

ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE



**FACTORS AFFECTING COST AND TIME OVERRUN IN
IT PROJECTS IN ETHIOPIA: THE CASE OF CYBERSOFT
SOFTWARE COMPANY, ADDIS ABABA, ETHIOPIA**

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A Research Project Submitted in the Partial Fulfillment of the
Requirements for Master of Arts (MA) Degree in Project Management

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Approved by Board of Examiners

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_____ External Examiner	_____ Signature	_____ Date

DECLARATION

I declare that the study entitled “**FACTORS AFFECTING TIME AND COST OVERRUN IN IT PROJECTS IN ETHIOPIA: THE CASE OF CYBERSOFT SOFTWARE COMPANY**” is my original work. This study work has not been presented for any other university and is not submitted for the fulfillment of any other degree, and that all sources of material used for the project work have been properly acknowledged.

Eden Wubalem

Date

LETTER OF CERTIFICATION

I hereby declare that the study which is being presented in this project work entitled “**FACTORS AFFECTING TIME AND COST OVERRUN IN IT PROJECTS IN ETHIOPIA: THE CASE OF CYBERSOFT SOFTWARE COMPANY**” is conducted by Eden Wubalem for the partial fulfillment of the requirements for the award of master’s degree in Project Management. To the best of my knowledge it is original work carried out by her and it had not been presented for a partial fulfillment for any degree either at this or any other University.

Dereje Teklemariam (PhD.)

Date

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ABSTRACT

The aim of this paper is to analyze the factors that affect cost and time overrun of software projects in Ethiopia, particularly taking the case of Cybersoft Software Company. The methodology that was used here is comparative case study. Two case projects were selected based on their cost and time significance. As a data collection method, questionnaires, interviews and company documents were used. The key informants were software developers who were engaged in the development of those projects and management bodies of the company. A total of 15 questionnaires are collected from the software developers and an interview was held with the CEO of the company. The finding from the research showed that the first project suffered cost overrun of 20% and the time showed an overrun by one year. In the case of the second project the cost showed an overrun by 35% and time overrun by one and half years. According to the respondents, unrealistic schedule, scope change, incomplete and shifting requirements and specifications, newness of technology, project complexity and unfeasible cost estimates are the major factors which highly affected both projects. Moreover, the results showed that software companies faced various challenges to stay in the industry. The company argued that the government doesn't give enough attention for the IT industry. Since most governmental organizations outsource their projects for foreign companies, it has been very difficult for the local software companies to stay in the market. According to the research, the cost and time overrun of the projects had a significant effect on the supplier, the client and the overall industry. The supplier faced financial loss and delay in returns in investment. From the clients' side, it creates lack of satisfaction and affects the performance of their business. It has also an adverse impact on the development of the ICT industry as a whole. In order to minimize the cost and time overrun in software projects, some recommendations are given by the researcher. Majorly careful planning is needed for a more accurate and realistic schedule, scope should be designed very carefully, ample time should be given to design requirements and specification and thorough discussion should be made between the supplier and the client and finally government support is very important for the development of the industry.

Keywords: Project time overrun, Project cost overrun, Software, Cause, Effect

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

According to Sweis, (2015), using technology becomes a very important issue in most organizations. The IT industry plays a crucial role in the economy and has a significant effect on the efficiency and productivity of other industry sectors. In developed countries due to their technological advancement, high professional expertise, financial capacity and other factors they are able to achieve very successful projects. To achieve a competitive advantage, an organization should be aware of the continuous changes in the field and should adopt strategies that will enable them to compete in the field and help to minimize work requirements, time and efforts. He also said that it is rare to find an organization without an information system or some form of technology to perform its daily routine activities. Like any other projects, IT projects are prone to risks and uncertainties and face the probability of failure. Failing to deal with these risks and uncertainties could lead a project to failure in meeting its specified requirements and expected outcomes.

The concept of project and project management takes a very important part in any type of organization. In different organizations the success of the projects decides the well being of the organization. Since the late 1960's project management researchers have been trying to discover which factors lead to project success. Different scholars on the field stated that it is widely accepted that the role of project managers is very important in this field. They must have a good focus to gain an expanded comprehension of the potential effects of the critical success factors which in turn could assist their work on current and future projects management.

Atkinson (1999) said that, "the success of the project management has been measured by Cost, time and quality (The Iron Triangle), over the last 50 years. Out of these three, cost and time are at best, which calculated at a time when least is known about the project, whereas quality; it depends on the attitude of people, which changes over the life time of the project".

According to Kumar (2015), to say a certain software project is successful, the project should be completed within the planned timeframe, estimated budget and with the given requirements and specifications. However, different challenges have been encountered by projects that affect their successful completion.

Pimchangthong¹ and Boonjing² (2017) states that the success of IT projects is an area of concern for many organizations around the world. The process of working on IT projects involves a lot of challenges from planning the project till its implementation. In the case of Ethiopia, nowadays, various huge projects are being performed on different sectors. We have been heard that some of them complete without any problem within the scheduled time and budget. Whereas, most other projects face a lot of challenges to be completed within time and budget due to different factors. These factors sometimes can be solved easily and the project will be successfully completed or they may lead to a total disaster and makes the project completely failed. This paper takes the experience of cyber soft engineering software company from the Information Technology Sector regarding the cost and schedule overrun. Like any other sectors, software companies faced an overrun in their projects. It is known that Successful Information Technology projects deliver improved financial benefits directly or indirectly even for other sectors.

The aim of this study is that to assess the factors that affect cost and time overrun in software projects. This research will try to identify the major factors that contribute to the overrun of time and budget in IT projects and it indicates the possible solutions in order to solve the problems.

1.2. Statement of the problem

The challenges faced by different organizations in completing projects can be vast depending on the type of sector they are working on. The challenges may be human, financial, or other factors. A lot of researches have been done in project success by various scholars in foreign countries. Some scholars stated that there are different factors which can be specified as a cause for project failure. Delays and cost overruns have a significant effect on project success and in the overall stability of a country's economy. Singh (2009) states that, delays and cost overruns, reduces competitiveness of the economy and reduces efficiency of available economic resources. Based on the article published by Oracle, project failure can be caused by number of factors like, consistent alignment, proactive risk management, performance measurement, project scope definition and management and methodology usage. Different issues raised by the above and other scholars. As a result, the factors that challenge the success of a project differ from one country to another and from one sector to another. However, a lot of scholars agreed that time and cost overruns are the major causes of project failure.

There are anecdotal evidences that so many software projects are started but they are not completed within the scheduled time and budget. There could be lots of factors for this. In order to bring a solution for these problems the factors must be assessed and identified.

In the case of software companies in Ethiopia, even if the sector is not that much developed as that of the developed countries, there are some ICT and software companies that become actively working on the area. And the IT projects can't be exceptions from time and cost overruns. Hence, many IT projects which have been undertaken by various companies are failed to be completed within time and cost due to different factors. As far as the researcher tried to search, there are no sufficient researches done here in Ethiopia in this area even though lots of researches have been made in other areas like construction.

The main concern of this study, therefore, is to assess the factors that affect cost and time overrun in IT projects in Ethiopia by taking the case of Cybersoft. This study will further try to develop a conceptual framework to identify the factors that lead to cost and time overrun in this case, software companies specifically in the case of Cybersoft Software Company.

1.3. Research Questions

The study is going to be guided by the following research questions:

- What are the main factors that affect cost and time overrun in a project?
- How does time and cost overrun affect the success of a project?

1.4. Research Objective

1.4.1. General objective

- To assess factors affecting the cost and time overrun of software projects in Ethiopia with specific emphasis on Cybersoft.

1.4.2. Specific objectives are:

- To assess the effects of time and cost overruns on IT projects.
- To provide recommendations in order to conquer known failure factors.

1.5. Significance of the study

The researcher believes that when this study is done a lot of different parties will be beneficiaries. The study will help the specified company, cyber soft engineering and other similar companies to improve and develop their performance by completing the intended project within the specified time schedule, budget and resources. Other similar software companies will also be beneficiary by this study. And this will play a significant role in the development of Information technology projects in our country. Others are like academic institutions. They may use the study to add extra knowledge and improve their curriculum. In addition, it is hoped that the study will provide the necessary idea for researchers to proceed on researches in different fields in the industry. It may also have policy relevance for government to devise laws in this area.

1.6. Scope of the study

The scope of the study is limited to two software projects that were undertaken by Cybersoft. The geographical location is in Addis Ababa. This is a case study and the paper studied the factors that affected the cost and time overrun of those specific projects and how those factors affected the projects. The study tried to compare the overrun between the two projects and assess the factors that led to the overrun. The projects were selected purposively based on their magnitude which is reflected by amount of budget, time allotted and number of employees involved. The findings, conclusions and recommendations are only limited to Cybersoft projects. This can be used as a model for which most software companies are engaged in projects from simple to highly complex projects.

1.7. Limitation of the study

Research study is bounded with time and resource constraints. The main limitation of this study was shortage of time. In addition, to collect the necessary data, the researcher was planned to involve 20 respondents from software developers, unfortunately due to unavailability of the participants; the data was collected only from 15 respondents. The other main challenge was due to the confidentiality of some cost related data; the researcher couldn't find the planned and actual amount of cost and allocated time for the case projects. Instead the percent exceeded the planned time and cost was taken. Research analysis is limited to respondents who are software professionals in the specified

company and the study will cover only two projects that were undertaken by the company, thus the limitation of generalization becomes obvious.

1.8. Organization of the Research Report

This paper is organized in five chapters. The first chapter presents introduction, which includes background of the study, background of the organization, problem statement, research objective, research questions, significance of the study and the scope and limitations of the study. The next one, which is the second chapter, includes the related literatures which have been reviewed. The third part presents the methodologies used in the study. The fourth chapter contains analysis and interpretation of the data gathered. Finally, in chapter five the report comes to an end with the conclusion of the study and recommendations that were made.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1. Theoretical Review

While working on a project, cost and time of a project are the very important aspects to consider. Project cost and schedule overrun is the most common challenge that is shared by a lot of projects in different industries. Delays and cost overruns reduce the efficiency of available economic resources, limit the growth potential and reduce the competitiveness of the economy. Singh (2016) stated that if the project is poorly planned, estimates of project time and cost will be vague and so will be the initial contract. As a result, any additional works will become necessary later on, leading to high cost overruns. According to Pimchangthong and Boonjing (2017), failure rate of many IT companies are very high. This is due to high cost and time overrun, failed at meeting requirements and their risk management is poor. And this will put the company at risk of even survival. Budzier and Flyvbjerg (2012) also said that most software projects are completed with high cost took longer time or failed to deliver within the specified requirement. This will affect the routine function of the company that may lead to financial losses and negative publicity.

Software project failures are one of the primary reasons for increased cost of software product and services. According to Mandal and Pal (2015), completing a software project within time, within budget and with good quality should be the main goal of software engineering. According to them, identifying the main reasons to failure of software projects is harder than what we all think of.

Possible reasons of project failure are identified by them by gathering from different sources. Some of these sources are:

1. Human sources
 - Poor user input, lack of user training, conflicts, politics, poor quality work by developers, poor quality work by management personnel
2. Technology source
 - Wrong technology selection, technology too new or didn't work as expected, use of immature technology, technology planning

3. Process source

- Wrong process selection, lack of communication, lack of user involvement, unnecessary processes, careless, sloppy, or missing software development processes, non-adaptability of process to change

4. Organizational source

- New to business, improper organizational structure, poor communication among customers, developers and users, reasons related to human resource, insufficient resources, organizational culture and structure

5. Management source

- Lack of leadership and effective management, poor reporting of the project status, insufficient involvement of senior management, failure to plan, poor management and control

6. Business source

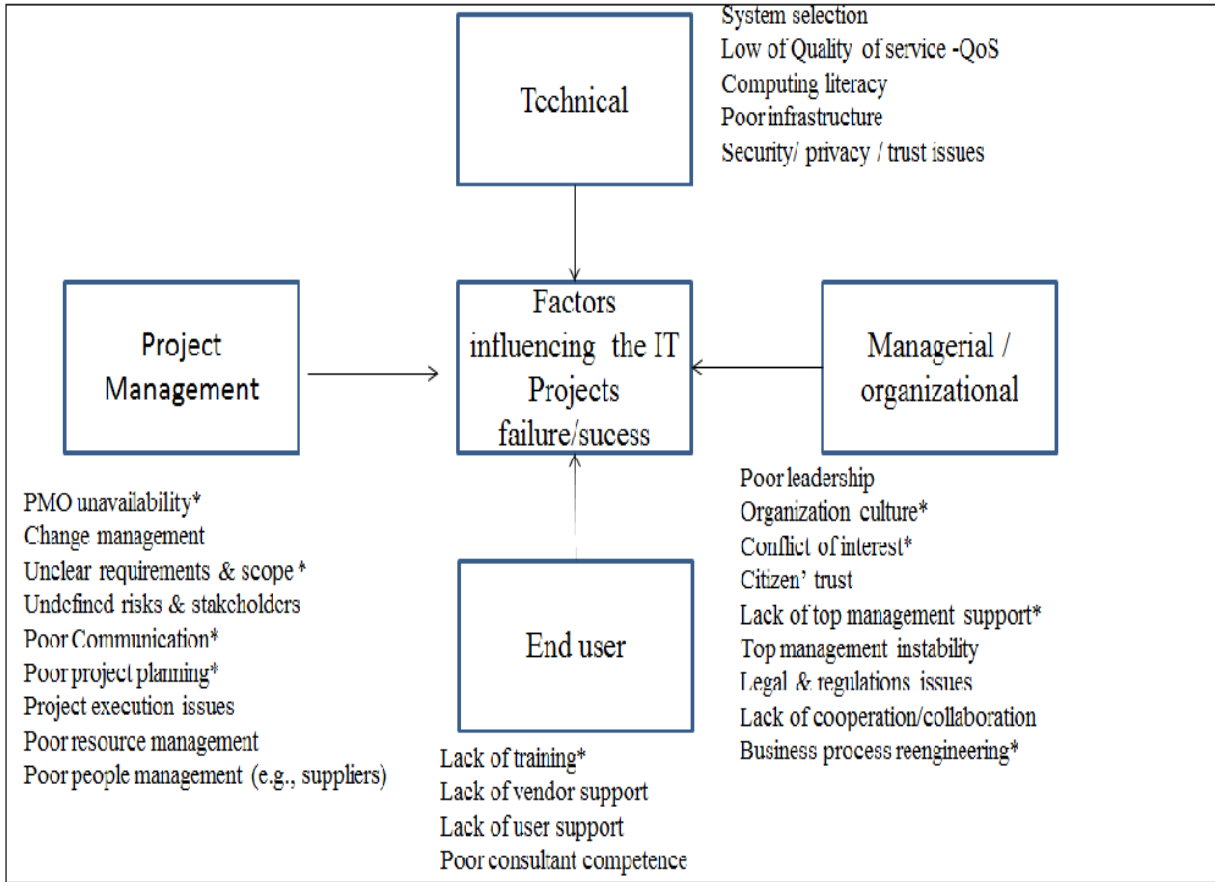
- Non adaptive to business condition, poor selection & use of a particular tool or vender, commercial pressure,

7. Project source

- Originated from system requirements, related to project risk, reasons related to system, reasons related to budget and schedule

Ebad (2016), said that software projects in developing countries suffer high failure rates. He stated that based on the literature survey they have done in South Africa on the factors that are responsible for software project failures, they come up with some findings. According to the results they get, management/organization factors including lack of top management support, organizational culture, business process reengineering, lack of training, and unavailability of project management office are major factors that contribute to failure of software projects and they showed various influencing factors in the following figure.

Figure 2.1. Major Factors that contribute to failure of software projects



Adopted from Ebad (2016)

As Dalal & Chhillar (2012) stated. Failure of a software project could have a very high impact on the overall performance of the company and this may lead to huge financial losses, wastage of time, effort and others.

According to Dalal & Chhillar (2012), the most common causes of software failures are;

1. Unrealistic low budget request
2. Underestimates of time requirements
3. Lack of clear goals and specifications
4. Poor management and poor communication among customers, designers and programmers
5. Use of very new technologies
6. Refusal to admit that a project is in trouble

Smith (2002), applied his own definition for IT project failure and classified in to two parts, which are;

“A Challenged project: is completed and operational but over-budget, or over the time estimate, or delivered with fewer functions than originally specified or the general perception is that the project is a failure”.

“A cancelled project is considered to be a failure if the project is cancelled at some point during the project life cycle”.

According to Yeo (2002) review identified four major concepts on IS failures. These are;

1. **Correspondence Failure:** this is a failure in which when the objectives of the systems design don't achieve what they intended to do, then the information system is considered as a failure. The design goals and requirements should be specified clearly in advance, so that their achievements can be accurately measured.

2. **Process Failure:** A process failure is a failure type that occurs when an IS cannot be successful within the allocated cost and time. Two outcomes of process failure are expected. The first one is on workable system can be produced and the second one is an overrun is occurred which leads to a huge financial loss.

3. **Interaction Failure:** The level of end-user usage of the information system is suggested as a surrogate in IS performance measurement. This has an impact on users' satisfaction. Some related measures of IS usage include user attitudes and user satisfaction, the amount of data transferred or the frequency of use. However, heavy usage does not necessarily mean high user satisfaction and improved task performance.

4. **Expectation Failure:** this is perceived as a deviation from what is expected. It is the variation between the actual and desired situation for different stakeholders. In the expectation failure, the system doesn't fulfill the requirements, expectations and values of the stakeholders.

2.1.1. Project Cost Overrun

Schwalbe (2007), in her IT project management book defined cost as a resource sacrificed or foregone to achieve a specific objective or something given up in exchange. Spacy (2017), stated

cost overrun occurs when the costs to complete the work is greater than the amount budgeted for that work. Other scholars in the field Tsunoda, Monden, Matsumoto, Hatano, Nakano and Fukuchi (2010), said that in order to prevent software projects cost overrun, it is better to predict the project which has high risk of cost overrun in the early phase of the project. In their paper they have analyzed 290 software projects and identified the over 200 risk factors. Out of these factors the major risk factors which has a strong relationship with cost overrun was identified and come up with some solutions. Based on their analysis, in order to avoid cost overrun, they suggested that project managers should

- Review with the customer and approval
- The quantitative estimation by the tool
- Estimation of the systemization size and the basis for it
- The clarity of customer's project goals
- The clarity of deliverables and products for each task

2.1.1.1. Causes of cost overrun

Studies on the factors affecting cost overrun in projects identified various causes. Noorani (2016), identified some common reasons that leads to cost overrun, which are, under financing, unfeasible cost estimates, under estimating the project complexity, prolonged project schedule, lack of backup plan and lack of resource planning, Buys (2015) also lists the causes of cost overrun, these are, design errors, scope change, inappropriate and inadequate procurement, complexity of projects and slow close out of a project in the post execution phase of the project.

Another scholar in the field, Markgraf (2018), states that poor execution of project management tasks can lead to increased costs. According to him, the major causes of cost overrun are, inaccuracy of cost estimates, unrealistic design, planning error and changes in the scope of supply within a project. According to Bloch, Blumberg and Laartz (ND), IT projects was faced an overrun due to missing focus (unclear objectives, lack of business focus), content issues (shifting requirements, technical complexity), skill issues (unaligned team, lack of skills), execution issues (unrealistic schedule, reactive planning) and unexplained cause.

Singh (2016) also states that any delay in implementation of a project will result in cost overrun for the project. He said that, initial cost estimates are arrived at using the current input prices. If there are

delays, inputs will become more expensive and, in turn, will cause an increase in the project cost. This means that in addition to other factors, time overrun on account of any other factor is also an underlying cause for cost overruns.

2.1.1.2. Underestimation of Project Costs

According to Budzier and Flyvbjerg (2012) in order to achieve a successful project, four solutions are recommended to minimize time and cost overrun in public sector organizations. These solutions are

1. **Benchmark the organization to know where it stands** – this simply means that understanding where the organization stands. Establish a system of reporting that enables accurate decision-making and try to spot things early. Moreover, a powerful benchmark compares not only your project risks internally but also with other sector organizations.
2. **De-bias your IT project decision-making** - once you have understood and measured the risks in your organization you can turn this knowledge into better decisions.
3. **Reduce the complexities of your IT projects** – if the project took longer time than allocated, then this means that the project is at a higher risk. As a solution, reducing the projects complexity may help to improve IT project.
4. **Develop Master builders to learn from the best in the field** - in every organization and in every industry there are project managers who are able to deliver the project on-time and on-budget. Hence, finding these Master builders and try to use their experience and practices on how to avoid failure is very important.

2.1.2. Project Time Overrun

Anuar & Kiat (2014), in his article Said that, in project management, time is an intangible resource that is unique because it is absolutely finite and time availability of a project is defined as the availability of time needed to do a job assigned. Project time overrun indicates an extension of project completion time from the planned duration. Stallsworth (2009), defines project schedule as a tool used to help manage resources and tasks, and it will help to guide a project to a successful completion. Each individual task identified in the schedule is given a duration consisting of a start and end time. Resources can then be assigned to the tasks, and milestones can be set at significant

points within the project schedule. He stated that milestones are very useful aspects of a schedule. They are significant events that helps a project to have a progress and which can be helpful for senior management.

2.1.2.1. Causes of time overrun

In addition to the above points various scholars specify various causes for time overrun. Medley (2017), identified some points that contribute to schedule overrun like, limited access to information, lack of trust in data, manual preparation of reports, inconsistent processes, management reserve (contingency is spent too quickly), and surprises that cause overruns in cost and time. Li Minyong & Davis (ND) mentioned 3 major causes of schedule overrun in software projects, these are estimation issue (poor estimation of schedules) and requirements issue (poor requirements analysis and gathering) and Project management issue.

From another point of view, organization culture can play a significant role in project success. According to Tukiainen, Ainamo, Nummelin, Koivu & Tainio (ND), projects frequently faces various problems, which lead to time and cost overruns as well as quality deficiencies. They state that Cultural and institutional backgrounds have a major effect in these three attributes in the sense that it will have an adverse impact on the outcome of the specific event and the overall project progress. In addition, Cerimagic (2010) also said that a great performance of a project manager only cannot guarantee the success of the project. Unless and otherwise those individuals who work on the project are able to adapt to the organization culture and if the right team dynamics are realized.

2.1.3. Relationship between project cost overruns and Schedule delays

Most of the time cost overruns and schedule delays are very interrelated. This is due to in most cases factors that lead a project to cost overrun and the root causes for schedule delays are similar. Schedule delay by itself can be a cause for cost overrun and a schedule delay means there is an increase in the cost of the project. However there are also some causes for cost overrun which have little impact on schedule, like labor or indirect rate changes, inflation and changes in the estimated cost due to negotiations. Majerowicz & Shinn (2016).

Majerowicz & Shinn (2016), summarized the major themes within which schedule delays and overruns can be characterized

Table 2.1. Schedule Overrun/Delay Themes

Themes Schedule Overrun/Delay Themes	Affected Project Management Processes	Impact/Outcome
Insufficient scope planning; ineffective change management; inadequate requirements definition	Activity definition; baseline control; requirements management	Missing or under-scoped planning packages, work packages, and activities
Success-oriented estimates	Activity duration estimating	Overoptimistic planning package, work package, and activity duration estimates
Project complexity	Activity sequencing	Missing or incorrectly defined schedule logic and dependencies; merge bias
Inadequate risk assessment	Probabilistic schedule risk analysis	Overloaded risks; underestimated risk probabilities and impacts
Technical/programmatic problems	Risk management; schedule margin planning	Performance inefficiency; schedule margin erosion; missed milestones
Other (leadership, communication, supplier, process, etc. problems)	All	Performance inefficiency; schedule margin erosion; missed milestones
"Black Swan" events	Recovery planning, continuous planning	Major schedule impact; major re-plan; project termination

Adapted from Majerowicz & Shinn (2016)

2.1.4. Project cost management

According to PMBOK, project cost management is primarily concerned with the cost of the resources needed to complete project activities. The project cost is one of the most susceptible parts of a project. Project Cost Management includes the processes required to ensure that the project is completed within the approved budget. The following are the major processes of project management:

1. **Plan Cost Management** - The Cost Management Plan establishes different methodologies with which the project cost will be established, set standards for change, and control procedures.

2. **Estimate Costs** – cost estimation process contains estimating the cost of various tasks like cost needed for each task, needed resources, labor, materials, and any other item of cost needed to deliver the task successfully.
3. **Determine Budget** – based on the estimation, the budget used to perform each task should be determined.
4. **Control Costs** – this is the stage where the overall condition of the project is determined at the status point.

2.1.5. Project Time Management

Project time is the time that a project takes to be completed. In order to finish a project within the planned time, it should be managed properly. The project manager is the one who is responsible to plan the time needed and the cost for each task in the project. The major processes of project time management are:

1. **Plan Schedule Management** - The plan contains various information on how the schedule will be created, who will be responsible for it, how aggressive it will be, and under what conditions it will be changed.
2. **Define Activities** – Projects are usually divided into different activities. Those activities involved in the project should be identified and defined in a way that in each task is handled in a better way.
3. **Sequence Activities** – After defining the activities, they should be sequenced in an orderly manner and the relationship between them is established. The activities of the project are tasks are “sequenced” that is, they are ordered and the relationships between them are established. According to PMBOK these relationships take the form of Finish-to-Start (FS), Finish-to-Finish (FF), Start-to-Start (SS) and Start-to-Finish (SF). However if the projects are small, these forms are not necessary.
4. **Estimate Activity Resources** - Once the tasks are sequenced, each activity must be assigned the necessary resources which are needed the successful completion of the project.
5. **Estimate Activity Durations** - A time which is needed to complete the activities specified should also be estimated.

6. **Develop Schedule** - According to PMBOK, in order to determine the critical path, network diagram should be produced and next a graphical bar chart schedule is created with each activity on their early start dates and finally the resource usage is plotted.
7. **Control Schedule.** The schedule needs to be controlled regularly to determine the status of the project.

2.2. Empirical Review

Previous researches showed that cost and schedule are the most important and critical issues in the life cycle of a project. Various researches have been made in this area. Bloch, Blumberg and Laartz (ND), while they were doing their research on IT projects in collaboration with the University of Oxford, they found out that half of the large IT projects exceeds their original costs. According to their findings large IT projects showed an overrun by 45 percent and 7 percent over time. The value of the delivered projects was less by 56 than it is predicted. This research showed software projects are very vulnerable to huge cost and schedule overruns. After comparing the budgets, schedules and predicted performance benefits with the actual costs and results, they found that these IT projects, in total, had a cost overrun of \$66 billion. It was also found that the longer a project is scheduled, the more likely it is that it will run over time and budget, with every additional time spent on the project increasing cost overruns by 15 percent. The main causes of this overrun was missing focus (unclear objectives, lack of business focus), content issues (shifting requirements, technical complexity), skill issues (unaligned team, lack of skills), execution issues (unrealistic schedule, reactive planning) and various unexplained factors.

Another research was made by Budzier and Flyvbjerg (2012), on a sample of 1,355 public-sectors IT projects. The sample included large-scale projects, on average the actual expenditure was \$130 million and the average duration of the project was 35 months. Their findings showed that the typical project had no cost overruns and its schedule overrun was on average 24% longer than initially expected.

However, comparing the risk distribution with the normative model of a thin-tailed distribution, projects' actual costs should fall within -30% and +25% of the budget in nearly 99 out of 100 projects. The data showed, however, that a staggering 18% of all projects are outliers with cost overruns >25%. Tests showed that the risk of outliers is even higher for standard software (24%) as well as in certain project types, e.g., data management (41%), office management (23%), Government (21%) and management information systems (20%). Analysis showed also that projects duration adds risk: every additional year of project duration increases the average cost risk by 4.2 percentage points.

According to Dalal, Chhillar (2012), another a failed software project which suffered cost overrun was ERP project in Jordan. The main problem of failure was stated as there was a huge gap between

the client company's status, the assumptions and the given requirement. This leads to a huge loss of capital and unsatisfied client.

According to chaos report of the Standish group report (2014), each year \$250 billion is spent for IT application development of approximately 175,000 projects in United States. The average cost that is needed for project development for a large company is \$2,322,000, for a medium company it is \$1,331,000 and \$434,000 for a small company. The Standish Group research indicates that 31.1% of projects will be cancelled prior to their completion. 52.7% of projects exceed their original estimates by 189%. According to the report, these costs indicate only the known costs, whereas the lost opportunities will cost a lot of billion dollars.

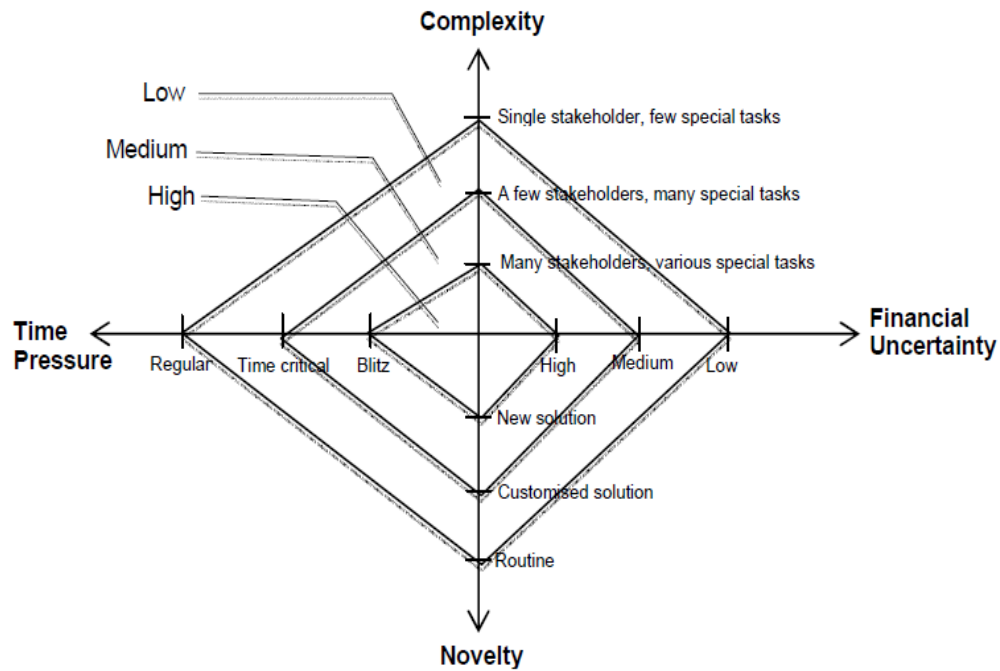
When we see the success history, the report showed that, the average success rate of the software projects is only 16.2% that are completed on time and on budget, in the larger companies, only 9% of their projects come in on time and on budget. Even when these projects are completed, many of them don't exactly fulfill their original specification requirements. Projects completed by the largest American companies have only approximately 42% of the originally projected features and functions. Smaller companies do better than that of the larger ones in which, a total of 78.4% of their software projects will get set up with at least 74.2% of their original features and functions.

According to the research, one of the major causes of both cost and time overrun is restarts. The research stated that for every 100 projects that start, there are 94 restarts. This doesn't mean that 94 out of 100 will have one restart; some projects can have several restarts.

2.3. Conceptual and theoretical framework

According to Allahaim & Liu (ND) complexity, Time Pressure, Financial uncertainty and Novelty (newness) are the main causes of cost overruns in projects. They are directly related to that of project cost overruns.

Figure 2.2. Cost overrun framework



Cost overrun framework

Adapted from Allahaim & Liu (ND)

In addition, it has already been discussed that a lot of factors are responsible for time and cost overrun in IT projects. These causes are identified and stated by different scholars in the literature. The researcher takes the most common types of causes that lead a project to cost and schedule overruns and summarized as follows. These are presented in the following table. As stated by Noorani (2016), Buys (2015), Markgraf (2018), Bloch, Blumberg and Laartz (ND), Singh (2016), Anuar, Kiat (2014), Stallsworth (2009), Medley (2017)

Table 2.2. Causes of cost and time overrun

Factors	Author
Under financing, Unfeasible cost estimates Under estimating the project complexity Prolonged project schedule, Lack of backup plan Lack of resource planning	Noorani (2016)
Design errors, Scope change Inappropriate and inadequate procurement Complexity of projects Slow close out of a project	Buys (2015)
Inaccuracy of cost estimates Unrealistic design Planning error Change in scope	Markgraf (2018)
Missing Focus (unclear objectives, lack of business focus), Content issues (shifting requirements, technical complexity), Skill issues (unaligned team, lack of skills), Execution issues (unrealistic schedule, reactive planning) unexplained causes	Bloch, Blumberg & Laartz (ND)
limited access to information, lack of trust in data, manual preparation of reports, inconsistent processes, management reserve (contingency is spent too quickly), Surprises that cause overruns in cost and time.	Medley (2017)
Complexity, Financial uncertainty, Time pressure Novelty	Allahaim & Liu (ND)
Cultural Differences Team conflict	Cerimagic (2010) Tukiainen, Ainamo, Nummelin, Koivu & Tainio (ND),

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

This part of the paper discusses the methodology that is used to conduct the project. The appropriate type of research method was applied. In addition, the research design, the data collection tools and techniques are also being discussed. The budget and timeline that is needed to conduct the entire project is also specified.

3.2. Description of the study Area/Organization

Cybersoft is one of the leading ICT solutions providers in Ethiopia. It was established in 1991 E.C. The location of the company is in Addis Ababa. The company's main activities are software development and providing network solutions. Cybersoft has served an ever-growing number of clients since its establishment. Some of the services and projects the company providing are developing software used for different purposes, applications, networking, website development and training. It has 42 employees which include software developers and other administrative staffs. Since its establishment Cybersoft has been undertaken more than 700 software projects for various governmental and non-governmental organizations. Cybersoft has quickly become the go-to IT firm for its different services. What's more is that cyber soft has completed comparable projects, and these IT projects demonstrate the company's ability to perform quality work on IT projects. Even though it succeeds in some of its project works, but in most of the times the projects which were undertaken by the company were faced cost and time overrun due to different factors.

3.3. Research Design

The research method that was used here is case study. According to Kemanusiaan (2007), Case study research, is used to understand complex issues from past studies. Case study method enables a researcher to closely examine the data within a specific context. This is because; case studies are very helpful in explaining the necessary instances in detail. Two cases were selected based on the significance of their cost and time and thorough study was done on the factors that contribute to their overrun.

The research design used here was descriptive type. Using the selected case projects, the factors that affect cost and time overrun of the projects were described. It tried to elaborate in detail the antecedents and consequences of cost and time overrun of projects.

3.4. Data Type and Source

3.4.1. Data Type

The data type that was used in this research was both qualitative and quantitative data. Quantitative data contains cost and time information of projects. As it is already mentioned above, it is a case study with descriptive design which demands qualitative data.

3.4.2. Data Source

The data sources used for this study were both primary data and secondary data sources. Primary data was sourced from management bodies of the company, software solution managers and software developers and testers who were engaged in the development of the two specified projects. Questionnaires and interviews were used to generate the primary data. Secondary data was sourced from information provided by various journals and company documents.

3.5. Target population and Sample

As this study is census, the target population of the study was those employees who were engaged in the development of the two software projects and with an experience of two or more years. The total number of software developers who were involved on the projects was 20 and out of them the researcher was found only 15 respondents. As they are involved in the day to day tasks of the project, from inception to closure, they are the right source of data for this study.

3.6. Data collection methods and tools

Data was collected by using questionnaires and interviews. The researcher believed that these data collection techniques were helpful to collect the necessary data that is required in the study. The questionnaire was distributed for all employees who were engaged in the development of software in both projects. Set of questionnaire has been built to identify the factors affecting cost and time overrun in the project. In the interview part, the manager of the software company was involved.

3.7. Data Analysis and Presentation

While doing a research, data should be analyzed and presented in a way that is easily interpreted and should be understandable. In this qualitative case study, the data collected was analyzed by using thematic and content analysis methods.

Hence, the data was analyzed using descriptive analysis of similarities and differences of the two case projects in practice, severity of factors and ranking the factors as per the responses of the participants by using simple percentage. The analysis is majorly based on the cost and time overruns which was faced by the specified company. The results are discussed in relation to the research question and objective by relating to literatures.

3.8. Ethical Considerations

Consideration of ethical issues is a very important aspect while doing a research. According to Fouka and Mantzorou (ND), the major ethical issues raised in conducting a research are;

1. Informed consent: a person should knowingly, voluntarily and intelligently and in a clear and manifest way, gives his consent.
2. Beneficence – be of benefit, do not harm
3. Respect confidentiality – individuals are free to give and withhold as much information as they wish to the person they choose.
4. Respect for privacy – an individual has to determine the time, extent, and general circumstances under which private information will be shared with others

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1. Introduction

This chapter illustrates in detail the main findings and discussions from the questionnaire and interview regarding the factors affecting cost and time overrun in Cybersoft's two project cases. The first part explains the case projects and their deviation from their actual cost and time. Then the factors which were responsible for the overruns will be discussed based on the literature and from the responses given by the respondents. Finally the effects of the overruns will also be explained in detail.

4.2. Respondents position and experience

As it is already discussed in chapter 3, the methodology part, the data collection methods that were used in this research are questionnaire and interview. The questionnaire was distributed to software developers of the company who were engaged in the selected projects and the researcher interviewed the CEO of the company. The number of questionnaire distributed was 20. But the researcher was able to collect only 15. This is due to unavailability of the intended participants. The qualification and experience of the participants is presented in table 4.1.

Table 4.1: Position, qualification and experience of respondents

Position	Qualification	Experience	No. of Participants
Software Engineer	BSC in computer science and/or software engineering	2-5 years	3
		5-10 years	5
	MS in software engineering	2-5 years	
		5-10 years	3
Solution line manager	BSC in software engineering	2-5 years	
		5-10 years	2
	MS in software engineering	2-5 years	
		5-10 years	2
Total			15

The above table shows that 66 % of the respondents have BSC in computer science or software engineering and 33% of them have MSC in software engineering. In addition 26 % of the respondents are working as solution line managers in the company and 73% of the participants are working as software developers.

4.3. Results of the questionnaires

As it is already specified, two project cases were selected from Cybersoft and those projects faced high cost and time overrun. This is done by comparing their planned time and actual time they take and their planned schedule and the time they take to be completed as a reference. Unfortunately due to the confidentiality of the data, the researcher couldn't get the amount of cost and schedule planned and the actual cost and time taken for the projects. The only data that was found was how much percent the cost exceeded its original budget and the time it exceeds from the planned schedule.

The first case project was a software application project, which was used for Management Information System. The cost showed an overrun by 20% and the allocated time taken to complete the work exceeds the original schedule by one year.

The second case was a Human resource management software application development. The actual cost incurred for the project showed that the cost was exceeded by 35%. When we come to the time it takes, the actual time taken to complete the project exceeded its planned time by one and half years.

4.3.1. Factors influencing cost and time overrun in Project One and Two

As it is mentioned above, the first case project that was selected for this study is Management Information System Application software. 7 participants were involved in this response. This software showed a cost overrun of 20% and a schedule overrun by 1 year. The respondents were asked to rate the significance of the factors in terms of their importance for each cost and time overrun variables. The rating was specified by Not Important (NI), Least Important (LI), Moderately Important (MI), Very Important (VI) and Extremely Important (EI). These lists of factors were found from the literature and the respondents were asked to give their response. In addition they were asked to specify if there are additional factors they did experience, which are not specified in the questionnaire.

The second project taken as a case was software application developed for Human Resource Management. 8 participants were involved in responding the questionnaire. The cost of this project was exceeded by 35% and faced a schedule overrun by one and half years. The participants of the questionnaire were asked to rate the significance of the factors in terms of their importance for each cost and time overrun variables like that of the previous project. The response of the participants, in terms of the severity of the factors affecting the cost and time overrun is summarized here below.

The factors were grouped into three categories, which are;

1. Factors related to the project
2. Factors related to the organization
3. Factors related to the project manager and team members

In order to summarize the findings, the researcher took the main factors in which 50% and above of the respondents classified as a major factors in which the specified projects are highly affected by. These are the factors which fall under Extremely Important, Very Important and Moderately Important factors based on the responses given by the participants.

4.3.1.1. Factors related to the project

A. Extremely Important Factors that affect Project one and Two

In relation to project one, 30 factors have been identified and according to the respondents, 6 factors are selected by them as Extremely Important Factors which highly affected the project. These are unrealistic schedule, scope change, design errors, unfeasible cost estimates, lack of business focus, and lack of trust in data. 85% of the respondents said that unrealistic schedule was the most significant factor that affects the time and cost overrun of the first project. This result is in line with Noorani (2016) in which, setting unrealistic schedule will have a huge impact on the successful completion of a project within time and budget. Scope change and design error are the next top two extremely important factors for the overruns.

Whereas in the case of project two, the factors which highly affect the cost and time overrun of the project are 5 and these are, scope change, shifting requirements and specifications, incomplete requirements, unrealistic project schedule, under estimating project complexity. In this case, according to the respondents, the first factor that highly influences the overrun is scope change. As

Buys (2015) said scope change is one of the main causes for IT software overruns. While the project is running, changing its scope will bring the project backwards and create a delay in the schedule and this will lead to high cost overrun. The other basic factors are shifting requirements and specifications and also incomplete requirements. These are the major challenges which come from the client side. While the researcher collected the data, this was one of the main issues that were raised by the company. According to the respondents, 10 – 30% of requirements are added later in the project. After completing the project, the client will come up with additional requirements and this will lead the project to schedule overrun. Though project updates leads to changing requirements and specification, this factor can also be considered as a major area of concern.

In general, we can see that scope change and unrealistic schedule are those factors which are extremely important factors for cost and time overrun in both projects. This shows how these two factors are the most significant factors for delivering a project within time and cost. Changing the scope of the project while the project was running will have a big impact on delivering the project within the specified time and budge, because it is difficult to proceed with the original cost and time. The second factor, which is unrealistic schedule, is also a factor which highly affects the project. Setting unrealistic schedule when starting project leads to high cost and this will affect the overall completion of the project. So from this we can say that both projects shared some factors that commonly affect them. On the other hand, because each project is unique by itself, the factors that highly affect one project may not necessarily affect the other one and this can be seen in the above example. The rest of the factors the rest factors only affect the individual projects.

Table 4.2: Extremely Important project related factors for Project One

No.	Factors	No. of Respondents in %
1	Unrealistic schedule	85
2	Scope change	71
3	Design errors	71
4	Unfeasible cost estimates	57
5	Lack of business focus	57
6	Lack of trust in data	57

As can be seen from the table, the top three factors that cause cost and time overrun in the first project are unrealistic schedule, scope change and design errors.

Table 4.3: Extremely Important project related factors for Project Two

No.	Factors	No. of Respondents in %
1	Scope change	85
2	Shifting requirements and specifications	71
3	Incomplete Requirements	71
4	Unrealistic project schedule	57
5	Under estimating project complexity	57

In the second project, scope change, shifting requirements and specifications and incomplete requirements are the most important factors for cost and time overrun.

B. Very Important Factors that affect Project one and Two

The factors which fall under the Very Important classification in project one are novelty/newness of technology, underestimating project complexity, time pressure, unclear objectives, shifting requirements and specifications. Whereas in project two the very important factors are novelty/newness of technology, unfeasible cost estimates, time pressure, unclear objectives, and inconsistent process.

In the first project, 85% of the respondents said that novelty/newness of technology is a very important factor. It is obvious that technology update is expected in software environment. According to the respondents, in this project, an updated technology was used and it had an influence in their performance and that results in creating a delay in the project which leads to cost overrun. When a new technology or software is applied, the software developers should take training and should fill their skill gap. The second factor was underestimating project complexity, 71% of the respondents feel that underestimating project complexity and time pressure were the next very

important factors for the overrun. As Allahaim & Liu (ND) stated, complexity of the project played a significant role in maximizing the cost and delay of a project. The third factor is time pressure. The respondents put time pressure as the third very important factor. A project with a time pressure will definitely be susceptible to high cost and time overrun. Unclear objectives were also responsible for the overrun. If the objective of the project is not clearly stated, then the project cannot be delivered accurately and this had an impact on the project. Shifting requirements and specifications were also the other factor, which was raised by the respondents as a cause for the overrun.

In the case of the second project, like the first project, the very important factor selected by most of the respondents was novelty/newness of technology. The second factor was unfeasible cost estimates. Setting unfeasible cost estimation has a great impact on the success of a project. According to Budzier and Flyvbjerg (2012), in order to reduce underestimation of costs, they suggested four solutions which are, benchmarking the organization to know where it stands, De-bias IT project decision-making, reducing the complexities of IT projects and developing master builders to learn from the best in the field. Time pressure was the third factor for project two and it is similar to that of the first project. Unclear objectives and inconsistent processes are also the factors which are raised by the respondents as very important factors for project cost and time overrun.

From this we can see that novelty/newness of technology, time pressure and unclear objectives are the very important factors for both projects.

Table 4.4: Very Important project related factors for Project One

No.	Factors	No. of Respondents in %
1	Novelty/newness of the project	85
2	Underestimating project complexity	71
3	Time pressure	71
4	Unclear Objectives	57
4	Shifting requirements and specifications	57

Table 4.5: Very Important project related factors for Project Two

No.	Factors	No. of Respondents in %
1	Novelty/newness of technology	85
2	Unfeasible cost estimates	85
3	Time pressure	71
4	Unclear objectives	71
5	Inconsistent process	57

C. Moderately Important Factors that affect Project one and Two

This part discusses factors which affect both projects moderately. Even if these factors are not as serious factors as the previous ones, still they somehow affect the project's cost and time overrun. The main factors that affect the first project moderately are complicated standards, slow closeout of a project, using an informal project management methodology with clearly defined risk management and communication plans, Manual preparation of reports. The factors which affect the second project moderately are unrealistic expectations, slow close out of a project, design errors and technology incompetence.

71% of the respondents in the first project said that complicated standard was the first factor which moderately affects the project. The standards which are used in software application development should be simple and clear. The second factor is slow closeout of a project. Delay in closing out of a project by itself is one cause for cost overrun. According to Buys (2015), slow close out of a project will have a significant impact on the successful completion of a project. Using an informal project management methodology is the other factor. From what the researcher got from the collected data, even if the company had a written document on how to use project management methodology in the company, they didn't apply it properly. The last factor which moderately affect the cost and time overrun of the project is manual preparation of reports. This affects the project in a way that it took time and this will contribute for the delay in the schedule.

In the second project, unrealistic expectation is the first factor which affects cost and time overrun. Like that of the first project, Slow Close out of a project is also another factor. The third factor is

design errors. Even if it is not a very serious factor, in this project the respondents said that design errors were moderately affect the project by creating a delay in the schedule. The last factor is technology incompetence. Being technologically incompetent somehow affected the successful delivery of the project.

Table 4.6: Moderately Important project related factors for Project One

No.	Factors	No. of Respondents in %
1	Complicated Standards	71
2	Slow closeout of a project	71
3	Using an informal project management methodology with clearly defined risk management and communication plans	57
4	Manual preparation of reports	57

Table 4.7: Moderately Important project related factors for Project Two

No.	Factors	No. of Respondents in %
1	Unrealistic Expectations	71
2	Slow Close out of a project	71
3	Design errors	57
4	Technology Incompetence	57

4.3.1.2. Factors related to the organization

A. Extremely Important Factors

The second category is factors related to the organization. Under this category five factors which highly affect cost and time overrun of the projects are identified and out of them the respondents categorize Project organizational structure as an Extremely Important Factor for project one and Culture and enterprise management method for project two.

Table 4.8: Extremely Important organization related factors for Project One

No.	Factors	No. of Respondents in %
1	Project organizational structure	71

Table 4.9: Extremely Important organization related factors for Project Two

No.	Factors	No. of Respondents in %
1	Culture and enterprise management method	71

The organizational culture of the company becomes a major organizational related factor in the first project. This shows that if the culture of the organization is not suitable for the specific project it will have an impact on the projects successful completion. In the second project, the method that the organization was used to manage the culture and the company had an adverse effect on the completion of the project within time and budget.

B. Very Important Factors

In the category of Very Important Factors, according to the respondents, lack of top management support and culture and enterprise management method are the Very Important factors related to the organization that affect the cost and time overrun of project one. In the case of project two, lacks of top management support and project organizational structure are the two very important factors.

From this we can see that in the first project, failed to give the necessary management support had a great impact on the company and put it at high risk in completing the project successfully. The culture and the management method followed by the company was also a very significant factor for the project to be delivered on time and on schedule.

In the second project, just like that of the first lack of top management support is the first very important factor and project organizational structure is the second that was responsible for the overrun.

Table 4.10: Very Important organization related factors for Project One

No.	Factors	No. of Respondents in %
1	Lacks of top management support	71
2	culture and enterprise management	71

Table 4.11: Very Important organization related factors for Project Two

No.	Factors	No. of Respondents in %
1	Lack of top management support	85
2	Project organizational structure	71

C. Moderately Important Factors

In the moderately important factors part, Management reserve was moderately important factor for both projects.

Table 4.12: Moderately Important organization related factors for Project One and Two

No.	Factors	No. of Respondents in %
1	Management reserve (contingency is spent too quickly)	71

4.3.1.3. Factors related to project manager and team members

A. Extremely Important Factors

In the third category, which are factors related to project manager and team members of the project, six factors were identified and out of them the respondents categorized 4 of them as an Extremely Important factor for project one. These are Lack of commitment, Team conflict, Lack of skills, and Lack of ability to coordinate. According to the respondents, 85% of them said that, the project team

had very low commitment on the work. The second factor stated by them was team conflict and skill gaps were also observed. From the side of the project manager, lack of ability to coordinate the team were the main problem. In the case of the second project, no factors are stated as an extremely important factor.

Table 4.13: Extremely Important project manager and team members related factors for Project One

No.	Factors	No. of Respondents in %
1	Lack of commitment	85
2	Team conflict	71
3	Lack of skills	71
4	Lack of ability to coordinate	71

B. Very Important Factors

In the very important factors section, team alignment problems was observed between the teams in project one and the project manager's lack of ability to coordinate is the one factor for the second project. The role of project managers is very important. If the project manager is failed at performing his/her function properly it will have a definite effect on the success of the project.

Table 4.14: Very Important project manager and team members related factors for Project One

No.	Factors	No. of Respondents in %
1	Unaligned teams	71

Table 4.15: Very Important project manager and team members related factors for Project Two

No.	Factors	No. of Respondents in %
1	Lack of ability to coordinate	85

4.4. Effects of cost and time overrun

The second objective of this research is to assess the consequence of time and cost overruns on the above two case projects. According to the study, cost and time overrun has a significant effect on different aspects. From what the researcher found from the interview with the CEO of the company, in addition to these case projects, more than 90% of the projects which were undertaken by the company, faced cost and time overruns. This shows how much software projects are vulnerable to risk of failure. This will have an adverse impact on the software company, the client and the overall ICT industry in the country.

When we look from the company's side, cost and time overrun of projects makes the company to incur additional cost and this leads to financial loss. This will put the company at a difficult situation to survive in the industry.

From the client's side, if the project doesn't delivery within time and cost, this will have a direct and an indirect impact on its business. This is because, the objective of the project is to increase the productivity and the overall performance of the company, and so if the project failed to deliver within the specified time and budget, it will affect the overall performance of the company. In addition it will create client dissatisfaction. This may lead to the change to client business requirements and even may totally cancel the order.

In general, to the industry as a whole, cost and time overruns could bring about a drop in IT activities and it will have an adverse effect on the development of the industry. According to the CEO of the company, due to the above reasons and others, they are struggling to stay in this industry. This indicates that the effect of cost and time overrun will reduce the number of investors that will join the industry and this will have a direct effect on the overall growth of the country's economy.

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CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

The specific objectives of this research are to identify the factors which are responsible for time and cost overrun in projects in the specified area, to assess the consequence of time and cost overruns on IT projects, and provide recommendations in order to conquer known failure factors. The data were gathered by using questionnaire and interview. The main sources of the data were software developers who were involved in the two case projects and in the interview part the CEO of the company were involved. From the data gathered, the following conclusions were derived.

5.1. Conclusion

Based on the above findings from the comparative case study of the two projects, the following conclusions were made;

1. The first specific objective is to identify the factors which are responsible for time and cost overrun in the two case projects of Cybersoft. According to the findings, both cases were completed with high cost and time overrun. The first project which is software developed for Management Information System showed a cost overrun by 20% and its schedule exceeds by 1 year and in the case of the second project, which was developed for Human Resource Management system showed 35% of cost overrun and the schedule was delayed for one and half years.

In order to identify the causes for the overrun, 30 factors which are related to the project, 5 factors which are related to the organization and 6 factors related to the project manager and team members were identified. In this research, the factors are rated by using Extremely Important, Very Important, Moderately Important, Least Important and Not Important. In order to summarize the findings, the researcher took what 50% and above of the respondents categorized as significant factors. In addition, only factors that are extremely, very and moderately important were taken as due to their impact to the cost and time overrun of the two projects.

2. The result showed that, from factors which are related to the project, scope change, unrealistic schedule and shifting requirements and specifications are the major factors which commonly affect both project. From the second category, which are factors related to the organization, Project organizational structure is an extremely important factor for project one and Culture and enterprise management method for project two. From factors related to project manager and team

members category, Lack of commitment, Team conflict, Lack of skills, and Lack of ability to coordinate are the factors which highly affect the cost and time overrun of project one. For project two no extremely important factors are specified.

3. The findings of the research showed that most of the factors which affect cost and time overrun of IT projects, especially software projects are more or less similar to those found in the literature. However, what the researcher found in addition was that what we get in the literature is derived from the projects done in foreign countries. When we come to our country's case, the reality is more or less different due to various cultural and socio-economic factors.
4. The second specific objective of the research is that, to assess the consequence of time and cost overruns on IT projects. Cost and time overruns are the basic failure factors for IT projects. The effect of time and cost overrun has a significant impact on the supplier, the client and on the overall ICT industry. The supplier faces a big financial loss, delay in returns in investment and its survival in the industry will be difficult. From the clients' side, they will be dissatisfied with the performance and will create an impact on their businesses overall performance. It also has an adverse impact on the development of the ICT industry.

5.2. Recommendations

In order to minimize the cost and time overrun in IT industry, especially in software development projects, the following recommendations are given.

1. The company should be more careful in planning the project time. It is better to be more realistic and sufficient backup time should be allocated. This is reflected in both projects and definitely will be in others too.
2. The company should give ample time while designing a Scope. Because changing the scope while the project is on the way will make the project vulnerable to additional cost and time. So defining the scope should be performed with care. It is one of the three components of the Iron Triangle, which when changing causes change in the other two elements.
3. Incomplete requirements and shifting specifications and requirements are the other very common problems in software projects. The design of the requirements and the specifications should involve sufficient discussion and dialogue between the supplier and the client. Even prototyping will be needed to make sure that requirements are properly captured.

4. When the company applied new technology it is important to give the employees the necessary training and upgrading their skills so that they can perform their task without a problem. In addition, it is recommended to use CASE tools to automate some aspects of the software development process, which expedites the development process.
5. Smaller teams are easily managed. Therefore while organizing a team trying to come up with smaller teams will help the process.
6. From the interview it was found that even if there are documents stating about how project management methodologies should be applied in the company, however, it is not applicable. Hence, in order to complete the projects, the company should develop distinct project management methodologies in project management knowledge areas like methodologies in project cost management, in project time management and risk management.
7. During the interview, it was found that government doesn't give attention and incentive to the participants of the sector. Even if there are competent IT companies in the country, many governmental organizations outsource their work for foreign software companies and this had an effect on the performance of local IT companies. Therefore, to encourage the industry, the government should consider giving some incentives for the local companies, such as land lease, tax privileges, investment loans, duty-free facilities and encouragement by purchasing local software instead of outsourcing, should be given to operators.

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APPENDIX I: QUESTIONNAIRE FOR RESEARCH THESIS

Introduction

This questionnaire is prepared to gain the necessary information from key informants for the research entitled “Factors Affecting Time and Cost Overrun in IT project in Ethiopia: The case of Cyber Soft Engineering”, which is being conducted as partial fulfillment of MA in Project management.

The main aim of this research is to assess the factors that cause time and cost overrun in IT projects and to make the necessary recommendations based on the findings.

I would like to inform you that your response is very important for this research and your feedback will be completely confidential and used for this research only.

Thank you,

Eden Wubalem

I. Part One

General Organization Information

1. Name of Organization: _____
2. Company Type: _____
3. Respondent's position in the company: _____
4. Gender: Male Female:
5. Educational Background: _____
6. Work Experience: _____
7. Type of the Project: _____
8. Average time spent on the specified project _____
9. Average team size on the specified project _____
10. Did the project get completed on time and within budget?
Yes No
11. Was the product delivered with all the requirements as per initial specifications?
Yes No
12. What proportion of features/requirements was added later?
<10% 10%-30% 30%-50% >50%
13. How do you consider managing a large team in your project?
Easy Not so easy Difficult Very difficult
14. What can be done to overcome the above problem?
More training courses smaller teams more project reviews
Specify others _____
15. Delivery time of the project were exceeded by
<1 month 1-3 months 3-6 months >6months
16. Cost of the project were exceeded by
<10% 10%-30% 30%-50% >50%

Part II

In the following table, a list of factors and their importance are stated. Please indicate the significance of each factor by ticking in the appropriate boxes. If you want to add anything that is related to each factor, you can use the remark column.

How important do you think the following factors are responsible for project time and cost overruns?

N.I – Not Important

M.I – Moderately Important

L.I – Less Important

V.I – Very Important

E.I – Extremely Important

No.	Factors						
Related to the project		N.I	L.I	M.I	V.I	E.I	Remark
1	Novelty or newness of the project						
2	Under estimating the project complexity						
3	Time pressure						
4	Unclear objectives						
5	Scope change						
6	Design errors						
7	Incomplete Requirements and Specifications						
8	Shifting requirements and specifications						
9	Lack of resource planning						
10	Lack of Resources						
11	Unrealistic Expectations						
12	Complicated Standards						
13	Under financing						
14	Unfeasible cost estimates						
15	Unrealistic project schedule						
16	Inconsistent processes						

17	Planning error						
18	Lack of backup plan						
19	Slow close out of a project						
20	Lack of business focus						
21	Limited access to information						
22	Lack of trust in data						
23	Failure to conduct thorough systems impact analyses.						
24	Using an informal project management methodology with clearly defined risk management and communication plans.						
25	Little systems documentation existed						
26	Manual preparation of reports						
27	Lack of information asymmetry between the supplier and the client						
28	Not involving high degree of customization in application						
29	Lack of User Input						
30	Technology Incompetence						
Related to the organization							
1	Lack of top management support						
2	Project organizational structure						
3	culture and enterprise management methods						
4	Management reserve (contingency is spent too quickly)						
5	Inappropriate and inadequate procurement						

Related to project manager and team members							
1	Lack of ability to coordinate						
2	Lack of Commitment						
3	Cultural Differences between team members						
4	Team conflict						
5	Unaligned team						
6	Lack of skills						

If you have faced any additional challenges regarding the cost and time overrun in the projects, please specify here.

APPENDIX II: INTERVIEW QUESTIONS

Dear Sir/Madam

First of all I would like to thank you for giving me your time to have this interview. My name is Eden Wubalem and I am a Masters graduate student in Project Management at AAUSC. The main objective of this interview is to collect data for the research entitled “FACTORS AFFECTING COST AND TIME OVERRUN IN IT PROJECTS IN ETHIOPIA: THE CASE OF CYBERSOFT SOFTWARE COMPANY”. There are several factors that can make this research fruitful. But for the most your cooperation, honesty and genuine responses are the basic ones. Therefore, I kindly request your cooperation and sincere response to the interview session.

Interview Questions

1. How many projects were undertaken in the company since its establishment?
2. What kind of challenges did you face in general while working in the projects?
3. What kind of solutions did you give for those problems? How do you handle them?
4. What were the main challenges that you faced from the clients side?
5. How did you overcome those challenges?
6. What were the effects of the projects cost and time overrun?
7. How do you describe project management practice in your company?