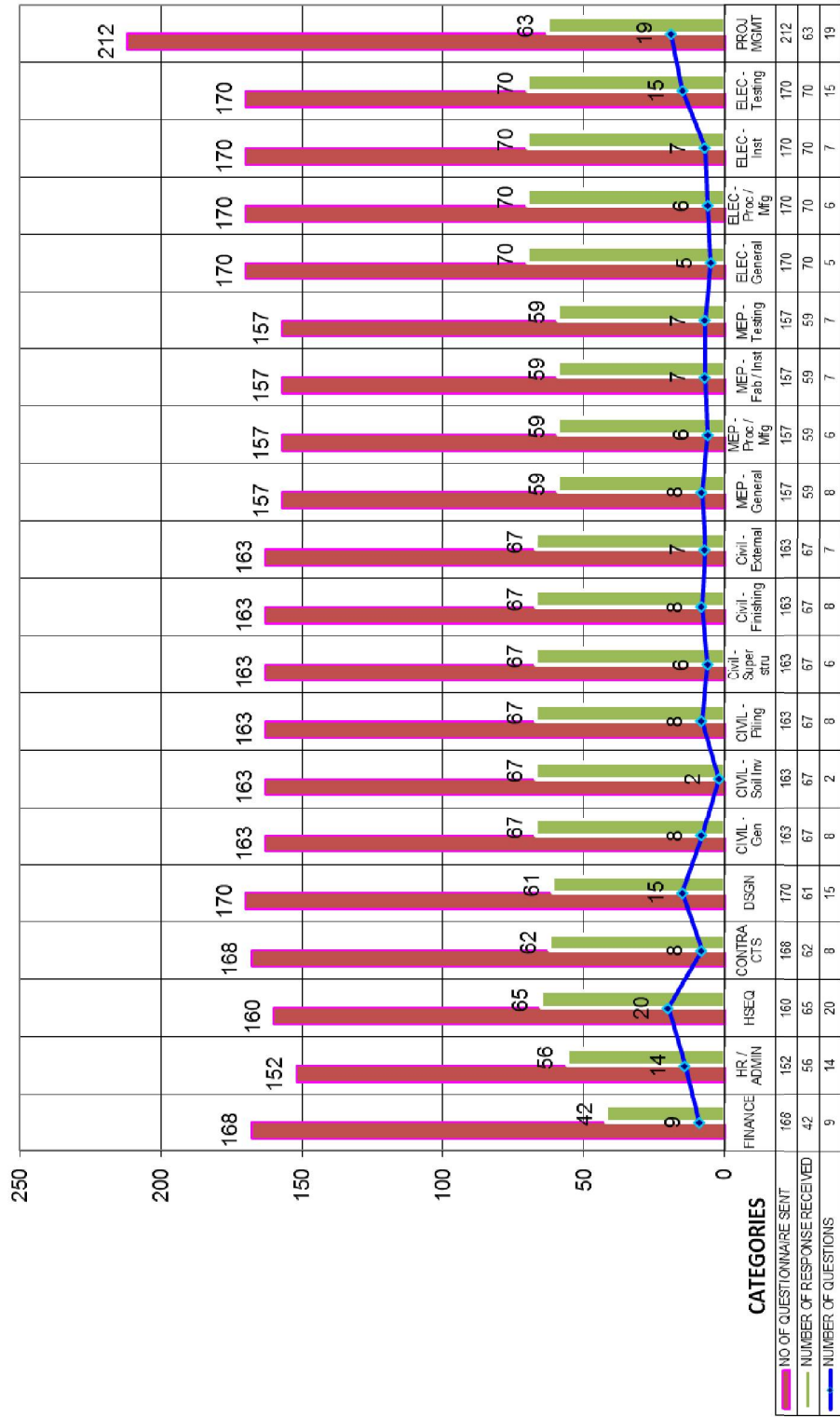


FIG.3.10 :: QUESTIONNAIRE # 1 - NUMBER OF QUESTIONS / QUESTIONNAIRE SENT / RESPONSE RECEIVED

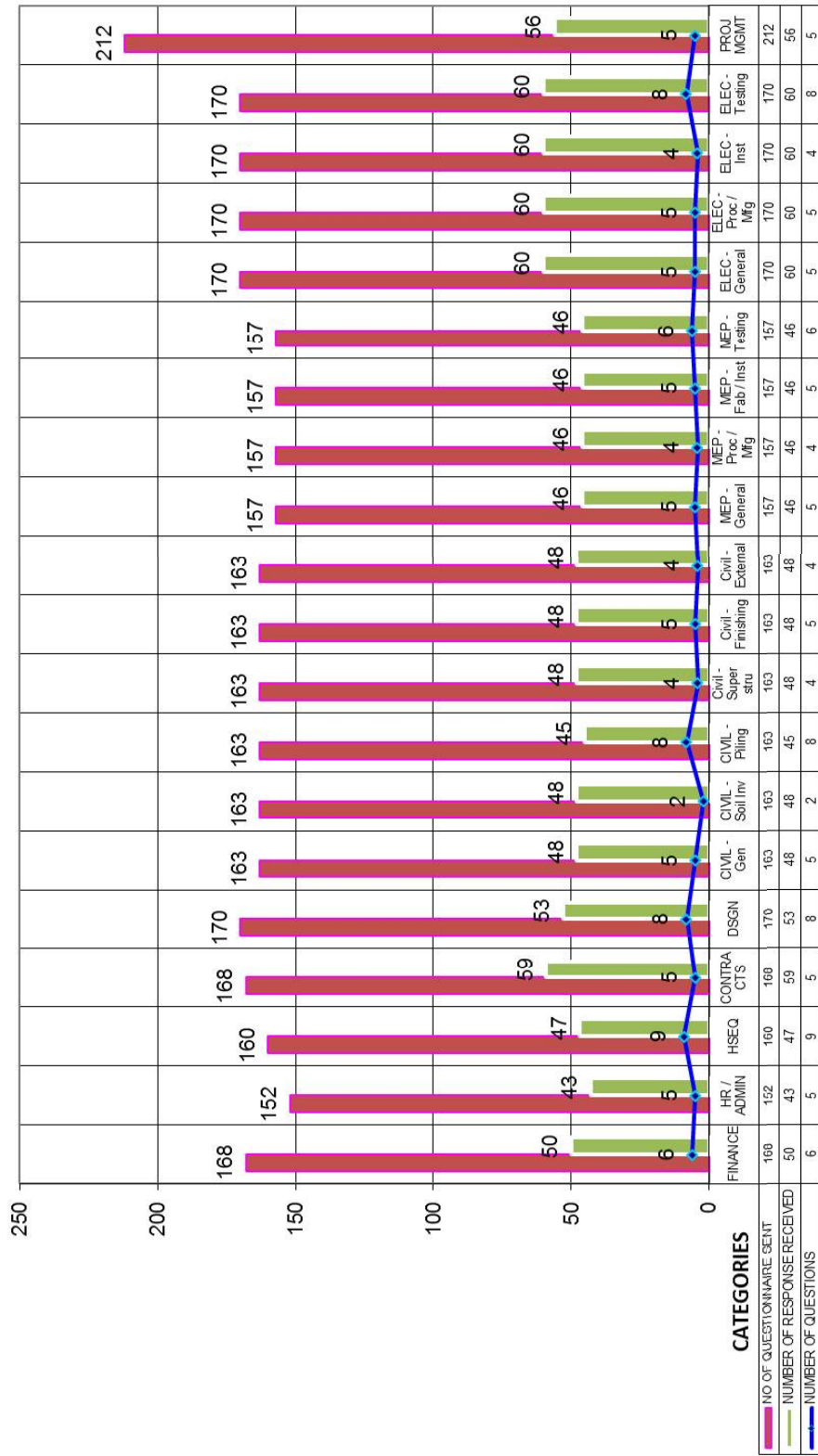


FIG.3.11 :: QUESTIONNAIRE # 2 - NUMBER OF QUESTIONS / QUESTIONNAIRE SENT / RESPONSE RECEIVED

3.4 Analysis Technique

The objective of this study as stated above starts with the identification of significant risk variable. For this, the initial risk variables as obtained from the literature review were further revised using Nominal Group Technique with the utilization of six project experts in the field of construction of substation in UAE. The risk variables as revised were further utilized for obtaining responses and the data as received from respondents were analyzed using Factor Analysis using SPSS to identify the significant risk variable which have factor loading of 0.7 or more (Hair et al. 1998). For the measuring of relationship between the perception of the stakeholder pertaining to contingency on project performance in terms of time and cost, using the significant risk variables and the response received against them, Cross tab using SPSS and Excel spreadsheet were utilized for analysis to find out the Chi-square value to test hypothesis. For the formulation of the contingency estimation mode being the Objective 3 of this study, Multivariate analysis for regression using SPSS was performed while Excel spreadsheet was utilized for the quantitative analysis and validation purpose.

3.5 Scope of Research

Even though the risk variables that are initially considered for the study and subsequent revisions and finally obtained significant ones seems to be a common one for a general construction project, this research output is specific to the construction of substation in UAE.

This research provides an insight on the significant relationship between the perceptions of the stakeholder pertaining to contingency on project performance in terms of cost and time, however, the contingency estimation model will be only for the cost estimation.

3.6 Chapter Summary

This chapter provides the researcher with a basic framework on what has to be done, when and which the activities to be taken up in sequence, where to find the source & whom to contact for the data and finally, how to analyze the data and validate them, thereby concluding the study with a proper dissertation.

Since research is a wide ocean; according to the aim and objective of the current research, this comes under the exploratory research type. Furthermore, based on the mode of enquiry for the information, this research is classified as Quantitative research. The Research questions and objectives were formulated based on the business problem and the identified gaps from the previous chapters. The questionnaires were formulated using Nominal Group Technique initially and are self-administered for obtaining the primary data. Secondary data are collected for the requirements of the research wherever applicable. The sources of data collection were identified in detail. The sampling design is non-probabilistic judgmental sampling due to the limited expertise in the area of present study. Various analyses such as Factor Analysis, Chi-square testing and Multivariate analysis are identified for utilization along with the details related to conformance of data reliability, validity and representativeness. The limitations based on the scope of the present study are formalized. A flow chart detailing the various stages of the Research Process and Research Model are presented for a quick overview of the proposed research.

Accordingly, the next step of research towards the initial identification of the risk variables and their categorization are taken up and detailed in the next chapter, which forms the neural system of the current study.

3.7 References

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