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Abstract

Construction delays are occurring in every phase of a construction project and are common problems in construction projects in Addis Ababa. Moreover, it is well known that the delays in construction projects are the major causes of project failure. If the delay is not identified and the corrective project management decision is not taken in time a project may incur extra cost and extension of project time, which gives rise to dissatisfaction to all the parties involved and nowadays it's becoming a major obstruction for their development for developing countries like Ethiopia. This research first identified 88 key factors causing delay in Ethiopian construction industries, and then the most common and critical causes of construction delay were evaluated by using both the data collected in a survey of construction managers, resident engineers, contractors, and clients, and interviews with senior professionals in the field.

In Addis Ababa, the number of public and private building construction projects is increasing from time to time. However, it becomes difficult to complete projects in the allocated cost and time. Taking into account the scarce financial resources of the country, cost overrun is one of the major problems in Addis Ababa. Therefore, this research will be carried out to dig-out information on the factors that cause cost overrun and time delay during construction and their effects on public building construction projects in Ethiopia.

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1. Introduction

1.1. Background of the study

Ethiopia is the fastest-growing, non-oil driven economy among African countries. The country has showed a remarkable growth over the past ten years with average annual growth GDP of 10.9%. Recently, the contribution of the industry sector (which is 21.2%) and particularly that of the construction sector to the national economy is given high prominence and is mainly driven by the energetic performance of the construction sub-sector Despite the construction sector has high importance, several defects are being noted in the sector that require immediate action One significant problem is significant delay of infrastructure and construction projects which can hold back or impair planned economic development

Addis Ababa is the most populous area in Ethiopia and it is the capital of Africa, so it is touristic destination, besides that the number of populations is very large and is estimated around 3.4 million in 527km^2 area. There is high demand for housing and construction so to satisfy this demand the schedule of the work has to be very fast and resource allocation has to very adequate.

As a result, the demand, the construction industry is booming but the characteristics of construction industry is also known for its delays and its frequent calamities between the contractor and the client. In addition, the quality of the built structure (building, pavement and other infrastructure) are very poor. Many construction projects are behind the schedule and/or over budget. Though the range has dissimilarity within researchers, many literatures have indicated that, in our country all (100%) public construction projects are going through cost overrun problem ranging1% -300% from the estimated cost. (Ashebir Shiferaw, 2017)

1.2. Statement of problem

The ministry of finance and economy had assigned 56.59 billion birrs for 2019 to ministry of urban development and construction. This budget shows the significance of the construction industry in the country's growth and future endeavor. This being said the construction industry is challenged with various problems. One of the challenges is cost overrun in projects' such road, mega structures, residential building and many more. Project cost overrun and time delays affect the stakeholders that are both directly or indirectly involved in the project. The first victim of cost overrun and time delay is going to be the owner of the project, in which he/she is going to be affected financial. In addition, it will also create a harsh relationship in between the parties involved in the project, especially between the contractor and the client(owner). Also, cost overrun in addition to time delay may damage the reputation of the contractor. The lag of project of in time and the over budget of project's also impacts Ethiopia indirectly. A recent example is delays in construction of all the industrial sugar factory in Ethiopia, which caused a demand problem in the sugar market. This and many problems are caused due to time delay and cost overrun.

1.3. Research Objective

General objective

To determine the cause of constructional time delay and cost overrun in projects'

Specific objective

- To observe the general culture towards time and cost in construction projects of Addis Ababa
- To determine the causes of delay in schedule in regards to material, labor and equipment
- To determine the causes of delay in regards to stakeholder (client, contractor and consultant)
- To determine the causes of cost overrun in regards to the project stakeholders (client, contractor and consultant), productivity, construction management
- To determine the effect of contractual relationship has on constructional delay and cost overrun?
- Recommend solution to solve problems related to construction time delay and cost overrun

1.4. Research Question

- What are the causes for construction cost overrun and delay in the constructional site?
- What are the causes of construction cost overrun and delay related to material, equipment, supply and logistic?
- What are the major contributors for construction cost overrun and delay in the managerial level?
- How does contractual relationship among the client, contractor and consultant contribute from constructional delay and cost overrun?

1.5. Significance of the study

The result of this research is intended to identify the root causes of construction delays and cost overrun and improve the situation in the construction industry to the client, contractor and consultant. The improvement in this issues impact's the stakeholders and the country in the following ways: -

- Saves the client(owner) of any project from unnecessary costs
- Avoid any future disputes regarding cost and time
- Improvement in a contractor's reputation
- Delivery of project in a timely manner
- Enable projects to be operational in a timely fashion
- Enables the contractor and clients to be more considerate of factor that could affect the project
- Improve Ethiopia's economy indirectly

1.6. Scope of study

The research is going to involve the general the parties involved in the construction process which are client (owner), contractor and consultant. The research is also going to explore how cost overrun and time delay is play in the operational level and managerial level.

This research will cover contractor, which are level 3 and above working on building projects Practicing in Addis Ababa city. This research include both local and international contractors that have projects in Addis Ababa

The contractors and projects sites which selected for this specific research are

- JIBRIL YASSIN MEHHAMED B.C at Burrachalli real estate
- Country club developers (CCD) at Lege Taffo site
- Kidma construction at Kasanchis site
- Dugda construction at Lideta site
- China state construction engineering at commercial bank of Ethiopia head office building
- CGCOC construction company at EEP new head quarter

1.7. Limitation

Regarding this title many researchers hasn't made publication particularly about Addis Ababa and there are very few publications related to our title so we couldn't have adequate information about our project tile and it needs another intensive investigation regarding the project title which is not economically and time taking. The other limitation is the data recording culture is very week in the industry

The sampling method that will be used for this research is non probabilistic sampling, specifically Convenience Sampling and purposive sampling. Some of limitation that come from using non probabilistic sampling are: -

- It impossible to identify how well the population is represented
- It is impossible to be confidence based on the sample collected in the research

But the research is going to improve the quality of the sample by in-depth interview and involving parties that are directly or indirectly connected to the issues at hand.

1.8. Organization of the paper

The study is divided into three chapters. Its contents organized as follows: Chapter one provides a general background, statement of the research problems, objectives, research questions, significance of the study, scope of the study, Chapter two consist general review of the literature under the considering of both theoretical and empirical literatures which are related to construction time delay and cost overrun. And chapter three focuses on methods of data collecting.

2. Literature review

2.1. Introduction

A construction project is considered successful if it completes on the agreed budget, schedule, quality and also considering the health and safety of the employees. Public construction projects in Ethiopia are parts of the country's development initiative. It shares considerable amount of the country's scarce financial resources. In Ethiopia, the construction industry is the highest recipient government budget in terms of government development program. Consequently, public construction projects consume an average annual rate of nearly 60% of the government's capital budge (Koshe, 2016).

Another issue in a construction project is cost overrun. Cost overrun is a common phenomenon that almost associated with most of the projects in construction industry. It is more severe in many developing countries where these overruns sometimes go beyond 50% of the expected cost of the project. (bank, 1998)

2.2. Definition of construction delay and type of construction delays

Construction delays is defined as a late completion of a contracted constructional work or the lagging of work from the planned or contractual schedule (Koshe, 2016). Most importantly, delays can be seen in these four major categories as

- Critical or Non-Critical
- Excusable or Non-Excusable
- Compensable or Non-Compensable
- Concurrent or Non-Concurrent (Trauner, 2009)

Accordingly, (Gajare, 2015) defines critical delays that affect the milestones date and critical activities. While non critical delays have no effect on the project completion date.

An excusable delay, in general, is a delay that is due to an unforeseeable event beyond the Contractor's or the Subcontractor's control. Non-excusable delays are events that are within the Contractor's control or that are foreseeable. (Trauner, 2009)

A compensable delay is a delay where the Contractor is entitled to a time extension and to additional compensation. A non-compensable delay means that although an excusable delay may have occurred, the Contractor is not entitled to any added compensation resulting from the excusable delay. Thus, the question of whether a delay is compensable must be answered.

Concurrency delays are difficult to define as it is not mentioned in most contract specifications, and further more how additional compensation for time extension or responsibility that the contractor is entitled to is not defined. (Gajare, 2015)

2.3. Cause of construction delays

In a research done in India by (Gajare, 2015), the following where identified as a cause for construction delay

- Contractors improper planning
- Contractors poor site management
- Inadequate contractor's experience
- Shortage in material
- Labor supply
- Lack of communication between parties

Also, in a research by (Koshe, 2016), the following table illustrated the severity and causes of delay in Ethiopia

	Delay factors	Categories	FO		DS		Importance Index	
			FI	RANK	SI	RANK	RII	RANK
DF14	Delay in progress payments for completed works	Client	88.89	1	86.67	2	77.04	1
DF55	Fluctuating labours availability season to season/Seasonal labours availability	Labour	87.78	2	84.44	3	74.12	2
DF68	Late delivery of materials	Material	83.33	3	82.22	6	68.52	3
DF32	Difficulties in financing project by contractor	Contractor	74.44	13	87.78	1	65.35	4
DF13	Type of project bidding and award i.e. negotiation, lowest bidder.	Client	78.89	4	82.22	6	64.86	5
DF1	Bureaucracy (Excessively complicated administrative procedure)	Client	77.78	8	82.22	6	63.95	6
DF67	Escalation of materials price	Material	77.78	8	81.11	9	63.09	7
DF54	Unclear and inadequate details in drawings	Designers	78.89	4	78.89	13	62.23	8
DF70	Poor quality of construction materials	Material	77.78	8	80.00	11	62.22	9
DF23	Preparing Incomplete/un detailed BOQ		78.89	4	77.78	17	61.36	10

2.3. Definition of Cost overrun

Cost overrun is excess of actual cost over budget. Cost overrun is also sometimes called "cost escalation," "cost increase, or "budget overrun." Cost overrun is defined as the change in contract amount divided by the original contract award amount. This calculation can be converted to a percentage for ease of comparison (Naveenkumar.G.V, 2016).

(Nega, 2008) defines cost overrun as a, the difference between the final actual cost of a construction project at completion and the contract amount, agreed by and between the owner and the contractor during signing of the contract.

2.3.1. Cause of cost overrun

(Ahbab, 2012) identified the following as causes to cost overrun

- Rework and wastage of materials
- Inflation
- Inadequate contractor experience

- Fluctuation and escalation in prices of material and machinery
- Design and work permit changes during construction
- Inaccurate initial project scope and cost estimate
- Poor and unforeseen site condition (location, ground)
- Increase in quantity of work
- Poor supervision and poor site management
- Financial difficulties of owner

2.4 Summary literature review

This research is going to further study construction delay on time and cost overrun in the context of Addis Ababa. The literature review conducted in this research proposal is a phenomenon that is experienced globally in any construction project. This research is further going to reiterate this assumption made in a previous research in the context that is going to be applied in contractor practicing in Addis Ababa.

3. RESEARCH METHODOLOGY

3.1. Introduction

This chapter describes the methodology and methods we will adopt for our desertion. It starts by providing an introduction to general research methodologies followed by reviews of different approaches in and Construction time and cost researches. The methodologies adopted for various stages of this research are then presented and justified.

The contents of this chapter are as follows. Section 4.2 presents a general overview of the research concept and methodology. The research philosophy and approach are briefly discussed in sections 4.3 and 4.4 respectively. Techniques available for the chosen research approach are also discussed. Section 4.8 explains the methodology adopted for this research.

3.1.1. Research and Research Methodology

Referring to English dictionaries (Dictionary, 2006) ,research can be defined as a detailed and systematic investigation into a subject to establish facts or discover new information. According to (Greenfield, 1996)research is an art aided by skills of inquiry, experimental design, data collection, measurement and analysis, by interpretation and by presentation.

There are two different types of research namely pure and applied (Liu, 2003). Pure research is undertaken to develop knowledge and to contribute to the body of theory which exists; while applied research seeks to address issues of applications, to help solve a practical problem. Typically, research involves solving either a close-ended or an open-ended problem. Close-ended problems are simple problems each with a correct solution. The existence of the problem, its nature and the variables involved can be identified easily. In contrast, open-ended problems tend to be complex. The existence of the problem may be difficult to identify, the situation is likely to be dynamic and the variables are difficult to isolate.

Research methodology refers to the principles and procedures of logical thought that are applied to a specific investigation (Liu, 2003). (Kagioglou, 2000) provides a holistic and integrated research method. The research philosophy created by the outer box guides and energizes the inner research approaches and techniques. The research approaches incorporate qualitative and quantitative methods. Research techniques consist of data collection tools such as literature review, interview, questionnaire survey, experiment, observation and workshop.

3.1.2. Research Philosophy

According to (Bryman, 2012)there are two main philosophical schools of thought in social research: ontological and epistemological. Ontology involves the logical investigation of the different ways in which different types of things are thought to exist and the nature of the various kinds of existences. On the other hand, epistemology deals with question of knowledge acceptability in a discipline and the methods through which knowledge is acquired. In simple terms, ontology, epistemology and methodology are the studies of what, why and how of a research project.

3.1.3. Research Approach

A research approach is a way of unfolding a specific style and employment of different methods in doing research. It is also being referred to as a research strategy by some authors such as (Naoum, 2007), who stated that the research strategy is a way in which the research objectives can be questioned. It is a strategy of enquiries which moves from philosophical assumptions to research design and data collection (Myers, 1997).The research approach or strategy can be categorized in various ways. One of the most common categorizations is quantitative, qualitative or a combination of both methods – called triangulation or mixed research methods (Liu, 2003).Many research projects use more than one method. The reasons for combining methods are to capitalize on the strengths of the approaches and to compensate for any weaknesses encountered. However, the decision on which type of research strategy to follow depends on the purpose of the study and the type and availability of the information which is required (Liu, 2003) . The following sub-sections briefly review the characteristics of the quantitative, qualitative and triangulation research methods

3.1.3.1. Quantitative Research

The quantitative research method is about gathering factual data and studying relationships between facts in order to find out how these relationships agree with theories of previous research findings. This approach adopts a „scientific method" in which the initial study of theory and literature yields precise aims and objectives with hypotheses to be tested (Liu, 2003). It uses empirical approaches including laboratory experiments, survey methods, formal methods (e.g. econometric) and numerical methods such as mathematical modelling (Myers, 1997). The main strengths of quantitative research methods lie in precision and control. The samples collected from quantitative research are often large and representative, hence the results can be generalized to the larger population within acceptable error limits

3.1.3.2. Qualitative Research

The qualitative research method originates from the social sciences to enable researchers to study social and cultural phenomena. Qualitative research seeks to understand how people see and interact with the world (Liu, 2003). It is an exploration of the subject undertaken without prior formulations – the objective is to gain understanding and collect information and data such that theories will emerge (Liu, 2003). It is, therefore, „subjective" in nature and consists of “detailed descriptions of

situations, events, people, interactions and observed behavior". Naturalistic observation, case study, ethnography and narrative report are tools used for qualitative research (Myers, 1997).

The analysis of qualitative data is more difficult than quantitative data, requiring a lot of filtering, sorting and other manipulations to prepare them for analytical techniques (Liu, 2003). The information gathered in qualitative research can be classified under two categories, namely exploratory and attitudinal researches (Myers, 1997).

3.1.3.3. Comparison of Qualitative and Quantitative Methods

The distinction between qualitative and quantitative research is not very clearly defined because it is almost simultaneously regarded by some authors as a fundamental contrast and by others as no longer useful or even simply as „false" (Layder, 1993)For instance, it is possible to take a quantitative approach to many issues that are qualitative in nature. Similarly, several qualitative decisions should be made when using quantitative methods (e. g. the questions to pose, the design to implement, the measures to use, the analytical procedures to employ and the interpretations to stress) (Linn, 1990). The key difference between the two approaches is that the quantitative research focuses on quantifying data, while the qualitative methods focus on gaining an understanding of underlying attitudes and measurements.

3.1.4. Triangulation Research

Triangulation involves the use of a mixture of quantitative and qualitative research tools. Although some scholars insist that either a quantitative or qualitative research approach should be used, a combination of research approaches has proven to be effective in many cases depending on the research objectives (Lee, 1991)The combination offers a multi-dimensional view of the subject obtained through synergy. Thus, it can be very powerful to achieve insights and results to assist in making inferences and in drawing conclusions. Triangulation also gives an added dimension and adds considerable value to the research results, providing both breadth and depth

3.1.5. Approaches in Construction Technology

According to (Liu, 2003), the research methods which are most applicable to construction research include action research, survey, case study, experiment and ethnographic research. However, in the past decade, the number and complexity of research methods available to construction researchers have increased sharply, particularly with the advent of it focused research within the construction domain. Where only a few forms of inquiry were available (and acceptable within the scientific domain) previously, many options now exist. This proliferation allows for a wider choice to the researcher and better matching of the research tools to the demands of the research questions.

3.2. Research Methods Adopted

This section discusses the methodologies adopted for the research in order to achieve the aim and specific research objectives

3.2.1. Technology and Literature Review

An essential early stage of virtually all research is to search for and to examine potentially relevant theory and literature (Liu, 2003)Theory and literature are the results of previous research projects. Theory is the established principles and laws (such as Einstein's theory of relativity). Literature in this context, concerns findings from research which have not attained the status of theory; often it represents findings from research into particular applications of theory. A literature review is based on the assumption that knowledge accumulates and that people learn from and build on what others have.

According to (Naoum, 2007)there are four main goals of the literature review:

• To demonstrate a familiarity with a body of knowledge and establish credibility

• To show the path of prior research and how a current project is linked to it

•To integrate and summarize what is known in an area

• To learn from others and stimulate new ideas

In order to address the first and second objectives of the research, technology and literature reviews involved Construction time and capital on construction projects in Addis Ababa also other cities is going to examined in detail. Primary data were sourced from academic journals, conference proceedings, articles, books and from various on-going researches. These are summarized and presented in Chapters 2 and 3. The technology and literature reviews were based on „personal document analysis", a qualitative analysis approach to review and analyze current theories and literature The technology and literature reviews also addressed "what" and "haw" questions related to Construction time and capital on construction projects in Addis Ababa.

3.2.2. Survey

The survey method is going to be adopt to learn the magnitude of which time and cost are used in the construction at Addis Ababa and investigate the construction industry's readiness to adopt new technology. This method was chosen because it provided an opportunity to discuss key topics with the construction practitioners. It is an appropriate method to discover the current the construction cost and time of construction in the city and to gather the stakeholder's opinions regarding the cost and time of construction in our city.

The questionnaire will design objectively to investigate construction time and capital on construction projects in Addis Ababa. Relevant questions relating to the waste, time

delay, construction logistics services and time management were developed utilizing both closed questions and open-ended questions.

For close-ended questions, a five-point Likert scale is going to be used

(e.g. 1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, and 5 – strongly agree). Closed-ended questions limit the respondents‟ answers to the survey and allow more questions to be answered, while open-ended questions give freedom to respondents to give recommendations for improvement and address certain issues.

3.2.3. Multiple Case Studies

Multiple case studies approach is going to be used in this research to investigate contemporary phenomena within six construction projects. This involved the comparison of current practices on construction time and capital on construction projects between six construction projects to establish key problem areas and examine the reasons for time delay and cost overrun also to give recommendations on how to improve the effective use of time and capital on construction projects.

3.2.3.1. Case selection

A case is defined by the setting of the project, the people who manage the project, the events that occur and the processes that develop over the project.

Six construction projects will be selected based on the following criteria:

• Adequate access to explore the relevant time and capital issues to be investigated.

• The willingness of organization’s individuals to participate and share their experience in managing logistics on the construction site

3.3. Data collection

Data is going to be collected by interviewing the project manager, site supervisor, site engineer, time keeper, quantity survivor and Forman in each project. A set of questions will be designed as a tool to gather opinions and responses from the managers and engineers about current problems and aspects capital and time on construction projects and also interview there take on how to improve capital and time efficiency and effectiveness on construction projects.

3.4. Interview Technique

Interviews will l last from an hour to three hours, which included face-to-face interview session and site visit to observe capital and time management which include materials delivery, handling and storage, waste management, reworks, change orders.

Semi-structured interviews allow the interviewer freedom to explore the expert's views or opinions while maintaining a level of comparability between interviewees. The interviews consisted of three parts.

Part 1 aimed to capture the general information about the site managers and the project that they were in charge of.

Part 2 aimed to look at the current practices and problems on Construction time and capital on construction projects

Part 3 aimed to forwarding recommendations on better way of Construction time and capital management

The case study method was chosen to gain insight into the current practices in managing Construction time and capital different projects to discover the common traits shared by them. It is suitable for learning about little known situations and it afforded an opportunity to investigate Sample selection

The method of purposive sampling was used to develop the sample of the research under discussion. According to this method, which belongs to the category of non-probability sampling techniques, sample members are selected on the basis of their knowledge, relationships and expertise regarding a research subject (Freedman et al., 2007). In the current study, the sample members who will be selected have special relationship with the phenomenon under investigation, sufficient and relevant work experience in the field of construction, active involvement on construction industry.

and achieve deeper insights into the areas examined.

3.5. Data analysis

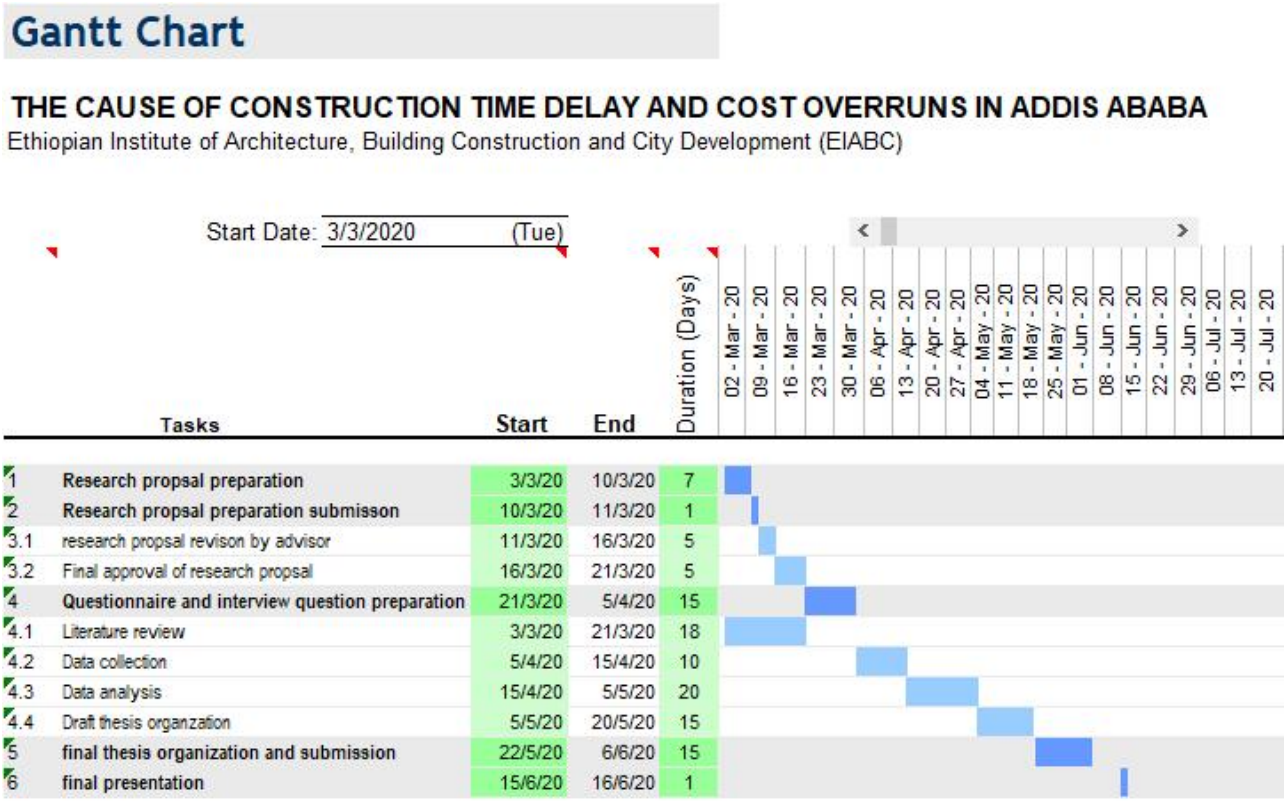
Analysis of the collected data involved both single case and cross-case analysis. Single case analysis produced individual case reports and cross-case analysis made a comparison of the „embedded unit of analysis" across the cases. The results were used to generate realistic scenarios to support the development of context-aware application for managing capital and time

Content analysis was used to analyze the data which will gathered from personal interviews. this is the type of research whereby data gathered is categorized in themes and sub-themes, so as to be able to be comparable. A main advantage of content analysis is that it helps in data collected being reduced and simplified, while at the same time producing results that may then measure using quantitative techniques. Moreover, content analysis gives the ability to researchers to structure the qualitative data collected in a way that satisfies the accomplishment of research objectives. However, human error is highly involved in content analysis, since there is the risk for researchers to misinterpret the data gathered, thereby generating false and unreliable conclusions

3.6. Summary

This chapter has reviewed, described and presented the research philosophies, methodologies and methods available to address the research objectives. The general research methodologies have been presented in order to provide the background for the methods that will be adopt in this research. The key research steps and tools used have been presented. The methods adopted for each research task have also been discussed.

Time schedule for the research



Budgeted cost the research

This budget is for the team of three undergraduate students

	Item	**Duration**	**Amount Requested**
1	Travel (transportations)	10 days	700 birrs
2	Printing	3days max.	250 birrs
3	Miscellaneous activities		100 birrs
	Total Costs		1050 birrs

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