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Identifying strategies and techniques for the Egyptian medium and large size contractors to respond to economic hardship

Michael Salib

The American University in Cairo

School of Sciences and Engineering

IDENTIFYING STRATEGIES AND TECHNIQUES FOR THE EGYPTIAN MEDIUM AND LARGE SIZE CONTRACTORS TO RESPOND TO ECONOMIC HARDSHIP

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by Michael Maged Salib

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Dr. A. Samer Ezeldin

Dr. Ahmed Waly

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Abstract

There are numerous challenges and problems facing the construction industry in Egypt as a result of several economic influences and sovereign decisions, which are listed below: 1) The Central Bank of Egypt (CBE) increased the value of the US dollar against the Egyptian pound in the official market to reach USD/EGP 8.85 in March 14^{th}, 2016. 2) Egypt's parliament approved the value added tax (VAT) in September 8^{th}, 2016. 3) The Egyptian Pound exchange rate liberalization in: November 3^{rd}, 2016. 4) Hike in the value of projects' funding since November 3^{rd}, 2016. 5) Fuel prices increased following the Central Bank of Egypt's decision to float the Egyptian Pound in November 4^{th}, 2016.

Many construction companies have shut down and left the market since 2016. The closure of these companies happened, as they did not acquire the experience and the managerial skills to deal with the economic hardship. They did not respond with the suitable techniques and strategies that will enable them to survive during this period of instability.

This research identifies adequate strategies and techniques to be implemented by the first category contractors registered in the Egyptian Federation for Construction and Building Contractors that could enable them to survive during such economic conditions. The identification process is processed through two different methods. First, companies in other countries that have passed by similar conditions have been analyzed in order to identify the strategies and techniques they have used in order to survive. Second, interviews with experts in the Egyptian market have been conducted in order to identify the strategies implemented by their companies as a response to such economic instability. Furthermore, the strategies previously identified and applied in foreign markets are presented to those experts in order to study their applicability and efficiency if used in Egypt.

A framework was developed in order to assist the construction companies in choosing the suitable techniques to their company size, through identifying the top ranked strategies and techniques that should be adopted by the company based on the parameters given to the framework. This framework has been verified by studying the financial statements of two companies, the first one has implemented almost all the top ranked

strategies, and the other one has implemented only few strategies and techniques from the top tanked strategies. The figures concerning 2017 have been analyzed in respect to 2016, in order to visualize the effects of the strategies on the companies' financials. The framework has been also validated through experts' interviews. These experts have used and tested the framework and have rated through an interview its applicability and effectiveness. Furthermore, the experts have given few comments and recommendations in order to enhance the framework.

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1.1 Introduction

During the last decades, many countries around the world have witnessed several economic hardships, which had always led to several negative impacts on different sectors and industries within the countries. During these tough times, companies have always been trying to fight for survival through trying different strategies, whether aggressive or conservative, risky or risk-adversely. Accordingly, they either overcome the instable period until the economy expands and booms again or they cannot stand the harsh condition and hence being bankrupt, or in other words they shut down.

Taking a deeper look into the effects of the economic hardship and more specifically the currency devaluation on the construction sector, some analysis may be accomplished. Some construction companies resorted to reducing the unessential cost, such as; reducing overhead cost as these companies eliminated the departments that are not considered core operations department. Other companies reduced the administrative cost such as buildings expenses or extra services offered to the employees. Overall, whatever the strategy implemented by the company, it is always accompanied with a downsizing of the work force, which leads to higher rates of unemployment and hence increasing the effects of the economic instability on the country.

On the other hand, some companies tried to overcome the situation without losing any of its assets. By mentioned the companies' assets here, it is meant to consider any tangible or intangible value of the companies including their employees. For instance, some companies revised their cost to ensure the efficient use of their resources and avoiding cost estimation errors. Other Companies tended to implement less risky techniques, such as, outsourcing and subcontracting their jobs. Furthermore, some companies thought out of the box and decided to perform diversification techniques, either through expanding their activities or geographically spread, or implement both together. All these techniques are analyzed in more details later in the literature review.

Unfortunately, Egypt is now going through the same status discussed above as it is facing a dramatic change in its economic shape since the "Devaluation of the Egyptian Pound" decision taken by the monetary policy committee on the 3rd of November 2016.

Although, there are always ups “Booms” and downs “Bursts” in any economy, and it is known that this cycle is normal and unavoidable; thus, downturns are usually taken into consideration. However, in this critical period of instability, the gap between “Boom" and “Slump" has become great, which led to the distortion in the contour of the Egyptian construction industry. It has been noticed that Egyptian companies are forcefully reacting in order to survive, however, most of them are facing financial losses, and others are forced to shut down.

In order to reach the optimum opportunities in the Egyptian economy to survive and overcome this economic hardship, searching and developing effective strategies to cope with the impending turmoil is paramount. A detailed exploration should be done to study the past experiences of countries that faced economic turmoil or currencies devaluation and how the construction sector was able to survive and sustain itself. In other words, analyze the precautions strategies taken by these countries and their action plans, and analyze the feasibility and applicability of these strategies on Egypt.

1.2 Construction Business Standing after Pound Flotation

According to the chairman of the Egyptian Federation for Construction & Building Contractors, the construction companies across Egypt has reached a state of inability to complete the execution of their projects in light of the lack of financial abilities. This crisis happened as a result of several influences and the decisions of a sovereign which are listed below:

- The Central Bank of Egypt (CBE) increased the value of the US dollar against the Egyptian pound in the official market to reach USD/EGP 1/8.85 in March 14th, 2016
- Egypt’s parliament approved the value added tax (VAT) in September 8th, 2016
- Egyptian Pound exchange rate liberalization in November 3rd, 2016
- Hike the value of the funding for projects in November 3rd, 2016
- Fuel prices increased following the Central Bank of Egypt’s decision to float the Egyptian pound in November 4th, 2016

According to the Chairman of the Egyptian Federation for Construction & Building Contractors,

- There are about 2,000 contracting company of the Egyptian market shut down during 2016 only, as a result of the negative challenges witnessed by the construction sector, such as the sudden rise in prices of construction materials, and the Egyptian Pound floatation, and the issuance of the law of value added tax.
- The delay in the approval of the Parliament on reparations submitted by the Ministry and the Committee of Housing for more than three months has led to the collapse of the construction sector. This delay has also caused the exit of more companies during 2017, especially that the companies became unable to complete the projects due to the shortage of the financial resources, as a result of sudden increases in costs and the lack of compensation disbursement to them.

Construction companies operating in Egypt were affected by the liberalization of the Egyptian Pound (EGP) exchange rate. The construction businesses have declined after the EGP devaluation decision by the Central bank of Egypt. The price of the US dollar has increased from 8.88 to more than EGP 18 in the official market since November 2016. Therefore, the main problem that companies faced was financial liquidity squeeze as the escalation of the construction materials prices was very fast while companies were still discussing new agreements to change project’s budget to cope with the new prices.

The construction companies reacted to the prices increase in several ways. For instance, many companies requested project time extensions in order to avoid squeezing their cash flow. Furthermore, companies requested quick compensations payments for the projects’ costs changes. It worth highlighting that the companies executing projects owned by the Egyptian government have also suffered until getting approvals for prices changes and receiving the compensations payments. However, some companies were not able to bear the severe decline in their cash liquidity and hence some of their undertaken construction projects were disrupted. This led to a regression in the performance of small and medium size contractors to the extent that they feared the risk of shutting-down.

Not only the private sector construction companies have suffered from the Egyptian devaluation, but also the public-sector companies. Below are some of the statements that public sector companies' management have declared after the pound floatation:

The first case is related to the Construction and Housing Company of the Holding Company for Construction (HCC). The company's representative has declared that the construction companies affiliated to the HCC were highly affected since the floatation decision and hence they prepared a study showing their observations on the floatation impacts on the companies in order to present this study to the Minister of Public Sector Affairs.

The second case related to the General Company for Construction Roland Egypt. The company's representative has stated that the company is facing a huge deterioration since the Central Bank of Egypt announced the Floatation of the local currency, as it causes a lack of liquidity due the price increase. Furthermore, he declared that the increase in prices, which is almost reached 100%, affected the progress of work as the contractors reduced the rate of spending in order to reduce the negative cash flow. This mainly applies in the projects in which the clients didn't consider to compensate the contractor on the material price changes. He finally requested fast compensation to the contractors in order to be able to survive and complete the project in the required duration. It worth mentioning that few months before the pound floatation, the company has announced that they have signed an agreement with the National Authority for Potable Water to supply the needed equipment for a new water processing plant. This equipment is imported from abroad using foreign currency; hence the company has signed the contract before the floatation and they are executing it after the floatation.

Another case is related to the General Egyptian Company for Buildings. The company's representative has pointed that the materials of the contracts they have has increased about 40% after the Central Egyptian Bank has announced the local currency floatation. This increase will affect the progress of work and can cause the stoppage of project as the company may not bear this huge increase, as it will not be able to satisfy all its financial commitments. He also pointed the importance of the quick compensation in order to help the contractor to survive, hence, the assurance of completing the projects without any delays or losses.

Additionally, El Moqawlat El Masrya Company is demanding for quick compensation policy to be implemented to be able to meet the price increase. The company's representative has also mentioned that already some employers have refused to compensate the contracting company with the price difference, especially for the cement and steel. The company's representative has also raised the potential problem that can happen, as the contractors will lose the motive to complete the work in the required quality and time so they will not be able to abide by the contract terms and conditions nor the specification, as they will start focus on their losses and how to eliminate these losses. This mainly applies to small and medium scale companies, which are suffering huge losses as they are bearing the difference in costs, which is happened after the increase of prices and the lack of compensation terms that preserve their rights. He has also clarified that the contractors executing residential projects will not face the same problems as the Ministry of Housing in coordination with the Ministry of Finance has announced that the contractor will be compensated with the difference in the material prices. He also stressed that the Ministry of Housing shall implement the same condition with the private companies, not only the public ones. He also explained that a number of major construction companies rectified their situation in their new projects, and added more items to contracts signed in Egyptian pounds, attributing raw material price differentiations to the awarding body.

The Housing Committee in the House of Representatives has prepared a draft law that oblige the governmental sectors to compensate the construction companies, suppliers, and the parties who are performing public services contracts for the increase of prices resulted from the local currency floatation.

After a long period of discussions and studies to prepare the Compensation Law and formulate its implementation technique, the law was finally issued on Sunday 1st of October, 2017, a new law 84/2017 referred to as the "New Law". The aim of initiating this law was to compensate the aggrieved and distressed contractors for the damages that emerged from the crucial economic decisions.

A committee called the "Compensations Supreme Committee" was established under the prime minister decree 1677/2017. The committee has taken the Ministry of Housing, Utilities and Urban Communities as a Center of Operations. The Compensations

Supreme Committee will be authorized for laying the basics, rules and compensation ratios for the damages arising from the economic decrees issued during the period from 1/3/2016 to 31/12/2016. The previously mentioned decrees have led to upsetting the financial balance of the contracting, supplies and receiving the valid services contracts during that period through the works that are implemented starting from 1/3/2016 and till the end of the contract's implementation.

Actually, the New Law has introduced some preliminary conditions, in order to award the compensation. These conditions include:

- Compensations will apply only on damages raised from the economic decrees issued during the period from 1 March 2016 to 31 December 2016 as these economic decisions created a financial imbalance to the construction, supplying and public service contracts. If the delay in the implementation is for some reason attributable to the contractor and the contracting authority has not extended the contract implantation duration, then the contractor should not be entitled for such compensation.
- Compensations will be awarded to contractors, suppliers and public service providers who signed contracts with the state, or any of its owned companies.

    According to the New Law "the companies owned by the state" means:

    - Each company owned by a public person individually or sharing with some other public persons or with companies or public-sector banks.
    - Each company in which one public sector or more has a share in or owns part of its capital by at least (51%) with a private sector. This percentage includes the shares of the public-sector companies or banks in the capital.
    - The subsidiary companies in which one of the holding companies has at least (51%) of its capital even if more than one of the holding companies or public legal persons or public-sector banks contributed in that percentage.
- Financial damage occurs to aggrieved party during the executed works of the contract from 1 March 2016 until the end of the contract.

- The damages do not result from the contractor’s acts of omission leading to delays in implementation.

The New Law demonstrates the government resolution of the previous hindrances, which affected investors engaged in public projects. Hopefully, this will avoid the flow of multiple disputes against the government in this context.

As the government has to do some steps in order to help the contractors survive and complete their projects, the construction companies have also to implement some strategies. In order to develop and implement effective strategy, a detailed exploration should be done to study the past experiences of other countries that faced economic instability or currencies devaluation and how the construction companies were able to survive and sustain itself. In other words, analyze the precautions strategies taken by these companies and their action plans, and analyze their effectiveness if implemented in Egypt.

From all the above, it is very clear that despite all the trials of the Egyptian Federation for Construction and Building Contractors, the Egyptian contractors have suffered during the economic instability as a result of several influences and the decisions of a sovereign.

1.3 Problem statement

The economic hardship made evidence that the skills and knowledge, particularly the management skills possessed by contractors were insufficient to face such critical conditions. The evidence of this is that it was noticed that several small and medium size contractors disappeared since November 2016, as they were not able to bear the severe economic changes.

The devaluation has led to a sequence of financial problems leading to one another in the construction companies. First the companies faced sudden instability in the commodity prices; including internal and external expenses and the tremendous increase in the imported goods prices as well. This instability led to liquidity squeeze, which in its turn distorted the companies’ cash flow, due to the cash outflow exceeding the cash inflow and the massive increase in the foreign exchange rates. Then the companies suddenly faced a risk of bankruptcy and hence the need for external financing; such as lending from financials institution, e.g. banks. Meanwhile the financing bank became more restrictive with the construction sector due to its instability; thus, the banks appetite to offer facilities to the construction companies has decreased. Therefore, the financial burden on the construction companies has become very stressful.

The construction companies, while confronting all this sequence of the above-discussed financial problems, frustrated to reach decisions that could take into consideration all these factors and their consequences. Therefore, they could not find the optimum techniques and strategies that may help them survive during the economic instability. This current status is negatively impacting the development of the industry in Egypt. Therefore, it triggers and assures that studying and developing the proper strategies to respond to such economic hardship is vital to survive.

1.4 Objectives

This research aims to identify adequate strategies for the Egyptian medium and large size contractors in order to overcome economic hardship. In order to reach this objective, the research explores the various techniques and strategies that were used by foreign construction companies and enabled them to survive during their countries' economic turmoil. A detailed study of these techniques shall be done in order to assess the reasons or the criteria of their selection, their effectiveness in dealing with the depression, and their applicability on Egypt. A framework has also been developed in order to assist the Egyptian companies choosing the adequate techniques and strategies to be applied. It also helps the companies to implement the strategies and techniques by presenting some implementation tips for each strategy/technique.

1.5 Research Scope

This research is limited to the medium and large size contractors. These contractors are basically the contractors classified as first category contractors in the Egyptian Federation for Construction and Building Contractors. In this research, the medium size contractors are the contractors having contracts amount from EGP 100 million/year to EGP 500 million/year while the large contractors have contracts more than EGP 500 million/year. The research considers the medium and large size contractors only as they are the leaders of the markets and the indicators for the success or failure of the rest of the market.

1.6 Methodology

The research method used to achieve the objectives of this thesis is based on the following steps:

1. Literature Review to investigate the previous researches that took place in similar markets that have suffered from similar economic instability, in order to see how the companies in these markets responded to the economic turmoil.
2. Expert Interviews to identify the techniques implemented by the Egyptian contractors and rate the effectiveness of the techniques used by the companies abroad in order to see their applicability in Egypt.
3. The Framework has been developed in order to assist the companies choose the adequate strategies.
4. The framework has been verified and validated.

These steps are further explained in the following section:

1.6.1 Literature Review

The literature review presents the previous researches that took place in similar markets that have suffered from similar economic turmoil. It mainly focuses on the survival strategies and techniques used by the survived companies that were working in these markets. The effective strategies and techniques used by these construction companies are highlighted in order to study their applicability and effectiveness if applied in Egypt.

1.6.2 Expert Interviews

For the purpose of achieving the goal of this research, an expert interview was conducted with expert engineers. This interview was used to investigate the main strategies implemented that have helped the company to survive during the economic instability period, and the applicability of implementing the strategies used in similar situation

(Nigeria, South Africa, and Thailand) on Egypt. The comments of the expert engineers highly contribute to the analysis of the study and drawn conclusions.

The selection criteria of the companies on which the study is based are a key issue, since the research is studying the general trend of the Egyptian construction industry.

After determining the selection criteria, the population should be determined in order to determine the sample size of the companies to be interviewed.

1.6.3 Strategies Identification

After conducting the expert interviews and based on the results, a ranking procedure takes place in order to identify the top strategies and techniques. These strategies and techniques are not limited to the ones identified through the literature survey but it also includes the suggested ones by the experts during the interviews.

1.6.4 Framework Development

A Framework is developed as a helping tool to assist the top management of contracting company choosing from the top ranked strategies and techniques concluded from the expert interviews the adequate ones suitable for the company's characteristics. It displays the strategies and techniques based on their priority and it also shows some tips regarding how these strategies can be implemented, in order to facilitate the implementation procedure of the chosen strategies and techniques.

1.6.5 Framework Verification and Validation

For the purpose of framework verification, financial statements of one of the leading contractors in Egypt has been obtained and analyzed to show the impact of using the proposed strategies on the financial standing of the company, so a detailed comparison between the figures of 2017 and 2016 was applied.

For the purpose of framework validation, a set of interviews were conducted with 5 new experts in the contracting field in Egypt. They were asked to provide their opinion about the applicability and efficiency of the proposed strategies Framework. The analysis and results of the interviews are illustrated in chapter 4.

1.7 Thesis Organization

This thesis is divided into five chapters. The first chapter is the introduction, followed by scope of the research, the objectives, and the organization of the thesis. It also presents, demonstrate, and analyze the current situation of the Egyptian market, as there are a lot of companies that shut down during 2016 and early 2017. It includes the drawbacks that the contracting companies suffer from, the reasons of these drawbacks and the efforts made by the companies and the efforts made by the Egyptian Federation for Construction and Building Contractors to resolve the issue.

Second, the research continues with a literature review. The literature review identifies some other countries that suffer from similar economic instability cases. Then, it presents the different techniques and strategies adopted by the construction companies in these countries to deal with the economic hardship. It is also studying the advantages, drawbacks, and the implementation strategies of each technique used by the construction companies.

Third, the research continues with the methodology of conducting this research, how the expert interview questions have been developed, the sampling criteria of selecting the interviewees.

Fourth, the research continues with the analysis and the assessment of the strategies and techniques based on their efficiency and effectiveness. This analysis helps the research to reach a conclusion concerning the advantages and drawbacks of each Strategy and technique. It also helps to know the lessons learnt of applying these techniques and strategies in these countries and the outcome they reached.

Then, linking these studied techniques with the Egyptian construction sector, through questioning the feasibility of applying these strategies in Egypt and acknowledging which techniques could be effective and which could not. In order to do so, interviews shall be conducted with different construction companies' management to evaluate the situation of the construction sector in Egypt and comprehend the realities on the ground. Meanwhile, an analysis of the response of the Egyptian construction companies to several economic shocks is required, as it helps in realizing the performance of these companies, which implies whether the suggested strategies are applicable in Egypt or not.

Finally, suggesting the optimum techniques and strategies that could be adapted by the construction firms in Egypt in order to sustain their performance and development based on the collected data and conducted research, in addition to drawing a framework that will help the Egyptian construction companies choose the optimum techniques.

2 Chapter 2: Literature Review

2.1 Introduction

The previous chapter has presented the drawbacks that the contracting companies suffered from after the devaluation of the local currency, and the reasons of these problems in addition to presenting the efforts of the Egyptian Federation for Construction and Building Contractors and their recommendations to resolve the problems and help the contractors survive during the economic instability. This chapter, the literature review, studies the previous research identifying the different techniques and strategies adopted in several foreign construction companies in different countries to deal with similar economic instability cases in order to analyze them and study their applicability in Egypt later in the research.

In the literature review the techniques used by three different countries after the devaluation of their local currency have been identified and analyzed. The countries are Nigeria, Thailand and South Africa. The basis of the choice of these countries was vital. Nigeria and South Africa were chosen as they are developing African country as the Egyptian case. Thailand is also a developing country and it is very similar to the Egyptian market as it in an import dependent market. These countries have adopted two main types of strategies and techniques. Nigeria has adopted some turnaround strategies that will be further explained in the following section, and Thailand has implemented some diversification strategies, as explained later. On the other hand, South Africa has implemented a combination of both types, the turnaround strategies and the diversification strategies.

The first country that should be analyzed is Nigeria. Nigeria has suffered from the devaluation of the Naira, the local currency. The Nigerian construction industry is somehow similar to the Egyptian construction industry as both of them is extremely import dependent (Ogbodu 2015). So, it is a fact that the construction company will not be able to control the effect of the devaluation of the local currency, however that can control their reactions toward the economic crisis.

According to Emiedafe (2015), the Effects of Naira Devaluation on the Construction Industry are:

- Reduction in government construction projects
- High costs of doing business
- High costs of housing and properties
- Rise in interest rate and cost of borrowing
- Low employment outlook for construction professionals
- Increase in construction project abandonment

All these effects had some adverse effects whether direct or indirect on the construction industry as the construction companies faced liquidity problems. So, the construction companies set and implemented some turnaround strategies in order to survive during the economic turmoil. This research paper will discuss the 6 most important turnaround strategies.

After studying the Nigerian turnaround strategies, the diversification strategies implemented by the Thai construction companies will be analyzed.

There are three different types of diversification, Vertical Integration, Horizontal Diversification and Geographical Diversification. These three types will be introduced later in this research in order to analyze their performance and relation to the market business cycle.

2.2 Turnaround Strategies

The turnaround strategies are the techniques and strategies to decrease the operation cost. This can happen through various methods. The most common techniques to reduce the operation cost are reducing the overhead costs, avoiding cost estimation errors, avoiding wrong assumptions and/or downsizing the workforce. In this section, the techniques used by the companies located in South Africa and Nigeria will be identified in order to learn their effectiveness on the companies' standing.

Figure 1: Turnaround Techniques

2.2.1 Reduction in Overhead Cost

Overhead costs affect companies in different industries. However, it affects the construction companies in an enormous way, as it is an ongoing expense through the project life cycle, so it is a running cost. It can be divided in two main types of expense: Direct Overhead Cost, and Indirect Overhead Cost.

Emiedafe (2015) has defined the Direct Overhead Costs and the Indirect Overhead Costs as follows:

Direct Overhead Costs:

The Direct Overhead Costs vary from one type of projects to another. It depends mainly on the type of job to be performed. However, the most common Direct Overhead Costs in a construction project are as follows:

- The Temporary facilities associated with project, such as laydown area, Company's quarters and on-site office space and facilities.

- Project-specific salaries: for foremen, schedulers, engineers and job superintendents.
- Job-specific equipment rentals: such as jackhammers, cranes, bulldozers and backhoes.
- Temporary utilities: the sanitation facilities and drinking water necessary for any job site.

Indirect Overhead Costs:

The Indirect Overhead Costs are the general expenses incurred not on a specific project but on the business in general. These costs are usually a regular payments or fees. These types of costs are usually:

- The salaries and benefits of all the employees that are not working directly in a job site activity, such as the administrative employees and the project management employees.
- The operational expense of the company's headquarters, such as the renting fees, the electricity fees, the phone and internet fees, and the insurance fees.
- Different types of ongoing expenses such as Marketing, travel costs, legal issues, and supplies.

It is clearly revealed that the overhead costs are various and numerous and can directly affect negatively the cash flow of construction companies. So each company should set effective strategies to reduce the overhead costs to be able to fund more on the operational activities.

The following are some ways to checkmate your overhead costs;

- Reduction of administrative cost such as salaries and benefits of senior executives, employees and other personnel.
- Selling or leasing underutilized equipment.
- Re-examining the need for your company-owned vehicles.
- Reduction in office expenses such as office rents or lease and other general expenses such as supplies, utilities, phone bills, office equipment and furniture etc.

- Cross-training employees to get the most out of each worker.
- Outsourcing your information technology, accounting and office tasks.
- Reduction of miscellaneous indirect cost such as marketing and advertising cost, legal fees, charitable donations and other contractual professional services e.g. auditors etc.

2.2.2 Outsourcing of Jobs

Whatever the specialization of the construction company is, they have to start thinking effectively to optimize the number of skilled labor engaged to the company. This will help to minimize cost overrun (Emiedafe, 2015).

The company shall not engage all the specialized labors in different fields, as there are some jobs that don't require the daily presence on-site. As previously mentioned that there are some jobs are associated to the Indirect Overhead Costs.

There are some tasks directly related to the project, which are not required until obtaining and signing an agreement. These tasks fall under the Direct Overhead Costs category. So the company can reduce this type of expense by outsourcing them or hiring them on the project duration only. This will affect positively the company's cash flow.

In other word, outsourcing the services will be more cost effective than keeping all the resources in-house as the company will be able to save the cost when the resource is not in use.

Examples of jobs that can be outsourced for the construction industry are:

- Accounting
- Legal Services
- Information Technology
- Quantity Surveyor
- Planning Engineer
- Architect
- Civil/structural Engineer
- Geotechnical Engineer

2.2.3 Avoiding Cost Estimation Errors and Budget Overruns

The fact that no one can deal with in the construction industry that the cost overrun is unavoidable. There are many reasons why the construction projects exceed the budget and goes beyond the estimated cost (Emiedafe, 2015).

The most common reason of why the project can exceed the estimated budget is the price fluctuation. Due to the devaluation of the Naira, the local currency, the prices of materials started to hike in a tremendous way based on the exchange rate. This increase in material prices directly affected the Nigerian construction industry, as it is import-based industry.

So, the conclusion is that if there is no enough care taken while estimating for a new project, the construction companies will face huge liquidity problems that will be unrecoverable. In order to avoid any frustrating results, here are some tips that each company should consider in order to avoid any cost overrun or estimation errors:

2.2.3.1 Watch Out for Omissions:

There are some items that are usually left out of the estimate. These items can be indirect fees such as permits fees, or direct construction items. Usually land development exceeds the estimated budget. In addition, the fluctuation in prices in some materials, such as exhaust fans, can be much greater than expected. The normal mistake in pricing such items can vary the budget thousands of Naira (Emiedafe, 2015).

Omissions are usually happening due to the missing item from the detailed drawings and/or the project specifications. In order to avoid any omissions in the project a suitable checklist has to be developed and used for each type of project.

2.2.3.2 Avoid Wrong Assumptions:

This is a very common broad error that happens in almost all the projects. It is a miscommunication issue between the project documents or between the parties. Usually it happens when the contractor doesn't receive good and detailed explanation of what is expected from him. So he performs the work according to his assumptions, which are not the same as the Employer's assumptions (Emiedafe, 2015).

The best solution to avoid wrong assumptions is to develop contract documents (Contract, Drawing, Specifications) that are very clear and very detailed describing what is expected from each party engaged to the contract.

2.2.3.3 Price Changes:

All types of costs can be changed due to numerous reasons, especially the material and equipment costs. So the contractor should study well both costs and negotiate with the suppliers to lock the agreed upon prices during the project duration. Additionally, the contractor should not leave any resources that are not currently in use to stay at the project. However, if a resource will remain idle for certain duration, the budget of this duration must be calculated in a good manner from the beginning of the project. this should be applied especially on the rented resources (Emiedafe, 2015).

2.2.4 Prudent Management of Cash

In critical economic situations, such as the currency devaluation, construction companies need to be prudent and not extravagant while managing and using their cash. Since the volume of construction projects deduces in such difficult times, the companies' revenues also decrease, which means that the companies become conservative until the economy stabilizes and the inflow of new projects increases.

According to Emiedafe (2015),

- If prudent cash management is successfully implemented, it shall lead to efficient disbursement and use of cash, controlled and planned collections, profitable investments and hence business success.
- However, if prudent cash management is not rightfully applied and the company finds out that its expenses are intensely augmenting, it goes into a loop of failures that starts with the increase of investment of owners' capital, which leads to credit worthiness weakness, so the company becomes unable to take advantage of new opportunities and hence business failure.

The aim of this method is to ensure that construction companies don't run out of operational funds during tough economic turmoils. Therefore, attaining a wide comprehensive knowledge about cash management is crucial and beneficial to the company.

2.2.5 Accepting Low Profit-Margin Projects

Construction companies always aim projects that ensure high profit margin. However, when currency devaluation occurs, the country's average total expending decreases as the money supply decreases. Not only the government expending reduces but also potential clients are affected and construction budgets are constrained. Thus, company can benefit in these times by working with numerous companies/clients, increasing the company profile, but with less profit. In other words, companies can accept low profit-margin projects until the economy revives instead of rejecting projects with low profits as the consistency of operational work, even with low profit, is better than not operating at all (Emiedafe, 2015).

2.2.6 Downsizing Workforce

Labor cost is for sure an enormous cost for construction companies; this is due to the volume of manpower needed to work in the projects. Thus, downsizing your workforce is a certain approach to remain afloat as a construction company as it will effectively cut the company expenses (Emiedafe, 2015).

Back to the Nigerian experience. The construction sector in Nigeria contributed about "70% of the country's gross domestic product (GDP)" and the government is considered the greatest wellspring of construction projects. Therefore, the government experienced a significant decrease in its revenues, which led to their inability to settle the debt of N500 billion owed to construction companies. President of the Federation of Construction Industry (FOCI), Mr. Solomon Ogunbusola; declared that the construction companies have downsized their workforce to enable them to survive (Emiedafe, 2015).

In his words: "the construction companies in Nigeria are working below 30 percent, not because we are interested in doing this, but we have been handicapped due to lack of payment by our clients and the major client we have today is the government (Federal, State and the local governments).

Our members are indebted to the banks. I can say authoritatively that the banks are writing and threatening some of our members, that they would publish their names that they are chronic debtors because, according to them, it is a directive from the Central Bank of Nigeria".

After researching and studying the Nigerian experience with the techniques they used to confront the economic instability, the following part will explore another case study, which is the Thai experience. Thailand has also faced a currency floatation similar to the Egyptian one, therefore, it is useful in this context to analyze the techniques they used different than the Nigerian ones. Whereas Nigeria used turnaround techniques, Thailand tried several diversification techniques, which will be studied in details in the following section.

2.3 Diversification Strategies

Diversification can be defined as the procedures a company takes in order to extend their business range and operation. This process can occur by creating a new production and services line, which requires internal and external managerial changes (Hillebrandt and Cannon 1990). Without changing their previous activities, the companies can proceed into the production of new products. (Ai-Lin 2002). Certainly, it can be observed that a country development can be influenced by the construction demand, which is correlated with the national demand. Therefore, in such economic turmoil periods, flexibility is the option to defeat instable demand. Thus, diversification can be considered as the best flexible method a construction company can apply to increase their opportunities into different markets (Ansoff 1969).

Usually, companies depend on their durable products market demand; generally, the demand cycle involves several essential stages. First, the introductory stage, which consists of researches on market behavior upon introducing the product, then, the progressing or growth stage is to implement sales of the products and then maturity stage that analyze the challenges, benefits, market competition and the costs of the product.

(Ansoff, 1969). For instance, a construction company will operate the downturn stage in the maturity period. Planning alternatives for the company management and strategy is essential; besides, it is important for the company to increase its market share by introducing new product substitution in old markets and promotes it into new market (Ansoff 1969)

Hillebrandt, Cannon and Lansley (1995) and Ansoff (1968) claims that economic turmoil can be a reason to diversification based on several factors, one it can be a reason to efficiently utilize all the company resources, to avoid any decrease in the market operational system of the company, overcome hard work circumstances

During economic instability, companies can engage in diversified work line in order to reduce the company loses, therefore, by initiation many business lines the company can compensate the costs and losses by the new products introduced into the market (Hillebrandt, Cannon and Lansley 1995).

Moreover, diversified companies can reap the advantage engendered by market power and resource power.

By applying this method, the construction companies will be able to increase their sales, which will improve their business status in the market. This diversification can be in products that are difficult to obtain or replicate or even substitute, which improve the company's performance (Amit and Livnat 1988). As mentioned above, economic turmoil is highly related to the market demand which influences the competition; thus, it can be noted that demand reduction during economic instability period can causes higher competition, which provide to the companies that applies a diversification method higher chances in the market, and decrease the chance of the market negative effects (Aleson and Escuer 2002).

To sum up, it can be claimed that the diversification strategy is an efficient method that can be applied by a company before and after an economic instability period as its main role is to overcome and reduce challenges and costs a company can endure during the economic turmoil.

There are two different types of diversification, the related diversification and the unrelated diversification. These two categories will be introduced in the part below in order to analyze its performance and relation to the market business cycle.

The related diversification will take place when an old company launches a new segment related to the existing one, while; the unrelated diversification is when a firm launches a product that is irrelevant to its previous business activities and system (Douma and Schreuder 2002). Many researches have claimed that the related diversification is more efficient and profitable than the unrelated one, as it merges the same resources with a new product. Besides, the related diversification can reduce costs and challenges by using the same distribution methods, reputation, technology and same management system (Ansoff, 1965)

In 1980, based on porter assumption, being able to compete in a market, a company have satisfied consumer needs at the lowest cost possible or provide them with various substitution (Hillebrandt and Cannon 1990).

By developing strategy around core competence- related diversification – firms can create new strategic assets faster and at a lower cost, leading to gaining competitive advantage.

Furthermore, related activities are capable of creating synergy, consisting of sale synergy, operating synergy, investment synergy and management synergy (Ansoff 1968), which support competitive advantage.

In contrast, when firms diversify into unrelated business, potential synergies decrease and internal governance difficulty increases. Accordingly, only financial assets could be shared, while other types of resources might not be suitable for sharing. As a result of non-shareable nature, when one market declines, whereas another flourishes. Those resources cannot be transferred, leading to overcapacity in one market and insufficient capacity in another. However, unrelated diversification still has its merit. By undertaking unrelated diversification, risk of failure could be spread across several product markets (Aleson and Escuer 2002).

There are various forms of Diversification, but the most important and relevant forms are:

1. Vertical integration
2. Horizontal diversification
3. Geographical diversification

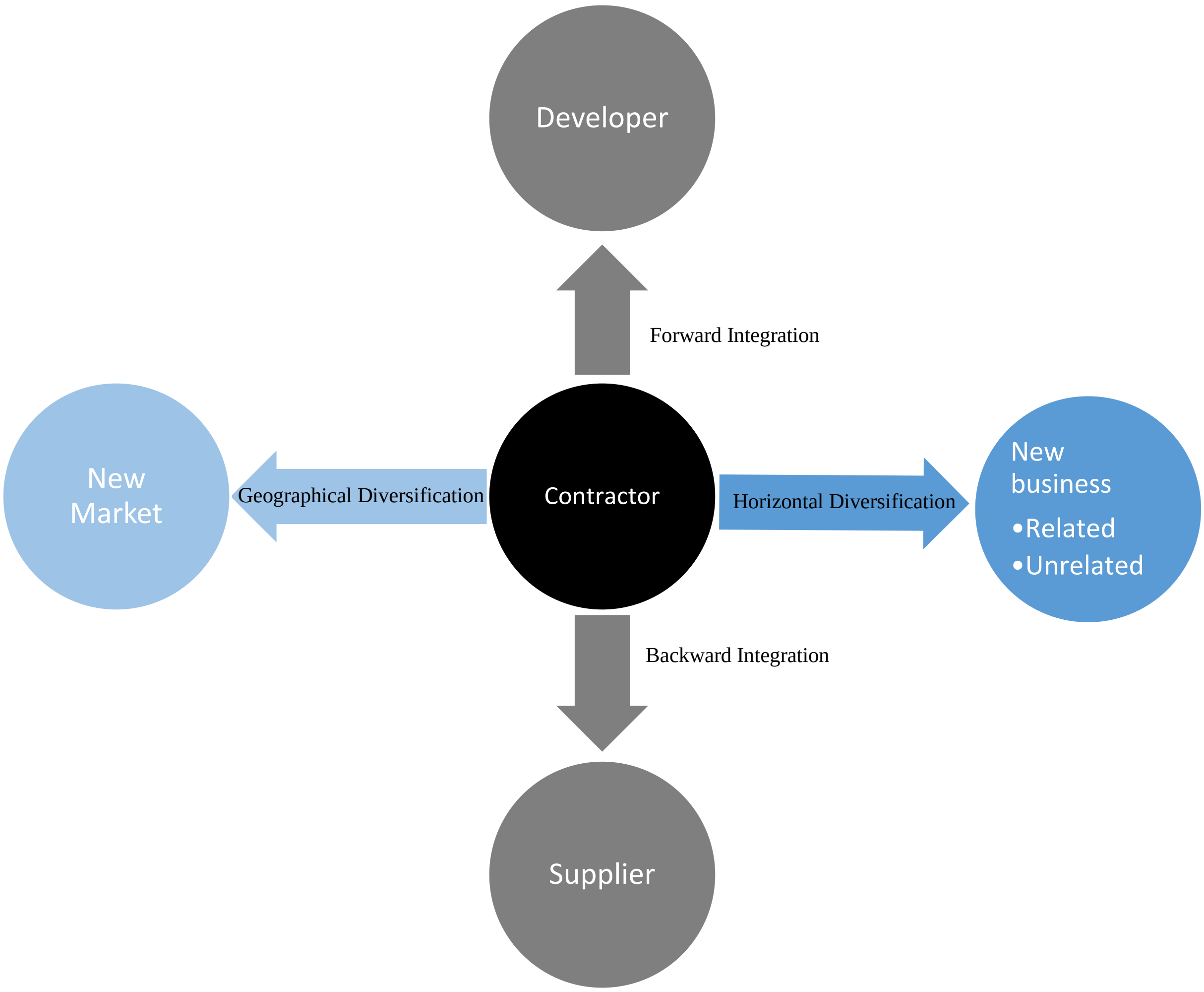


Figure 2: Forms of Diversification (Source: adapted from Johnson and Scholes 2002)

2.3.1 Vertical integration

The vertical integration can be classified into two main categories: forward and backward (Johnson and Scholes 2002). The backward integration can be described as the improvement of businesses whose products are inputs to the company's own main operation, while forward integration indicates to development into activities that are related to the company's outputs (Hillebrandt and Cannon 1989). In another way, vertical integration is when the company develops in term of the in-house functions executed (Male 1991).

Implementing vertical diversification strategy has an important advantage as it reports the issues emerging from market failure and the unexpected arising problems, which reduce the efficiency of the company (Hillebrandt and Cannon 1990). These problems are helping to increase the effect of the economic instability especially when the company become untrustworthy on credit. This problem may reason the stoppage of the construction projects, which will cause a delay in the execution. After employing the vertical integration technique, particularly when the construction company controls the source of supply of materials, the companies will be able to steady the market in which they are working (Langford and Male 1991).

In a fragile market that is exposed to uncertainties and unexpected events during an economic turmoil, enormous transaction costs that must be taken into account. In order to reduce the effect of this problem, the construction companies have to implement the vertical integration approach, as the cost of the internal coordination is much more less than cost of depending on the market (Douma and Schreuder 2002). Thus, vertical integration is a very good approach to deal with the economic instability.

Although the frequency of transaction between parties is not the main reason why one should adopt vertical integration in order to reduce transaction during an economic turmoil because of the reduction in transaction. However, if the firm is dealing with any activities within its chain that comprise asset specificity, uncertainty and complexity, it is then worthwhile to undertake vertical integration (Douma and Schreuder 2002).

As it is a fact that the construction demand will drop enormously during the economic instability, it is also will take a considerable time in order to recover. In order for the construction companies to survive, they will need to create competitive advantage against their rivals. Vertical integration is a good technique to increase the competitive advantage of the company because it will help the contractor to regulate the whole process more effectively and efficiently, as the company will be both the supplier and the developer. This will also help the construction company to bid for lower cost than its competitors (Douma and Schreuder 2002).

Following the concept of vertical integration is expansion of the new activity in the same area as the core activity. Thus, the most crucial risk of vertical integration is catastrophe linkage. Construction industry has its own risk inherent in cyclical demand patterns; the vertical integration cannot be regarded as a means of spreading risk. This is because vertical diversification, almost by definition, is likely to have the same cycles as the original business (Hillebrandt and Cannon 1990). Furthermore, Hillebrandt, Cannon and Lansley (1995) claim that vertical integration seems to be unprofitable and potentially dangerous, especially during an economic instability period because of a decline in demand. Hence, it is crucial for firms to precisely inspect and analyze the market condition.

In their respective studies, Hillebrandt, Cannon and Lansley (1995) have demonstrated that during the economic upturn due to attractive market condition the majority of construction companies in the UK invested mainly in property or speculative house building. In the event of an economic turmoil, this behavior would lead to oversupply in the market and difficulty for the firms since their assets are not able to generate revenue. This sector is perceived as the most unstable constituent of fixed investment and long-period tendency to fall (Matthews 1959). Similarly, Thai contractors, particularly those who work for the private sector, enjoy reaping vast profits from property and housing market during the boom. Once the market collapses, most of them have disappeared from the industry. While contractors who work for public sector suffered the most from possessing specific assets e.g. machinery, which became sunk costs.

All in all, although it seems that vertical integration could be utilized as a responsive strategy because of being able to control supply chain, reduce transaction cost, and create competitive advantage, but due to its main constraint which is catastrophe linkage one as a priority should be aware and consider the implication of this factor.

2.3.2 Horizontal diversification

The horizontal diversification can be defined as the movement of the company to new markets where the company has no engagement in it (Hillebrandt and Cannon 1989). This type of diversification can be either related or unrelated to the actual business of the company.

According to Lansley, the construction companies have to be flexible with their diversification strategies in order to be able to deal with economic instability. It is a fact that the business cycle is essential in any kind of business. Horizontal diversification is an important technique because it helps the companies to spread risks as it reduces the fluctuation in the demand (Hillebrandt and Cannon, 1990). By applying the horizontal diversification technique, the companies are able to spread their businesses and services in another market, so the companies will be able to balance their portfolio between the old markets and the new markets.

Though Hillebrandt, Cannon and Lansley (1995) warn that a economic hardship can create difficulty for those who adhere to this approach.

Generally, the economic instability affects directly the contractor's workload as he starts to reduce it because of liquidity constraints. In addition to the contractor's problem, the client, the private and the public sector, reduces the demand due to the financial constraints too. After this huge reduction in the demand and supply, some contractors tend to bid for the project with no or negative profit in order to survive. As a result, the contractor starts to face more liquidity problems that prevent him to expand in the existing market (Gruneberg and lve 2000). Accordingly, it is better to implement related or unrelated horizontal diversification rather than bidding with low profit, as it will increase the profit opportunity of the company.

During an economic instability period, there is an empirical fact that states that the companies usually suffer overcapacity. So, based on this fact, the companies may develop a horizontal diversification strategy that allows the company to use of the excess idle or unused resources (Montgomery 1994). Since the company's resources directly affect the profit margin and the diversification direction of the company, the company should look forward to implement a relevant diversification technique. The related diversification will allow the contractor to utilize the existing resources in more than one activity, which will lead to cost saving as the contractor will reduce the number of resources hired. Therefore, horizontal diversification is a very good strategy to respond to the crisis.

As stated before that competitive advantage can be created through vertical integration, it is also can be made through horizontal diversification. This is because when the contractor expands in his type of services or scope of work, he increases his power and capacity in the market (Montgomery 1994). The horizontal diversification can be very beneficial to the contractor as it could help the contractor gaining more recognition from the client. As an example, some of the contractor adds to their scope design stage; so the company becomes a design build company. Some of the clients might go to the design build company as it will be a time and cost saving as he can make an overlap between the design and the construction and the indirect cost will be charged by only one company.

Although there are various advantages in the horizontal diversification strategy, there are also many disadvantages that each company should know. Definitely, a company applying a horizontal diversification strategy will face many unexpected conditions as they are expanding into new areas. Given that the staff and managers are immature in the new area, they can face some problems and fail to deal with them.

In the boom construction companies had money to invest, while in the downturn the shortage of capital and fund results in firms being unable to maintain those businesses (Hillebrandt, Cannon and Lansley 1995), and Aleson and Escuer (2002) state that costs of such as distribution or training new managers or increase in coordination and control problems emerge in the organization which diverges from its core business. In addition, the marginal profits generated by high level of diversification i.e. those that are far removed from core competence will be perceive as a decline in the profitability (Aleson and Escuer 2002).

2.3.3 Geographical diversification

The geographical diversification can be defined as the movement of the company's work into new geographic markets either nationally or internationally (Element Economic web and Johnson and Scholes 2002). However, as the Egyptian market is passing through a deep economic hardship, the research paper will study the local geographic diversification but it will focus more on the internationalization.

The best approach to conquer the issue of financial cycle is to spread operations to different areas so that in any event the good and bad times of national cycles don't overlap (Hillebrandt and Cannon 1990) since the development of the construction business in every country has its own particular cycle i.e. the planning of business cycle in various nations is for the most part unsynchronized. Subsequently, geographical diversification is as fruitful at spreading hazard as horizontal diversification, and maybe far better. Hillebrandt and Cannon (1989) likewise highlights that the geographical diversification helps to increase the company's revenues and benefits the company in terms of spreading the risks or lessening the extent of high-hazard organizations in the "portfolio" of the organization. Geographical diversification technique would empower contracting organizations to diminish and stay away from hazard, for example, it will manage the instability of the demand in the local market and gives an opportunity to maintain and survive during the economic instability.

It is declared in Aleson and Escuer (2002) that construction companies used the geographical diversification technique in terms of resources based approach will have an advantage of efficient use of their own resources and the flexibility in the resource allocation. The benefit of using this technique is very similar to the benefit of using the horizontal diversification approach in order to be able to survive against the economic hardship.

The internationalization of a construction company will give the company a competitive advantage. As it is very easy for the multinational company to market its name through different countries since it will have a famous name and good reputation which will also help the company in the new market and give the opportunity to expand (Douma and Schreuder 2002). In addition, internationalization procedure can give more extensive information and experience to the construction company, which learnt from various locations. This can improve company's productivity. If a new innovative information and more extensive experience can be connected to the learning of the company in order to enhance its execution e.g. new system learnt from abroad markets which help to decrease cost, that new information may help the construction company to have the upper hand and get the lead in the local market whose learning is very limited (Hillebrandt and Cannon 1989).

Most of the construction companies face many obstacles in the internationalization due to the uncertainty in the international market and some complexity (Langford and Male 2001). The multinational construction companies have more risk to be powerless as there are enormous uncertainties and variations in the government policies that occur in various countries unexpectedly, especially the development countries (Mawhinney 2001). Besides the political problems the companies may face in the international market due to uncertainties and unexpected variations in laws, the construction companies may also encounter some economic and market problems, which will help to increase the overall difficulties in the international market (Pennings, Barkema and Douma 1994). These issues can become much more severe and can result huge disaster during the economic instability period in a developing country.

The empirical evidence demonstrates that overseas project costs are perhaps one or two times as those of domestic projects of the same size (Hillebrandt and Cannon 1989). Those costs are generated form heavy coordination costs, which may not be offset by the benefits derived (Wah 1998). In addition, this problem would be significant for faraway overseas projects. Finally, climatic and geographic risk such as flood or other natural phenomena mentioned by Howes and Tah (2003) could cause further operational difficulties because of its unpredictable nature and unfamiliar surroundings.

The geographical diversification strategy can be implemented by using one of the following methods: Internal Growth and External Growth. External Growth includes the techniques of merging, consortium and joint venture. The internal growth empowers the companies to study and comprehend the market, which enable the company to have the lead of the market and create a competitive advantage for the company against its competitors. On the other hand, in a fragile market that pass through an economic hardship, to depend on an internal growth only will lead to a very slow growth of the company as it will need a lot of time to employ and engage skilled employees to the company (Hillebrandt and Cannon 1989).

In order to grow in a quicker way, the companies have to implement the external growth technique, as it seems to be more effective and more efficient (Ansoff 1969 and Johnson and Scholes 2002). While acquisition may require a greater amount of payment, compared to the other, this could be a constraint during the economic turmoil. However, it does facilitate operation of the organization due to clarity of ownership. If the company considers international expansion, the joint venture and consortium are considered as very strong methods as it comprises low risk and quick approaches to success (Langford and Male 1991, and Johnson and Scholes 2002). At the end, the most suitable and compatible techniques is chosen based on the companies' capabilities and the condition of the market in which the company is contributed.

2.3.4 Trend of diversification affected by economic hardship

This section is based mainly on Hillebrandt, Cannon and Lansley (1995) Economic crisis can bring about the change in form and direction of diversification. This is because, sometimes, anticipated plan, whether vertical horizontal or geographical diversification may not reflect expected results. Observing the experience of UK contractors, during 1980's boom, their turnover grew considerably, therefore in order for long term growth they were diversifying into both construction-related businesses and little-connected businesses. However, once economic hardship had set in, most of those businesses, particularly unrelated activities as a reason of immediate survival were sold out. From the experience, most of them stressed they would not go into unconnected business again.

Some had moved on to public sector or utility concession, while the development of specific niche market as specialized contractors becomes another strategy to reduce high competition.

The overseas construction markets were the areas that had been neglected during the construction boom in the UK. Although they possess the capability to do so, most chose to operate domestically (Langford and Male 1991). Internationalization was considered seriously after the domestic market declined and as a result of wanting to spread risk to contra-cyclical areas. This situation, I believe, can also apply to Thai contractors who emphasized upon only domestic works and some large contractors had undertaken projects aboard but not continue because they had never thought about the reduction of workload.

After the crisis, the UK contractors do not see the need for control over a wide range of site-related activities such as the possession of supplying organization. They believe that the marketing is capable of dealing with segment activities. In addition, by introducing supply chain management in which value can be added through the chain, transaction by relying on market may be more advantageous, especially during the economic instability period as they do not possess a high number of fixed assets.

2.4 Conclusion

After studying the Nigerian, South African and Thai experience, nine strategies were identified that were implemented by the construction companies that have helped them to survive during the economic turmoil. These strategies are briefly:

1. Reduction in overhead costs.
2. Outsourcing of jobs.
3. Avoiding cost estimation errors and budget overruns.
4. Prudent management of cash.
5. Accepting low profit margin projects.
6. Downsizing workforce.
7. Vertical integration.
8. Horizontal diversification.
9. Geographical diversification.

These strategies will constitute part of the expert interviews in order to analyze whether they are applicable to be implemented in the Egyptian markets or not and the efficiency of each strategy if implemented.

3 Chapter 3: Data Collection and Analysis

3.1 Introduction

After identifying the strategies used by the construction companies in similar foreign countries, the identification of the strategies used by the Egyptian companies during the economic instability should take place. Thus, a questionnaire has been developed in order to identify the strategies used by the Egyptian contractors. The questionnaire will also enable the expert engineers in the Egyptian market to rate the applicability and efficiency of using the identified strategies in the literature review in Egypt.

3.2 Developing Expert Interview Questions

As previously explained in Chapter 1, the interviews were conducted with expert engineers (experience +15 years) in medium size and large size contractors in the Egyptian Market in order to obtain reliable results and achieve the goal of this research.

The interview questions have been developed in order to identify the main strategies implemented by the Egyptian companies that have helped them survive during the economic hardship period. The interview is also testing the applicability of implementing the strategies identified in chapter 2, Literature Review, that have been used in foreign countries (Nigeria, South Africa, and Thailand) onto the Egyptian companies.

The interview questions are divided into four main sections as follows:

- Section (I): is structured to investigate the company’s nature and size to verify that the required criteria apply to the company and ensure the reliability of the results. This section is mainly collecting generic data about the respondent and his company such as, the position/title, company name, company size, number of employees and the employees’ turnover rate.
- Section (II): is structured to identify the effect of the devaluation of the local currency on the company and how the companies responded during the economic hardship to survive. In this section the respondent begins to list the strategies and techniques that the company has implemented in order to survive during the economic instability, how the company has implemented this technique, why they chose this technique, the

advantages and disadvantages of each technique/strategy, and the reason of success/failure of each technique/strategy.

- Section (III): is structured to assess if the companies have applied the Turnaround strategies identified in Chapter 2, Literature Review. The Turnaround Strategies used by Nigeria are presented to the respondent in order to rate the effectiveness of using each strategy/technique in Egypt. If the respondent states that the strategy/technique is not effective if applied in Egypt, then the respondent should justify the reason of non-effectiveness from his point of view.
- Section (IV): is structured to assess if the companies have applied the Diversification strategies identified in Chapter 2, Literature Review. The Diversification Strategies used by Thailand are presented to the respondent in order to rate the effectiveness of using each strategy/technique in Egypt. If the respondent states that the strategy/technique is not effective if applied in Egypt, then the respondent should justify the reason of non-effectiveness.

It is worth mentioning that during the interview, the interviewees were asked about the strategies and techniques they have already implemented before presenting to them the strategies and techniques used by the companies in foreign countries. This has been made intentionally as this way will help in identifying different strategies other than the ones already concluded in the literature review.

3.3 Sample Selection

As previously specified in Chapter 1 and as shown in Appendix A, the criteria of selecting the interviewees and their companies (samples) are as follows:

- The sample company should be a member of the Egyptian Federation for Construction & Building Contractors and classified as first category contractors. In this research, the first category contractors will be classified as follows:
  - Large corporates that have contracts amount of more than EGP 500 million/year.
  - Medium enterprises that have contracts amount ranges from EGP 100 million/year to EGP 500 million/year.
- Different scope of work: civil, finishing, MEP and/or general contractor.

- The interviewees should be experts engineer with minimum of 15+ years of experience in the contracting field.
- The interviewees should have sufficient knowledge about the strategies and techniques used by their companies.

3.4 Sample Size

After consulting the Egyptian Federation for Construction and Building Contractors, it was found that 100 Companies registered in the Egyptian Federation for Construction and Building Contractors, classified as first category contractors, and satisfying the previous mentioned conditions in this research. Hence, the needed experts interviews to be performed are 20 to be able to get a 95% confidence level with 20 confidence intervals. The number of samples used in the survey is important for testing the validity and the degree of confidence in the data. Although the number is relatively low, it is still very hard to find suitable engineers for the study when the criteria is set to be 15+ years of experience and a high managerial position for the credibility of the study as shown in Appendix A. Statistically, the below equation is used in order to determine the sample size:

$$Sample\ Size = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + (\frac{z^2 \times p(1-p)}{e^2 N})}$$

Where,

N = Population Size
e = Margin of error
z = z-score of the 95% confidence level (1.96)

Confidence Level: The probability that your sample accurately reflects the attitude of your population. The industry standard is 95%

Margin of error: A percentage that tells you how much you can expect your survey results to reflect the views of the overall population.

$$Sample\ Size = \frac{\frac{1.96^2 \times 0.5(1-0.5)}{0.20^2}}{1 + (\frac{1.96^2 \times 0.5(1-0.5)}{0.20^2 \times 100})} = 19.36 = 20$$

3.5 Interview Conduction

As previously explained, the interviews are conducted with expert engineers, +15 years of experience, who are working for medium and large size contractors. Due to the tight schedules of these experts, not all the experts were able to book part of their schedule to share their experience with this research. Thus, from twenty-five (25) requested interviews, only twenty (20) interviews were actually conducted. The interviews took place at the experts' offices at their contracting companies. Each interview took from 30 to 45 minutes including the introduction of the topic and all the questions and answers/comments.

3.6 Analysis of the samples

The survey was conducted with different contractors in the Egyptian market matching the research methodology selection criteria illustrated earlier in chapter 1, among which 40% consist of medium size enterprises (Portfolio: Awarded contracts from EGP 100 to 500 Million/year) and 60% consist of large size corporates (Portfolio: Awarded contracts of more than EGP 500 Million/year).

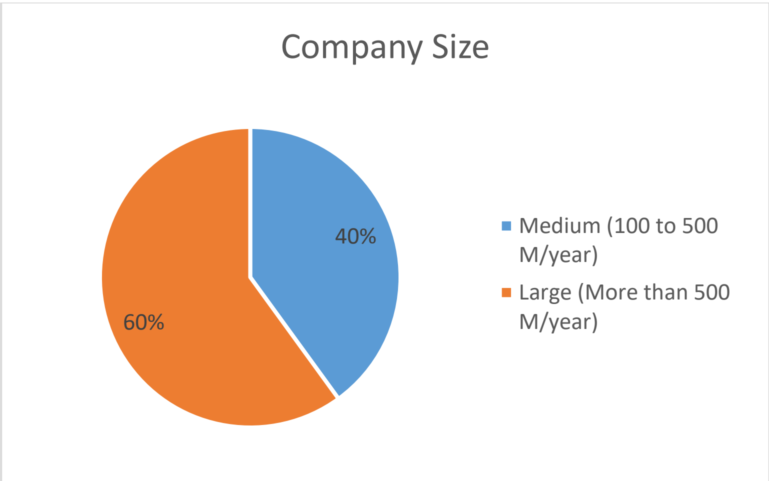


Figure 3: Sample companies' sizes

The numbers of employees in the sample companies varies from one company to the other, where 50% of the companies have more than 500 employee, 35% of the companies have from 100 to 55 employee, and the remaining 15% have less than 100 employee.

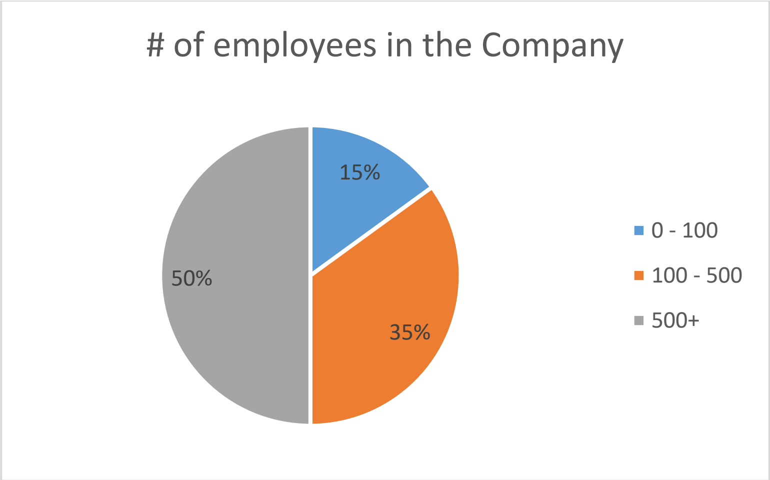


Figure 4: Sample companies' number of employees

While 85 % of the sample companies have employees turnover rate less than 25% and the other 15% of the sample companies have employees turnover rate from 25% to 50%.

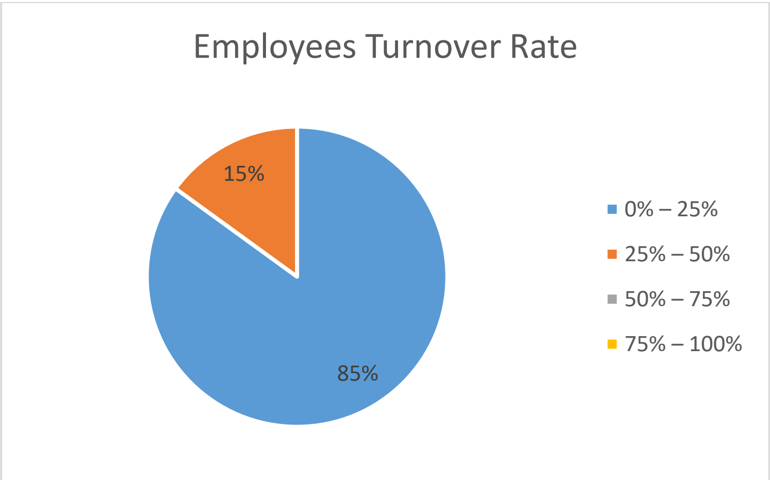


Figure 5: Sample companies' employees turnover rate

The interviewees experience varies from +15 years of experience and +35 years of experience, where 55% of the interviewees have from 15 to 25 years of experience, and the remaining 45% have more than 25 years of experience as shown in Figure 6 and Appendix A.

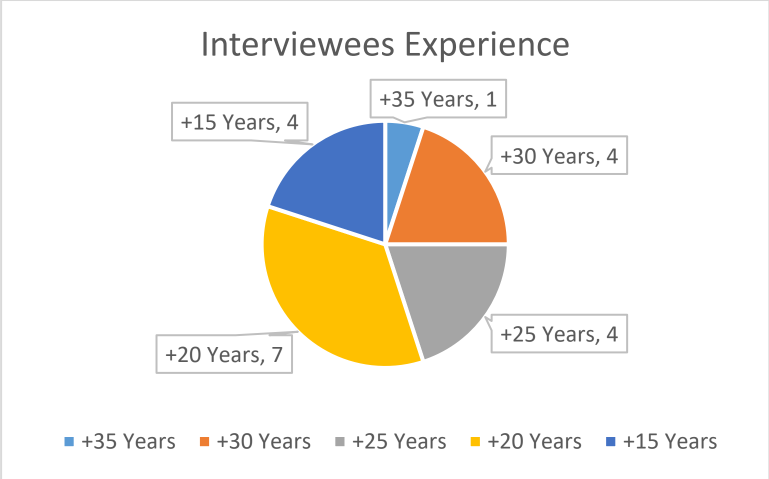


Figure 6: Interviewees Experience

While around 10% of the sample companies managed to continue their projects without suffering negative effects from the Egyptian pound devaluation as they got awarded several contracts during the economic hardship period, the rest 90% were highly affected (Figure 7). The below survey findings analysis shows how both types of companies survived the devaluation and how they evaluate the effectiveness and shortage of each applied strategy.

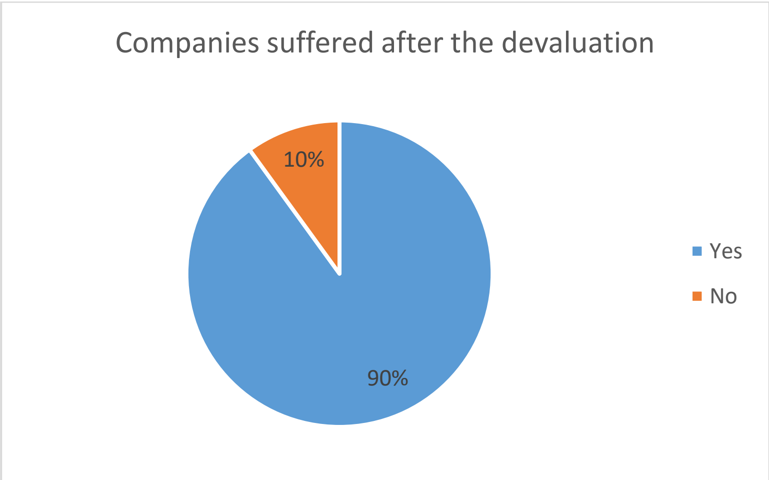


Figure 7: Companies suffered after the devaluation

3.7 Analysis of the findings: Strategies applied by the Egyptian contractors

The following section is presenting and analyzing the common strategies and techniques used by the interviewed companies in order to survive during the economic instability period. During this section in the interview, the interviewees have clarified how and why they have utilized these strategies. And how they think these techniques affected the growth rate of the company, uttering the advantages and difficulties of each strategy:

3.7.1 Reduce overhead cost

Among all the techniques used by the interviewed companies, the second most used technique is reducing the overhead cost as shown in figure 8. The companies reduced their overhead costs such as; renting smaller workplace, reducing salaries of new hired employees and incentive bonuses of existing employees. The main goal of using this technique is to reduce the overall cash out of the company. In contrast to reducing the company's costs, it worth highlighting that applying this practice may adversely affect the self-esteem of employees, which in its turn could negatively affect the quality of work and the added value of each labor. However, based on the experience of the interviewees, this strategy has proved to be efficient as it succeeded to decrease the cash out and improved their companies' cash flows.

3.7.2 Negotiate to amend contract price

This strategy depends on the negotiation skills of the company, and it is used in order to reduce the losses due to the price increase of imported materials. Hence, in this context, the benefits of using this strategy are reducing losses and improving the cash flow of the company. Despite the fact that this strategy is the most effective one based on the survey, it is difficult to be applied due to the difficulty of negotiating and convincing the counterparty to re-price the contract. Negotiations take long time to finally reach an agreement convenient to all parties. However, as an overall assessment of amending contract price technique, it is considered successful and most used by companies as shown in Figure 8. In practice, the reason of success as stated by the interviewees is that clients were cooperative and wanted to reach a win-win situation.

3.7.3 Negotiate to receive portion of the contract price in foreign currency

Similar to negotiating contracts amendments technique, this technique also requires negotiation skills from the company's side. The company needs to convince its counterparty that it needs to receive a portion of the contract price in foreign currency in order to use it to import the required materials. Since the devaluation occurred, the exchange rate of the Egyptian pound has been highly fluctuating, therefore, this technique was useful to indirectly stabilize the prices of the imported materials, and transform the uncertainty of cash flow to foreseeable cash flow by securing that the inflows would cover the outflows. The difficulty of implementing this technique still relies on the negotiations part, and in real life even when the two parties reached an agreement, sometimes the clients couldn’t easily find available foreign currency in the market. The availability of foreign currency in the market was mainly a problem during the first few months after the devaluation occurred. Therefore, despite the efficiency and effectiveness of this method, it was not easily implemented. Companies that were able to set agreements with clients strongly benefited from this technique, but unfortunately many of the clients did not agree to implement it.

3.7.4 Accept low profit margin projects

Another method highly used by sample companies is reducing the profit margin gained from projects. In other words, setting lower profit percentages in the tender phase of new projects, which increases the chances of being awarded and winning the projects’ bids. On the other hand, the major disadvantage of this technique is its negative effect on the company’s cash flow. The main conflict of this technique is the trade-off between surviving by winning projects but with lower profit margin or not winning projects and having unutilized resources and stagnant cash inflows. Interviewees expressed the difficulty of deciding to use this technique due to this trade-off, however, it succeeded to help these companies to survive.

3.7.5 Geographical diversification

Companies thinking from risk management perspective applied geographical diversification technique, which means they expanded their portfolio in different countries in order to minimize the political and economic risk of one country and at the same time generate a source of foreign currency inflow. However, in order to maximize the profit, companies targeted aggressive markets, which are the countries that are considered of high risk and hence they offer high return. This technique is moderately used by the interviewed companies who can afford to penetrate into foreign countries based on the companies’ size, culture and needs. This controversial technique reduces the concentration risk while it increases the safety risk by targeting politically risky countries, aiming to gain high profit and foreign currency. In general, the interviewees affirmed that this technique is beneficial to them and it succeeded to fulfill its purpose by generating high profit and a durable source of foreign currency.

3.7.6 Substitute the imported materials with similar local materials

The problem of foreign currency availability in the Egyptian market the first few months after the devaluation trigged another technique used by few companies. The idea is to substitute the imported materials with similar local supplies, but the challenge is to find local suppliers who have good quality of materials. The aim of this strategy is to reduce the total cost and at the same time minimize the need for foreign currency. Additionally, using local suppliers facilitates the ordering and the shipping process and fees, as it reduces the lead-time, which is the time that elapses between placing the order and its delivery to the site. On the other hand, the options are very limited as it is extremely difficult to find similar specifications of the required materials in the Egyptian local market. The limitation of this technique is not only about the lack of available options, but it also extends to the quality standards that are not always available in the local market. Although this technique is useful to reduce the effect of foreign exchange rates fluctuations on the projects budgets, it is not widely used as it lacks practicability and feasibility due to the mentioned limitations of this technique.

3.7.7 Optimize project duration

Moving to the techniques that were used by few companies, optimizing project duration was one of the strategies tried during the economic hardship. Some of companies have attempted to complete the projects even before the contractual completion date. This technique has various advantages if it is adequately implemented. Reducing the project duration will reduce the overhead costs burdened by the project, it will also help in some resource optimization, especially the equipment, as it can help in transferring the equipment instead of renting or purchasing. On the other hand, implementing this technique is a key issue as there are various factors affecting the project duration, such as how frequent does the engineer respond to the correspondences, the lead time of the material.

3.7.8 Get credit facilities from suppliers

In accordance with the target of stabilizing the company' cash flow, few companies managed to get credit facilities from their suppliers. Granting a facility in payment allows construction companies to better arrange their cash flow with some flexibility, and the suppliers preserve their rights through receiving post-dated checks, i.e. checks with future value dates, which present the agreed installments payment dates. Furthermore, this strategy helps companies to distribute their cash outflows over a defined forecasted timeline, which assists them to better allocate their resources and manage their cash flow efficiently. Nevertheless, it is still not easy to convince suppliers to grant companies payment facilities since credit facilities always relax the cash flow of the payer whereas they squeeze the cash flow of the payee. That's why, though this method is beneficial in supporting companies to improve their cash flow, it was not widely used after the devaluation as per the conducted interviews.

3.7.9 Diversify business lines and project types

Some companies had a wider perspective and thought about diversifying their business lines and tackled new projects types. These companies applied examples of unrelated horizontal diversification. For instance, as per the conducted interviews, one of the companies entered into solar energy projects, since there is a market need for this type of projects, and it was successful in means of increasing cash income, however, the disadvantages of entering into such diversified activities is the loss of concentration in the company's main scope of work. That's why before taking the step of establishing new lines of business, companies should study its feasibility with the company's size, nature and needs.

3.7.10 Establish partnerships

Last but not least technique used by the interviewed companies is establishing partnerships with other parties. The main target of this strategy is to support and assist each other in order to increase the liquidity and improve the company's cash flow. Meanwhile, the challenge of this technique is the conflict of interest between parties, because each party could be bias towards certain decisions for its own benefit, neglecting this action's effect on the other party and the general good for the company. Therefore, this strategy is not always successful, and has several challenges that could limit its benefits.

3.7.11 Conclusion

The below bar chart shows the different strategies that sample companies applied to survive against the economic hardship, and the percentage of utilization of each strategy:

1. 65% of companies reduced overhead Costs.
2. 60% of companies negotiated to amend Contract Price.
3. 45% of companies negotiated to receive portion of the contract price in foreign currency.
4. 35% of companies reduced profit margin.
5. 25% of companies applied geographical diversification.
6. 15% of companies substituted the imported materials with similar local materials.
7. 5% of companies reduced projects duration.
8. 5% of companies managed to get credit facilities from suppliers.
9. 5% of companies diversified business lines and projects type.
10. 5% of companies established partnerships.

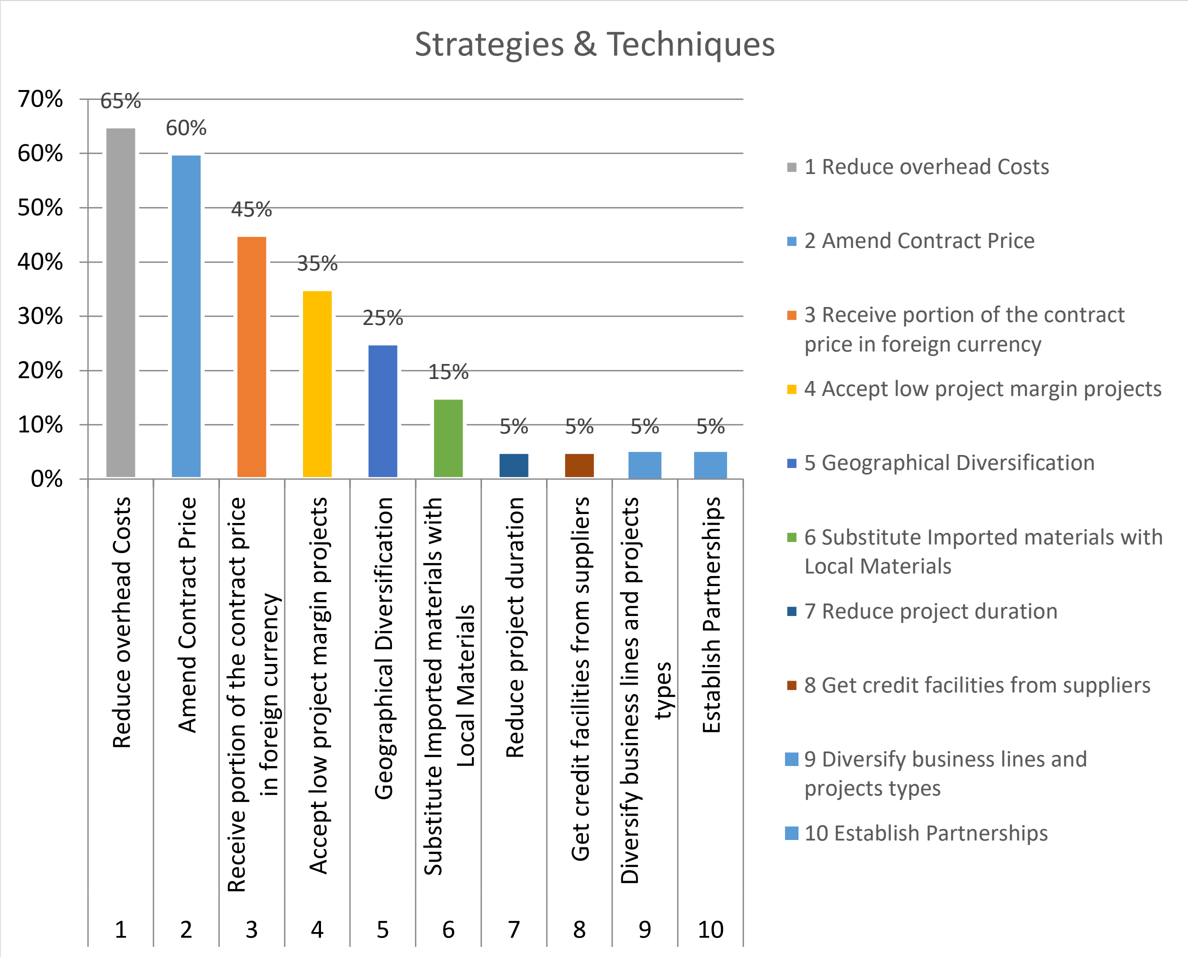


Figure 8: List of strategies and techniques the companies has followed in order to survive during the economic hardship

3.8 Analysis of findings: What do Egyptian companies think about the applicability of the techniques used by other countries?

In order to study and analyze the applicability of the techniques mentioned in other countries' case studies explored earlier in the literature review, an analysis of interviewees' answers on this question section is conducted. Interviewees were asked about each strategy, whether they have applied it or not, and if yes, to what extent they think it was effective. While if the answer is no, then do they think it could have been effective or not based on their experience and knowledge? And why do they think so?

3.8.1 Reducing overhead cost

The first most used strategy by 90% of the sample companies is reducing overhead cost. Interviewees clearly stated that this technique was a must after the devaluation and what it caused of economic hardship in Egypt, as companies could not continue functioning while enduring the same operating indirect costs. Additionally, the interviewees evaluated this technique to be somehow positively effective, since it reduces the cash outflow of the company, but it could not be used solely because companies cannot just depend on reducing indirect costs without finding a way to generate inflows. Therefore, companies used this technique combined with the other techniques mentioned throughout the paper.

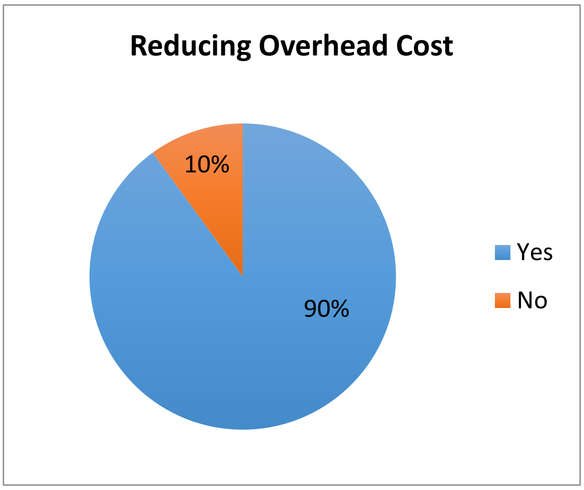


Figure 9: Reducing overhead costs

3.8.2 Outsourcing some of the jobs

Regarding outsourcing jobs technique, 50% of the interviewees outsourced some of the tasks that are not straight in the core operations of the companies. They believe it was effective since instead of running a full department with all its operating costs, they would just pay for specific tasks requested from an external party service provider. Meanwhile, the remaining 50% of the interviewees who did not use this technique, think that it is not efficient because they consider the additional cost paid for getting the service, which presents the profit of the external party providing the service, so the overall cost could actually exceed the cost of operating an internal department to do the requested jobs.

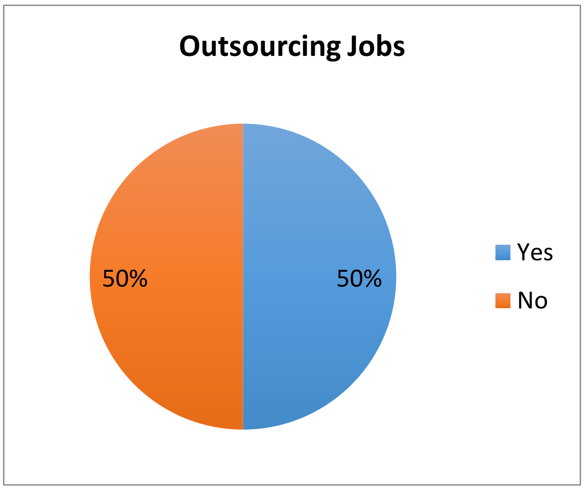


Figure 10: Outsourcing of jobs

3.8.3 Avoiding cost estimation errors and budget overruns

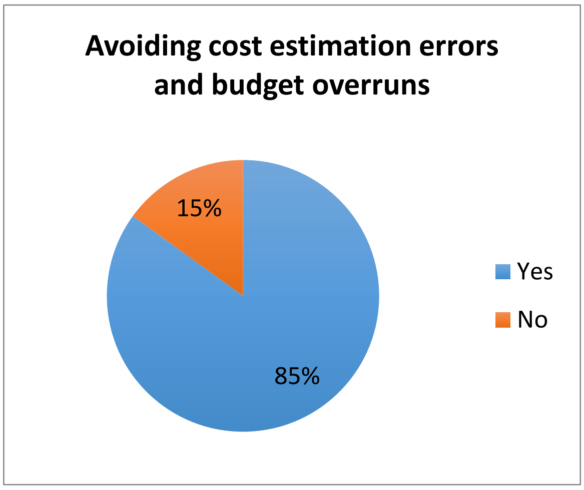


Figure 11: Avoiding cost estimation errors and budget overruns

Since, one of the conflicts that could be faced by construction companies is when estimated projects' costs are lower than the actual costs, most of the companies consisting of 85% of the sample interviews started to focus more on their budget forecasts. During the project's pricing process, these companies put a higher buffer in order to cover any shortages that may occur. Consequently, this technique limits the budget overruns that could occur due to such cost estimation errors or unexpected changes in the country's general economic conditions. Of course this technique is not applicable for the active ongoing projects, hence, it is only applicable for new projects. Companies that applied this technique illuminated its positive effect, while the few companies, i.e. the remaining 15% of the sample interviews, that did not use this strategy, assumed that they do not need to consider that factor as it is a rare case to happen, since usually there do not face cost estimation errors.

3.8.4 Implementing prudent management of cash

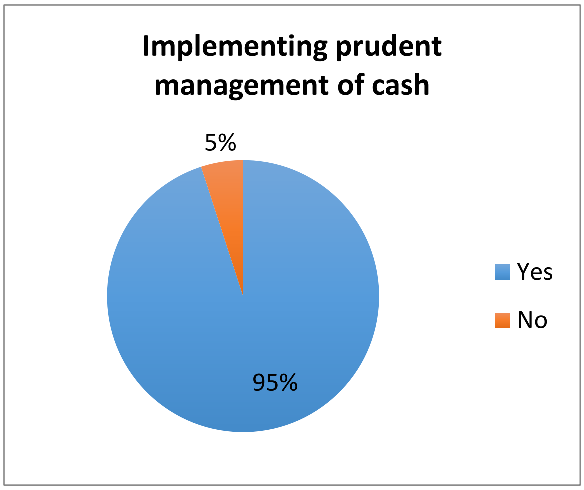


Figure 12: Implementing prudent management of cash

When a catastrophic hike of prices occurs, managing expenditures becomes very critical. That's explains why 95% of the interviewees assured their implementation of the prudent cash management strategy. The challenge is not only to limit cash out, but also how to prioritize the expenses in order to best use the cash resources efficiently and effectively. The interviewees ensured the effectiveness of this strategy. Even the few companies that did not try this methodology still thought that if it was implemented, it would have been effective. One of the benefits of this technique is not only to learn to apply it during economic slumps, but also to improve the employers and employees' awareness with prudent spending manner and how to minimize wastage, which could be beneficial for the company on the long term.

3.8.5 Accepting low profit-margin projects

Another technique widely used by construction companies during phases of economic turmoil is accepting low profit margin projects with the rationality that operating with lower return is better than not operating at all. This method was used by 70% of the sample companies, who expressed their opinion about its effectiveness, as 85% of them think it has positively affected their companies, while the remaining 15% think that it was not that effective. However, the 30% of the sample companies who did not apply this technique thought it would be unserviceable to use it as companies at these rough economic times need high profit projects to recover from the losses occurred from the active projects.

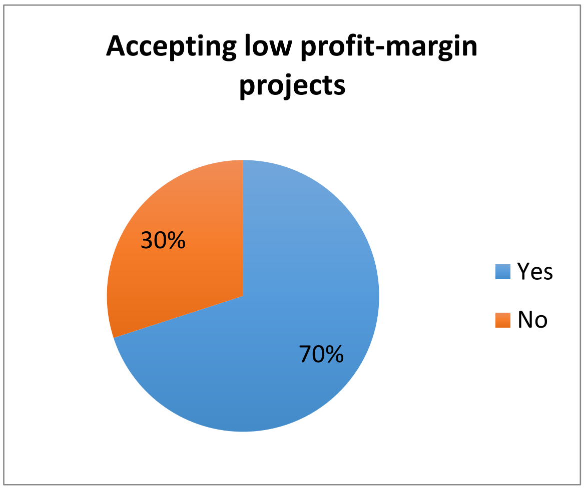


Figure 13: Avoiding low profit margin projects

3.8.6 Downsizing workforce

Although downsizing workforce could greatly cut off the company's cash outflows, it is not extensively used as per the sample companies, since only 45% of them applied this technique. While the advantages of this technique could be easily determined, as downsizing workforce directly affect the cost side of the company, the disadvantages may be difficult to perceive as they vary from

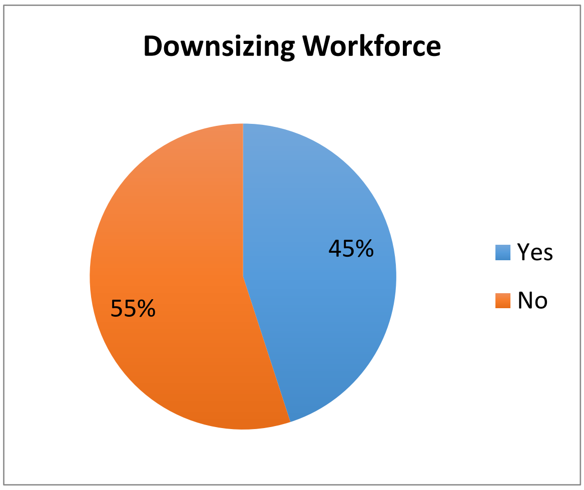


Figure 14: Downsizing workforce

company to the other and from country to the other. For instance, a company may be facing underemployment, which means they have minimal number of employees, or they could just have the equitable number of employees fitting the company's size, hence they could not decrease the workforce as per 25% of the interviewees interpretation. Furthermore, based on 15% of interviewees' perspective, the Egyptian culture also has its influence on the decision, as the Egyptian culture does not encourage employers to just dismiss employees in order to reduce their number. Rather, the construction company would do it in indirect ways, such as avoiding new hiring and preventing extensions of working years for employees exceeding 60 years old. That explains why 55% of the sample companies did not apply this technique.

3.8.7 Applying vertical integration

While the vertical integration technique is applied by 55% of the sample companies only, 85% of the interviewees believe it would be useful to apply it. The reason behind the success of this technique is the added value for the company not only during periods of economic hardship, but the generation of a new source of income to the company and the benefit of attaining a certain level of diversification. That's why, the interviewees ranked this technique's effectiveness to be very positive. Moreover, among the 45% who have not applied it, 30% believe it would have been useful to implement it, and the remaining 15% explained why they thought differently. The problem is not that this technique is not beneficial, but that it could be difficult to implement in some companies, which could be due to the internal factors, such as, the company's scope of work limitation, or external factors such as limited opportunity in a certain market.

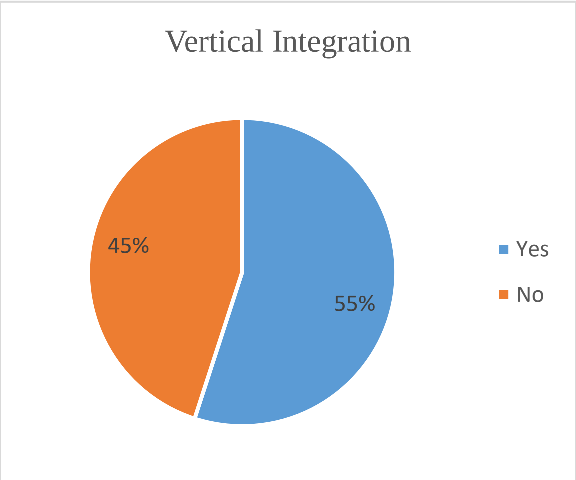


Figure 15: Vertical integration

3.8.8 Applying horizontal diversification

One of the most used strategies is the horizontal diversification as 80% of the sample companies have applied it and they believe it was useful and positively effective. Similar to the vertical diversification, the horizontal one is also beneficial for the company on the long run, since it helps the company to widen its scope of work and attain a diversified portfolio. Therefore, 95% of the interviewees perceived this technique to be useful, even the 20% of the companies who did not apply it. The only 5% of the companies, who believe it is the best technique to be used to help them survive, are the companies who think the markets they are working within have better and wider opportunities for growth than the other markets. Hence they do not want to take the risk in a different market. Nevertheless, this technique proved to be successful for all the companies who have applied it based on the conducted interviews.

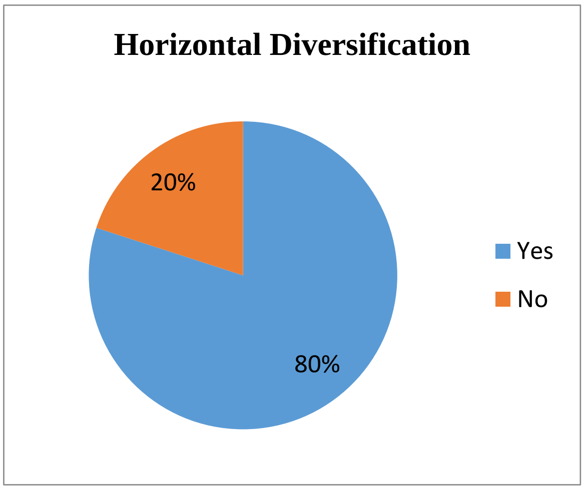


Figure 16: Horizontal diversification

3.8.9 Applying geographical diversification

Last but not least, the geographical diversification technique that has proved to be very successful as well, and implemented by 90% of the sample companies. The idea is simply that the more the company's operations are distributed among different locations and different countries with different levels and types of risk, the better off the situation of the company, as the loss of a project in one country could be offset by the profit generated from another project in a different country, as explained by the interviewees. All the interviewees agreed that this

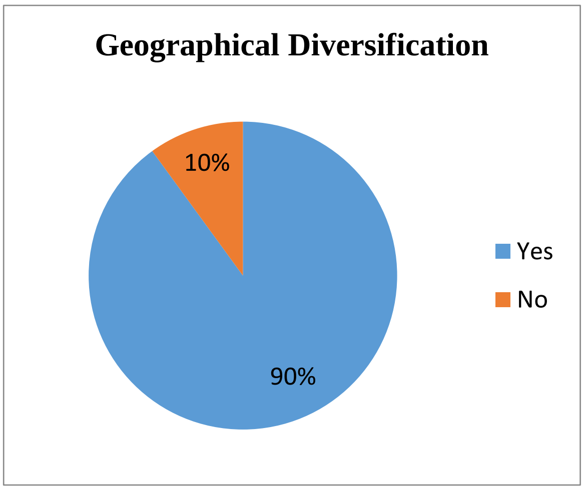


Figure 17: Geographical diversification

technique is very effective, even the companies that were not able to implement it still agreed that it is a very useful technique.

3.9 Overall techniques rating

At the end of the interview, the interviewees were asked to rank all the strategies extracted from the literature survey based on their efficiency, where 1 is the least efficient and 9 is the most efficient. This question was analyzed by calculating the quality points of each strategy/technique, where the quality point was calculated as follows:

$$Quality\ Point\ = (Rank\ 1\ \times N) + (Rank\ 2\ \times N) + \cdots + (Rank\ 9\ \times N)$$

Where N is the number of votes for a specific rank for the strategy/technique.

Table 1: Overall rating

Strategy	Rank									Quality Points
	1	2	3	4	5	6	7	8	9	
Geographical diversification		1		1	1		4	2	11	154
Reduction in overhead cost		3	4					6	7	129
Prudent management of cash			3	2	2		9	2	2	124
Accepting low profit-margin projects		6		3	2		2	7		104
Avoiding cost estimation errors and budget overruns	4		4			7	2	3		96
Horizontal diversification	3			4	6	6	1			92
Vertical integration		3		7	6	4				88
Outsourcing of jobs	4	2	7		3	2	2			70
Downsizing workforce	9	5	2	3		1				43

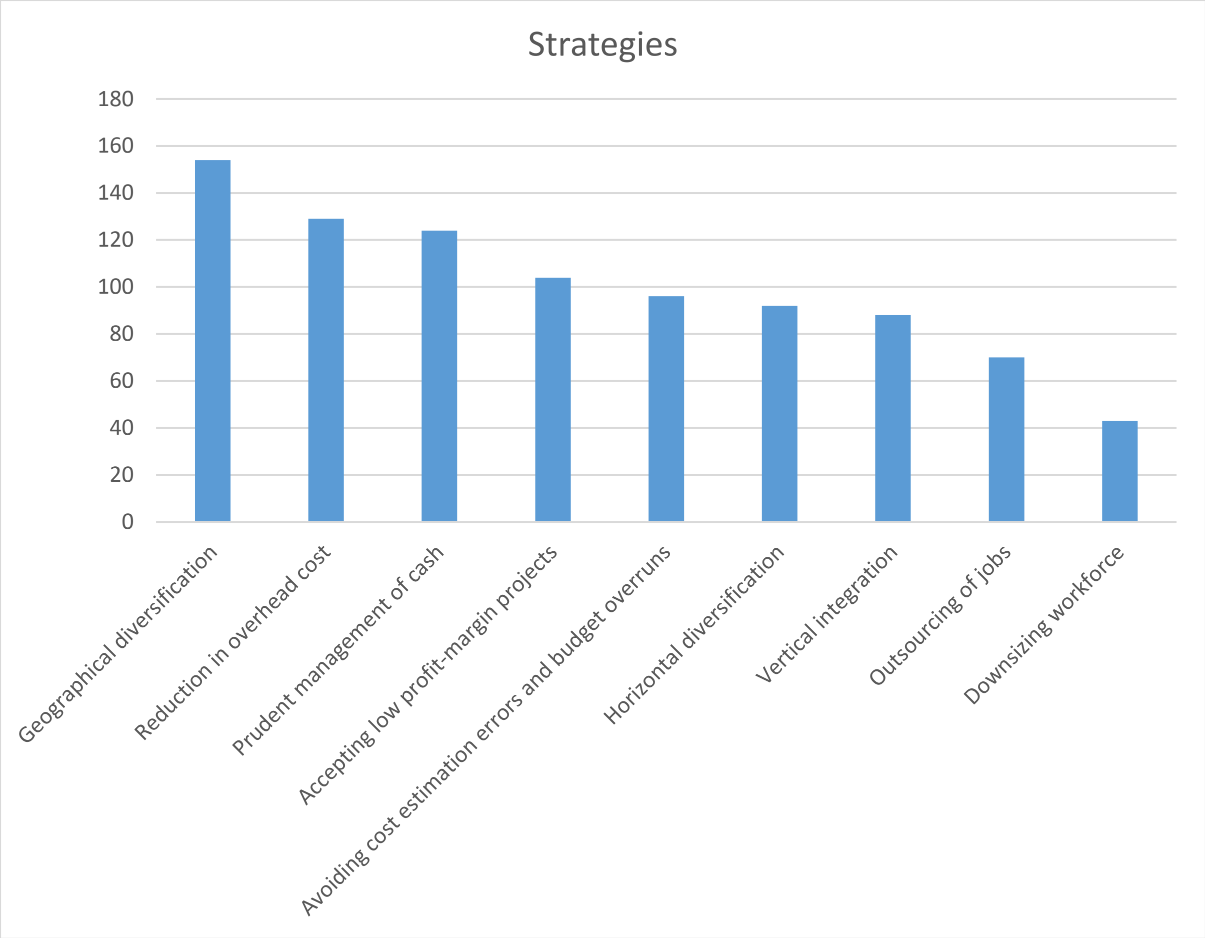


Figure 18: Quality points of the strategies and techniques

It is obvious that the top ranked techniques are the same as the top ranked in the previous sections which confirms that these are the most effective and efficient techniques to be used by the companies in order to survive during the economic hardship period.

3.10 Conclusion

There are some techniques and strategies the Egyptian companies have thought about and have implemented them in order to survive, while there were some other techniques applied in other foreign countries that they believe it would be beneficial to implement them. A conclusion can be easily drawn from the above results that the high ranked and the most recommended techniques from both types, the ones already implemented by the Egyptian contractors and the ones that are implemented abroad and the Egyptian experts identified them to be successful if applied in Egypt are as follows:

a. 95% of the companies have implemented prudent management of cash
b. 90% of the companies have implemented international diversification
c. 90% of the companies have reduced their overhead costs
d. 85% of the companies have planned to avoid cost estimation errors and budget overruns
e. 80% of the companies have implemented horizontal diversification
f. 70% of the companies have accepted low profit margin projects
g. 60% of the companies have considered amending contract prices
h. 45% of the companies have asked clients to receive portion of the contract price in foreign currency.

Table 2: Top ranked strategies and techniques

#	Strategy	Literature Survey	Interview Questions
1	Accept low profit margin projects	■	■
2	Amend contract price	□	■
3	Avoiding cost estimation errors and budget overruns	■	□
4	Geographical diversification	■	■
5	Horizontal diversification	■	□
6	Implementing prudent management of cash	■	□
7	Receive portion of the contract price in foreign currency	□	■
8	Reduce Overhead Costs	■	■

4 Chapter 4: The Framework

4.1 Introduction

In order to validate the results of the research a framework was developed. This framework is a framework that will be used by the Egyptian construction companies as a helping tool to recommend which strategies the company should implement in order to survive. The framework is verified and validated through various approaches as explained on the following sections.

4.2 Framework Development

The Framework is developed to show the impact of applying the survival strategies and techniques on the companies' cash flow. The first step was to obtain some reliable strategies to be implemented in order to survive during the economic instability. The top eight strategies and techniques collected during the experts' interviews and proposed throughout the literature review chapters were used in order to develop this framework.

The framework generates the recommended strategies and techniques to be implemented by the Egyptian construction company based on the company's size and the number of employees. The recommended strategies appears in an order from the most effective to the least effective. So, if a company would not be able to implement all the five recommended strategies, it can choose to implement the most two or three effective techniques. The framework also offers implementation tips for each strategy in order to facilitate the implementation procedure to the contractors.

The proposed framework presented in this chapter was established after an extensive research in several directions. The foundation of this framework is based on the following:

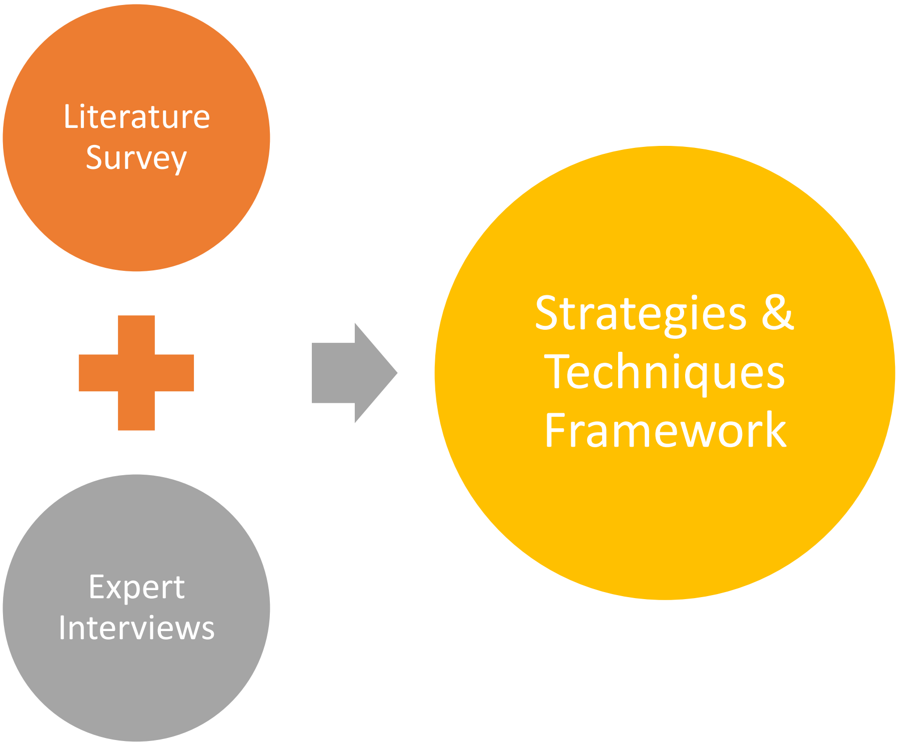


Figure 19: Strategies & Techniques framework

4.2.1 Literature survey

All the previous strategies and techniques used by construction companies outside Egypt as illustrated in chapter 2 of this research.

4.2.2 Expert Interviews

The results of the interviews conducted as shown in chapter 3 of this research showed the top ranked techniques and strategies as specified at the last section of the above referenced chapter, which are used in the framework development.

Table 3: Framework Development

#	Top ranked Strategies
1	Accept low profit margin projects
2	Amend contract price
3	Avoiding cost estimation errors and budget overruns
4	Geographical diversification
5	Horizontal diversification
6	Implementing prudent management of cash
7	Receive portion of the contract price in foreign currency
8	Reduce Overhead Costs

4.2.3 Framework Limitation

The proposed Techniques and Strategies Framework is limited to medium and large size contractors. The medium size contractors can be defined as the contractors who have portfolio of contracts of 100 to 500 Million Egyptian Pounds per year and the large size contractors can be defined as the contractors who have portfolio of contracts of more than 500 Million Egyptian Pounds per year.

The proposed Techniques and Strategies Framework in this study is generic and can be applied to any type of work. However, the research results are more suitable for the general contractors as the effectiveness of implementing these techniques would have the same impact if implemented by specialized contractors.

The acceptance of adopting this Framework in any construction firm is quite challenging. The company strategy and way of management plays a crucial role in accepting such new techniques. To successfully implement any new technique in a company, the top management has to accept and appreciate this new practice. Therefore, the" top- down" management approach should be adopted while developing an implementation strategy in the company to ensure the successful execution of these strategies and techniques.

4.2.4 The framework

The framework is a basic model that assists the user choosing the suitable techniques and strategies to be implemented in order to survive during the economic hardship.

The user has to specify the company size and the number of employees from the dropdown list, then, the framework generates the recommended strategies and some implementation tips. There is a side list mentioning all the strategies used during the study as well as the top ranked strategies based on the interviewees' votes.

Strategies and Techniques to overcome Recession in Egypt

Please choose from below the best description for the Company

Company Size	
Number of Employees	

Shown below the top 5 recommended strategies to be implemented in the company

#	Recommended Strategies in Ranking Order
1	#N/A
2	#N/A
3	#N/A
4	#N/A
5	#N/A

Shown below implementation tips for each of the above listed strategies

#	Top Ranked Strategies
1	Accept low profit margin projects
2	Amend contract price
3	Avoiding cost estimation errors and budget overruns
4	Geographical diversification
5	Horizontal diversification
6	Implementing prudent management of cash
7	Receive portion of the contract price in foreign currency
8	Reduce Overhead Costs

#	All Strategies
1	Reducing overhead costs
2	Outsourcing of jobs
3	Avoiding cost estimation errors and budget overruns
4	Prudent management of cash
5	Accepting low profit margin projects
6	Downsizing workforce
7	Vertical integration
8	Horizontal diversification
9	International diversification
10	Amend Contract Price
11	Receive portion of the contract price in foreign currency
12	Substitute imported materials with local materials
13	Reduce project duration
14	Get credit facilities from suppliers
15	Establish partnerships

#	Implementation Tips
1	#N/A
2	#N/A
3	#N/A
4	#N/A
5	#N/A

Figure 20: Framework

4.3 Framework Verification: Two Cases Studies

The research objective is to show the impact of applying the strategies mentioned through the proposed framework on construction companies in Egypt. This research uses case study approach to gather data. Using case study approach would be an efficient way to study and investigate the effectiveness of using the proposed techniques on real Egyptian companies and verify the applicability of these strategies in real life. The financial statements of two selected large construction companies in Egypt are analyzed in order to verify this research. First case study shows a company that has applied many of the discussed top ranked strategies in the research paper, which was reflected in the good performance and financial figures of the company. Meanwhile, the second case study explores another company that has used minimal strategies to survive after the currency devaluation, which led to a huge decrease in the profit of the company. Audited financial statements as of September 2017 are compared to the audited financial statements as of September 2016, in order to compare the performance of the two construction companies before and after the Egyptian pound devaluation that occurred on the 3rd of November, 2016 and all the related economic changes that happened during that period, such as the electricity and gas price increase. The collected data includes the figures of: revenue, cost of sales, other expenses, net profit and all the clarifications and related figures breakdowns that could help analyzing these financial figures and how they were impacted by the company's applied strategies.

4.3.1 First Case study description:

Table 4: Company 1 Description

Item	Description
Company Size (Awarded Contracts Amount)	Large (More than 500 M/year)
# of Employees	+ 23,000 Permanent Employee, and + 42,000 Temporary Employee
Employees Turnover Rate	0 % - 25 %
Strategies implemented by the Company	• Receive portion of the contract price in foreign currency • Geographical Diversification • Amend Contract Prices • Horizontal Diversification • Implementing Prudent Management of Cash • Avoiding cost estimation errors and budget overruns • Reduce Profit Margin • Reduce Overhead Cost

Listed below are the strategies that should be used by the company based on the framework:

- Amend Contract Price
- Horizontal Diversification
- Geographical Diversification

- Implementing prudent management of cash
- Reduce overhead Costs

As illustrated earlier, the first case study used to validate this research is a leading Egyptian construction company that implemented the main strategies proposed in this research paper as listed in table 4 and proved to be successful. Figure 21 represents the published income statement of the company revised and approved by the authorized external auditor showing comparison between September 2017 and September 2016 figures.

$ millions	Note	the nine months ended 30 September 2017	the three months ended 30 September 2017	the nine months ended 30 September 2016	the three months ended 30 September 2016
Revenue	(24)	2,818.3	805.4	2,959.1	962.1
Cost of sales	(20)	(2,569.5)	(724.0)	(2,740.8)	(896.3)
Gross profit		248.8	81.4	218.3	65.8
Other income	(21)	5.7	1.8	5.2	0.9
Selling, general and administrative expenses	(20)	(117.3)	(37.0)	(126.4)	(40.8)
Operating profit		137.2	46.2	97.1	25.9
Finance income	(22)	25.7	4.1	34.9	4.2
Finance cost	(22)	(49.7)	(22.2)	(43.5)	(0.1)
Net finance cost		(24.0)	(18.1)	(8.6)	4.1
Income from equity accounted investees	(9)	41.0	17.2	30.7	16.6
Profit before income tax		154.2	45.3	119.2	46.6
Income tax	(10)	(71.9)	(21.8)	(41.5)	(17.4)
Total net profit		82.3	23.5	77.7	29.2
Other comprehensive income:					
Items that are or may be reclassified to profit or loss					
Foreign currency translation differences		36.3	14.9	(47.8)	11.7
Other comprehensive income (loss), net of tax		36.3	14.9	(47.8)	11.7
Total comprehensive income		118.6	38.4	29.9	40.9

Figure 21: Income Statement

An analysis of each figure would be useful in order to relate each strategy applied by the company on financial figures respectively, which would help to draw a conclusion on how the company managed to survive during these economic fluctuations and generated a net profit while there were other 2000 Egyptian companies that shut down during that time because of this economic hardship.

Table 5 shows that although the revenue of the company decreased by 4.8%, the company managed to retain an increase in its gross profit by 14%. This positive figure shows that the company applied two strategies:

- Accepted lower profit margin projects, which led to the decrease of the revenue by 5%.
- Implemented prudent management of cash, which is shown by the remarkable decrease in the cost of sales by 6.3% that could present the direct cost of projects.

Table 5: Gross Profit

Figure	Amount in $Million As of Sept. 2017	Amount in $Million As of Sept. 2016	% of Change
Revenue	2,818.3	2,959.1	- 4.8%
Cost of Sales	(2,569.5)	(2,740.8)	- 6.3%
Gross Profit	**248.8**	**218.3**	**+ 14%**

The success of the company in decreasing the cost of projects with a higher percentage than the decrease of the revenue led to achieving a higher gross profit. Moreover, the breakdown on the cost of sales in figure 22 shows the decrease of changes in raw materials and finished goods by 4.6%, indicates that the company became more efficient in using materials and that there was reduction in wastage. All these figures imply that the company applied very efficient use of resources and very prompt organized management of cash inflows and outflows.

20. Cost of sales and selling, general and administrative expenses

i. Expenses by nature

$ millions	the nine months ended 30 September 2017	the three months ended 30 September 2017	the nine months ended 30 September 2016	the three months ended 30 September 2016
Changes in raw materials and consumables, finished goods and work in progress	2,255.6	618.4	2,365.4	802.2
Employee benefit expenses (ii)	353.9	120.7	401.8	103.7
Depreciation, amortization	28.4	8.3	42.2	14.3
Maintenance and repairs	13.2	4.4	15.6	5.0
Consultancy expenses	1.9	0.6	4.0	1.4
Other	33.8	8.6	38.2	10.5
Total	**2,686.8**	**761.0**	**2,867.2**	**937.1**

The expenses by nature comprise 'cost of sales' and 'selling and general and administrative expenses'.

Figure 22: Cost of sales and SG&A

At the same time, the company worked on decreasing the expenses that are not related to the core operations of the company, such as the selling, general and administrative expenses (SG&A) that could be related to the company building or site offices or temporary utilities and facilities…etc. This means that the company effectively applied "reducing overhead cost" strategy since it managed to decrease the overhead direct and indirect costs by 7.2% from 2016 to 2017. The breakdown of the SG&A in table 6 shows the main costs areas that were decreased. For instance, the consultancy expenses decreased by 52.5%. Additionally, there is a notable decrease in the employee benefit expenses by 12%, which includes wages and salaries, social securities, employee profit sharing, pension cost, and other employee expenses as per figure 23.

Table 6: SG&A

Figure	Amount in $Million As of Sept. 2017	Amount in $Million As of Sept. 2016	% of Change
Employee benefit expenses	353.9	401.8	- 12%
Consultancy expenses	1.9	4.0	- 52.5%
Selling, general and administrative expenses	**117.3**	**126.4**	**- 7.2%**

20. Cost of sales and selling, general and administrative expenses

i. Expenses by nature

$ millions	the nine months ended 30 September 2017	the three months ended 30 September 2017	the nine months ended 30 September 2016	the three months ended 30 September 2016
Changes in raw materials and consumables, finished goods and work in progress	2,255.6	618.4	2,365.4	802.2
Employee benefit expenses (ii)	353.9	120.7	401.8	103.7
Depreciation, amortization	28.4	8.3	42.2	14.3
Maintenance and repairs	13.2	4.4	15.6	5.0
Consultancy expenses	1.9	0.6	4.0	1.4
Other	33.8	8.6	38.2	10.5
Total	**2,686.8**	**761.0**	**2,867.2**	**937.1**

The expenses by nature comprise 'cost of sales' and 'selling and general and administrative expenses'.

ii.Employee benefit expenses

$ millions	the nine months ended 30 September 2017	the three months ended 30 September 2017	the nine months ended 30 September 2016	the three months ended 30 September 2016
Wages and salaries	313.4	107.2	349.2	89.8
Social securities	2.6	1.0	6.1	0.6
Employee profit sharing	3.2	1.0	4.8	3.3
Pension cost	4.3	1.5	5.6	1.6
Other employee expenses	30.4	10.0	36.1	8.4
Total	**353.9**	**120.7**	**401.8**	**103.7**

Figure 23: Cost of sales and SG&A (Cont'd)

$$Operating\ Profit\ Margin\ Ratio\ (2017) = \frac{Operating\ Profit}{Total\ Revenue} = \frac{137.2}{2818.3} = 4.87\%$$

$$Operating\ Profit\ Margin\ Ratio\ (2016) = \frac{Operating\ Profit}{Total\ Revenue} = \frac{97.1}{2959.1} = 3.28\%$$

$$Net\ Profit\ Margin\ Ratio\ (2017)\ =\ \frac{Net\ Profit}{Total\ Revenue}\ =\ \frac{82.3}{2818.3}\ =\ 2.92\%$$

$$Net\ Profit\ Margin\ Ratio\ (2016)\ =\ \frac{Net\ Profit}{Total\ Revenue}\ =\ \frac{77.7}{2959.1}\ =\ 2.62\%$$

For the purpose of studying the company's profitability ratios, the operating profit margin and the net profit margin ratios are calculated. It is noted that the profit of the company has increased in 2017 with respect to 2016 by 11.5%, which reflects the efficiency and effectiveness of the strategies and techniques that were implemented. While the revenue of the company decreased as illustrated above, the company managed to control its cost of sales and selling, general and administrative expenses which did not only sustain but actually increased the operating profit margin ratio of the company. The operating profit margin increasing by 45.5% from 2016 to 2017 shows that the core operations of the company were efficiently handled which increased their profitability. Similarly, the net profit margin ratio has also increased by 11.5%, which reflects the profitability of the company including all its activities. Both ratios assured the growth and the improved performance of the company.

Another strategy applied by the company is the geographical diversification, which is clear in table 7. First of all, the company already had very wide geographical diversification in the Africa, Asia, Europe and United States. The main concentration is in Africa, since the main operations and projects of the company are in Egypt. However, the company maintained 26.2% of its trade and receivables concentration in Europe and United States, which could be one of the main reasons of the company's survival and good performance even after the pound devaluation. The company ensured to sustain sources of cash inflows in different currencies, which minimizes the risk exposure to currencies and exchange rates fluctuations. Moreover, the company increased their operations in Europe and United States from 26.2% in 2016 to 29.6% in 2017, which further protected the company from the Egyptian pound devaluation, since the concentration of operations in Africa and the Middle East decreased from 60.8% in 2016 to 57.5% in 2017.

Table 7: Receivables geographical diversification

Figure	Amount in $Million As of Sept. 2017	Amount in $Million As of Sept. 2016	% of Diversification in 2017	% of Diversification in 2016
Middle East and Africa	677.0	654.0	57.5%	60.8%
Asia and Oceania	151.4	140.2	12.9%	13.0%
Europe and United States	348.5	281.2	29.6%	26.2%
Total	**1176.9**	**1075.4**	**100%**	**100%**

The major exposure to credit risk for trade and other receivables by geographic region was as follows:

$ millions	30 September 2017	31 December 2016
Middle East and Africa	677.0	654.0
Asia and Oceania	151.4	140.2
Europe and United States	348.5	281.2
Total	**1,176.9**	**1,075.4**

Figure 24: Trade and receivables by geographic region

The company has also implemented some more techniques and strategies that are not directly reflected in the financial statements, however, the company's representative has mentioned them during the conducted interview.

The company has amended the contracts through negotiations and the escalation formula agreed upon in the contracts. According to the interviewee, the contracts that had escalation formulas were very effective in terms of compensation; however, the contracts that did not contain an escalation formula, the company started to negotiate with the clients to amend the contract price and get compensation, and it was not easy to convince them to do so.

The company has also considered adding some procedure and checklist for the Tendering Department in order to avoid any cost estimation errors and/or budget overruns during the execution. The company has tried to make reasonable forecasts as the prices were increasing tremendously and it was not easy to predict the prices after few years.

Another technique the company has used is Horizontal Diversification. The company has implemented both types of horizontal diversification, the related and unrelated. The company has extended their activities in new markets where the company has no engagement in it.

They established an aluminum factory and a steel structure factory; so, they distributed their risks between three markets (steel structure supplier/subcontractor, aluminum supplier/subcontractor, and general contractor) instead of one.

The last technique the company has used is that it has negotiated either to receive portion of the new contracts in foreign currency or let the client supply the imported materials and carry out all the associated risks. This technique was very effective, as it has mitigated the risk of the unpredictable exchange rate during the economic instability.

All the above-explained techniques have clearly helped the company not only to survive during the economic turmoil, but also to gain net profit more than the previous year.

4.3.2 Second Case Study description:

Table 8: Company 2 Description

Item	Description
Company Size (Awarded Contracts Amount)	Large (More than 500 M/year)
# of Employees	+ 1,000 Employees
Employees Turnover Rate	0 % - 25 %
Strategies implemented by the Company	• Reduce Overhead Cost • Vertical Integration

Listed below are the strategies that should be used by the company based on the framework:

- Amend Contract Price
- Horizontal Diversification
- Geographical Diversification
- Implementing prudent management of cash
- Reduce overhead Costs

Table 9: Net Profit (company 2)

Figure	Amount in MM EGP As of Sept. 2017	Amount in MM EGP As of Sept. 2016	% of Change
Net Profit before taxes	59.1	88.8	- 56.6%
Taxes	(13.3)	(20.9)	- 36.5%
Net Profit	**45.8**	**67.9**	**- 32.5%**

The second case study used to expand the analysis of the proposed strategies is an Egyptian construction company that has used very limited number of strategies. This helped the company to survive, and generated net profit, however, the company struggled to survive since its net profit before taxes has decreased by 56.6% as shown in table 9. The below figures will illustrate what happened with the company.

Table 10: Gross Profit (company 2)

Figure	Amount in MM EGP As of Sept. 2017	Amount in MM EGP As of Sept. 2016	% of Change
Revenue	575.7	547.3	5.2%
Cost of Sales	(470.2)	(407.0)	15.5%
Gross Profit	**105.5**	**140.2**	**- 24.8%**

The company having its revenue increasing by 5.2% means that it succeeded to either sign a higher number of contracts or getting a higher profit margin from projects, or on the other hand, it had applied the “amending contracts prices” strategy. In all cases, the company has proved to be efficient in handling its revenues. However, the problem is that the company didn’t apply any strategies to control its cost of sales, such as prudent cash management technique. This led to the very high increase in the cost of projects of the company by 15.5% and hence the gross profit of the company, which represents the main profit gained from the core operations of the company, has dramatically decreased by 24.8%. Comparing the figures of the first case study with the figures of the second case study show the lack of efficiency in handling the performance of the company in the second case study, and it also shows the importance of applying prudent management of cash strategies in these tough economic conditions.

Table 11: SG&A (company 2)

Figure	Amount in $Million As of Sept. 2017	Amount in $Million As of Sept. 2016	% of Change
Salaries and Wages	12.9	15.2	- 15.1%
Materials	1.5	1.7	- 11.8%
Other Services	3.9	5.5	- 29.0%
Rental expenses	2.3	3.0	- 23.3%
Fixed Assets Depreciation Expenses	1.9	0.3	533%
Selling, general and administrative expenses	**22.4**	**25.8**	**- 13.2%**

Moving to the overhead costs of the company, the company was able to decrease such costs by 13.2% with a great cut off to the expenses that are not crucial to the company's operations as shown in table 11. The three major figured contributing to the overhead costs in this company are: the salaries and wages that the company succeeded to reduce by 15.1%, the other services that declined by 29% and finally the rental expenses that also declined by 23.3%. These major reductions led to the overall decline in the selling, general and administrative expenses by 13.2% although there is a small figure regarding the fixed assets depreciation expenses that has immensely increased. But since it is already a small amount, it had a small effect on the total costs. In conclusion, the company has implemented reducing overhead costs strategy that has proved to be effective by all the conducted interviews and all the analyzed case studies.

$$Operating\ Profit\ Margin\ Ratio\ (2017) = \frac{Operating\ Profit}{Total\ Revenue} = \frac{83}{575.7} = 14.4\%$$

$$Operating\ Profit\ Margin\ Ratio\ (2016) = \frac{Operating\ Profit}{Total\ Revenue} = \frac{114.3}{547.2} = 20.9\%$$

$$Net\ Profit\ Margin\ Ratio\ (2017) = \frac{Net\ Profit}{Total\ Revenue} = \frac{45.8}{575.7} = 7.9\%$$

$$Net\ Profit\ Margin\ Ratio\ (2016) = \frac{Net\ Profit}{Total\ Revenue} = \frac{67.9}{547.2} = 12.4\%$$

On the contrary of the first case study, the profitability ratios of this company show that its performance has declined during the economic instability. The net profit margin ratio has declined by 36.3% from 2016 to 2017 showing the deficiency that has occurred to the company and proves that the company was not able to surpass this economic instability without losses. The operating profit margin affirms the same idea as it has decreased from 2016 to 2017 by 31.1%, which means that the company couldn't even sustain the profit it gained from its main operations.

The company has also implemented some more techniques and strategies that are not directly reflected in the financial statements, however, the company's representative has mentioned them during the conducted interview.

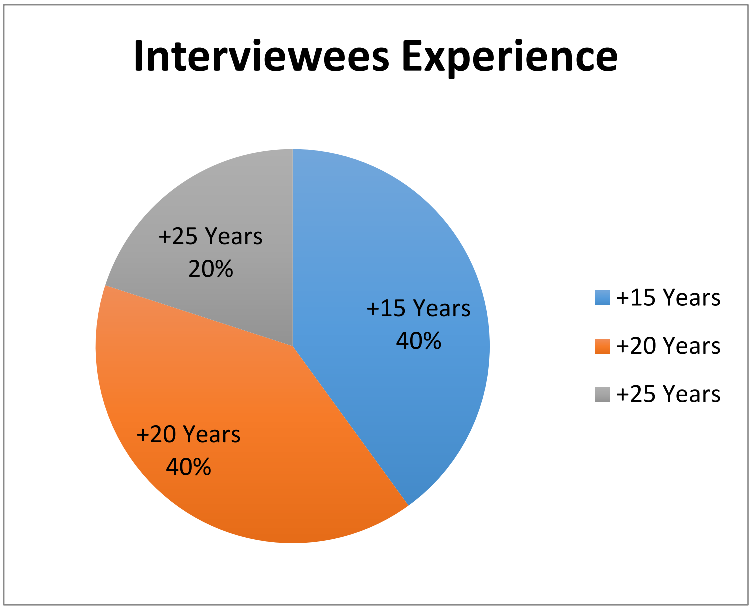
The company has implemented Vertical Integration. The company has implemented only both types of Vertical Integration, the forward and the backward. They established a real estate development company which is considered forward integration, and a stone quarry and a batch plant which are considered backward integration; so, they distributed their risks between the four markets (general contracting, real estate development, stone supplier and ready mix concrete supplier) instead of one.

All the above illustrated figures and analysis show that the company applied few useful strategies while it ignored some of the main ones. This led to the survival of the company without gaining any additional profit, whereas the net profit actually decreased compared to the previous year.

In conclusion, putting the two case studies companies in contrast and examining the applied strategies by each one and their effects on the companies, show that the top rank strategies identified in the framework has been proven to be successful.

4.4 Framework Validation

For the purpose of framework validation, interviews were conducted with different experts in the contracting field in Egypt. In order to get reliable outcome from the validation, five interviews took place as these 5 interviews represent 25% of the original sample size. Three of the interviews are working for large size contractors and the other two are working for



medium size contractor. The interviewees' experience varies from +15 years of experience to + 25 years of experience as illustrated in figure 25.

Figure 25: Interviewees Experience - Framework Validation

They were asked to test and use the framework, then to provide their opinion about the applicability and efficiency of the recommended strategies developed in the Framework. The interview questions can be found under Appendix C. Table 12 summarizes the results of the interview.

Table 12: Interview's answers

	Questions and Responses
Q.1	**Are you familiar with the strategies and techniques used by your company?**
Response	100% of the respondents were familiar with the strategies and techniques used by their companies
Comment	
Q.2	**Applicability and Efficiency of the proposed Framework (Low, Average, High)**
Response	60% High and 40% Average applicability & Efficiency
Comment	All the respondents believe that the proposed strategies and techniques will have a great impact on the Egyptian companies but it depends on the ability of the companies to implement such strategies.
Q.3	**Applicability and Efficiency of the proposed techniques and strategies (Low, Average, High)**

a. Accept low profit margin projects	Applicability: 80% High, and 20% Average Efficiency: 60% High, and 40% Average
Comment	The 40% who believes that accepting low profit margin projects has average efficiency, are justifying their opinions as they need high profit to balance their losses in the current projects
b. Amend Contract Price	Applicability: 100% High Efficiency: 80% High, 20% Average
Comment	The 20% who believes that amending contract price has average efficiency, are justifying their opinions as they can see that their losses is much greater than the signed amendment.
c. Avoiding Cost Estimation Errors & Budget Overruns	Applicability: 80% High, 20% Average Efficiency: 80% High, 20% Average
d. Geographical Diversification	Applicability: 60% High, 20% Average, and 20% Low Efficiency: 100% High
Comment	The 40%, who believes that geographical diversification has low and average applicability, are justifying their opinions, as the Egyptian contractors do not have the required experience and culture to adapt to the new market.
e. Horizontal Diversification	Applicability: 100% High Efficiency: 100% High
f. Implementing Prudent Management of Cash	Applicability: 100% High Efficiency: 80% High, 20% Average
g. Receive portion of the contract price in foreign currency	Applicability: 40% High, and 60% Low Efficiency: 100% High
Comment	The 60%, who believes that receiving portion of the contract price in foreign currency has low applicability, are justifying their opinions, as the Egyptian rules do not give the right to the Egyptian contractors to do so.
h. Reducing Overhead Costs	Applicability: 100% High Efficiency: 60% High, 40% Average
Comment	The 40%, who believes that reducing overhead costs has Average efficiency, are justifying their opinions, as the overhead costs are not representing a big portion of the contract price so it should be associated with the other techniques in order to be efficient.
Q.4	**Do you think that the proposed framework is user friendly or not?**
Response	100% of the respondents replied yes
Q.5	**Do you think that the proposed strategies and techniques of the**

	framework are beneficial for both medium and Large contractors?
Response	60% of the respondents replied yes for Large Contractors only and 40% of the respondents replied yes for both Large and Medium Contractors
Comment	The 60% who respondent that it is beneficial for the large contractors only further explained that some of the techniques are tough to be implemented by the medium size contractors because of two main reasons: 1- Lack of the required experience 2- Lack of liquidity
Q.6	**Do you think that the proposed strategies and techniques of the framework could improve the Company's performance?**
Response	80% of the respondents replied very effective, 20% gave Average response.
Comment	The 20%, who believe that the strategies and techniques will have average impact on the improvement of the company, are justifying their response by explaining that they are suffering from lack of liquidity that preventing them from doing any diversification techniques and/or any other techniques that will require cash and/or risk

It can be concluded that all the respondents believe that the proposed framework can improve the companies' cash flow after the economic hardship in Egypt. The results of the interview showed that 80% of the respondents believe it is highly applicable and efficient if fully implemented. The other 20% of the respondents believe that it can be applicable and efficient in an average level due to the absence of experience and knowledge required for the implementation process. Most of the respondents believe that the survival strategies and techniques used in this framework are highly efficient if mutually implemented as the company may still suffer if they implemented part of the strategies as the strength of this framework is effective when adding all the effects of all the strategies together.

5 Chapter 5: Conclusion and Recommendation

This chapter presents a summary of the research, the key findings obtained in this research work, the limitations and the recommendations for future work.

5.1 Research Summary

The main objective of this research was to identify adequate strategies for the Egyptian construction companies to overcome economic hardship. This target was achieved by 3 steps: 1) Literature survey to investigate and identify the successful techniques used by the construction companies working in foreign countries that suffered the same economic hardship conditions that Egypt passed through. 2) Interviews with Experts in the Egyptian construction companies in order to identify the techniques that they have already implemented and presented to them the strategies and techniques identified in the literature survey in order to rank their efficiency and applicability in Egypt. 3) Framework was developed using the top ranked techniques by the experts in order to assist the top management of the Egyptian construction companies in deciding on which strategies should be implemented and how to implement these strategies. To verify the developed framework, financial statements of two different companies have been analyzed in order to study the effectiveness of the implemented strategies on the companies' net profit. One of the two companies has implemented almost all the top ranked techniques and strategies while the other one has implemented only few techniques, which affected the net profit of each company. The framework was validated through interviews with top management of Egyptian construction companies in order to rate the ease of using the framework and its effectiveness.

5.2 Research Findings

The Egyptian contractors should acquire various managerial skills and implement some strategies and techniques in order to survive during the economic hardship. Choosing the suitable and adequate techniques depends on certain factors, such as the company's size, the number of employees working for the company… etc.

The top-ranked techniques are:

1) Accept low profit margin projects.
2) Amend contract price.
3) Avoiding cost estimation errors and budget overruns.
4) Geographical diversification.
5) Horizontal diversification.
6) Implementing prudent management of cash.
7) Receive portion of the contract price in foreign currency.
8) Reduce Overhead Costs

The framework created is using the above database in order to generate the top 5 techniques to be used by the company based on the company's size and the number of employees. The framework also generates implementation tips in order to put the user on the right track and assist him in the implementation procedure. The framework has shown welcoming feedback when it was validated by experts in the contracting field.

5.3 Research Limitation

Throughout the course of research, there were some limitations and shortcomings

First of all, the research considers the first category contractors only while identifying the strategies and techniques. However, the strategies identified in this research may be applicable also to the lower categories but it has never been tested nor validated for the other categories and sizes.

Secondly, the main survey (Appendix B), which the study relies on, was conducted on 20 experts only; all of them are contractors (8 medium size contractors, and 12 large size contractors). Although the number is relatively low, it is still very hard to find suitable engineers for the study when the criteria is set to be 15+ years of experience and a high managerial position for the credibility of the study.

Thirdly, the study was developed with engineers working in the contracting field, regardless the specialization of the contracting company i.e. general contractor or specialized contractor …etc. Results could change according to the company's type and nature of work; hence, there could be a degree of deviation.

Finally, since the whole experiment was carried out by the author himself, it is unavoidable that there is a certain degree of subjectivity. It would have been objective if concluded by two or three researchers.

5.4 Recommendations for Future Research

Despite that the framework was able to achieve the objective of the research, there is still room for development and improvements for more efficient and accurate results. Below is a list of recommendations for future researchers:

- Include a larger amount of respondents for the study in order to obtain a higher confidence level.
- Create different sets of frameworks; each framework to deal with the company type and nature of work (i.e. general contractor, civil contractor, MEP contractor …etc.) to increase the accuracy of the results.
- Expand the framework to increase the criteria of choosing the strategies and techniques.
- Test and validate the strategies generated by the framework in order to see their applicability on the small contractors

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7 Appendices

7.1 Appendix A: Interviewees

#	Position	Experience
1	Chairman	+35 Years
2	Project Controls Director	+30 Years
3	Managing Director	+30 Years
4	Resources Director	+30 Years
5	Finance Director	+30 Years
6	Executive Director	+25 Years
7	Tendering Director	+25 Years
8	Project Director	+25 Years
9	Chairman	+25 Years
10	Contracts & Claims Director	+20 Years
11	Tendering Director	+20 Years
12	Chairman	+20 Years
13	Tendering & Business Development Director	+20 Years
14	Project Controls Director	+20 Years
15	Project Manager	+20 Years
16	Project Director	+20 Years
17	Cost Control Manager	+15 Years
18	Operations Manager	+15 Years
19	CEO	+15 Years
20	Chairman	+15 Years

7.2 Appendix B: Interview Questions

7.2.1 Company Info:

1) Name (Optional):
2) Title:
3) Company Name:
4) Company Size (Awarded contracts amount):
   - ○ Small (Less than 100 M/year)
   - ○ Medium (100 to 500 M/year)
   - ○ Large (More than 500 M/year)
5) # of employees in the Company:
   - ○ 0 - 100
   - ○ 100 - 500
   - ○ 500+
6) Employees Turnover Rate:
   - ○ 0% – 25%
   - ○ 25% – 50%
   - ○ 50% – 75%
   - ○ 75% – 100%

7.2.2 Strategies used by the Company in order to survive:

7) Has the company suffered after the devaluation of the Egyptian pound?

- Yes
- No

8) List 3 strategies the company has followed to survive against the economic turmoil:

Strategy 1		
How did you utilize these strategies?		
Why did you utilize these strategies?		
How do you think the mentioned strategies affected the rate of growth?		
(Pros and Cons for each strategy mentioned in the previous question)		
Pros	**Cons**	**Reason of Success/Failure**

Strategy 2		
How did you utilize these strategies?		
Why did you utilize these strategies?		
How do you think the mentioned strategies affected the rate of growth?		
(Pros and Cons for each strategy mentioned in the previous question)		
Pros	**Cons**	**Reason of Success/Failure**

Strategy 3		
How did you utilize these strategies?		
Why did you utilize these strategies?		
How do you think the mentioned strategies affected the rate of growth?		
(Pros and Cons for each strategy mentioned in the previous question)		
Pros	Cons	Reason of Success/Failure

7.2.3 Proposed Strategies:

I. Turnaround Strategies

The turnaround strategies are the techniques and strategies to decrease the operation cost.

1. Overhead costs:

   a. Did you reduce the overhead costs?

      ○ Yes

      ○ No

   b. If yes, please rate the effectiveness of using this technique (1 least, 5 most)

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

   c. If no, do you think it could have been effective if used?

      ○ Yes

      ○ No

   d. If no, why?

2. Outsourcing of jobs:

   a. Did you outsource some of the jobs?

      ○ Yes

      ○ No

   b. If yes, please rate the effectiveness of using this technique (1 least, 10 most)

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

   c. If no, do you think it could have been effective if used?

      ○ Yes

      ○ No

d. If no, why?

3. Cost estimation errors and budget overruns
   a. Did you avoid cost estimation errors and budget overruns?

      ○ Yes

      ○ No

   b. If yes, please rate the effectiveness of using this technique (1 least, 10 most)

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

   c. If no, do you think it could have been effective if used?

      ○ Yes

      ○ No

   d. If no, why?

4. Prudent management of cash:

   The companies become conservative until the economy stabilizes and the inflow of new projects increases

   a. Did you implement prudent management of cash?

      ○ Yes

      ○ No

   b. If yes, please rate the effectiveness of using this technique

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

c. If no, do you think it could have been effective if used?

- ○ Yes
- ○ No

d. If no, why?

5. Accepting low profit-margin projects:

a. Did you accept low profit-margin projects?

- ○ Yes
- ○ No

b. If yes, please rate the effectiveness of using this technique

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

c. If no, do you think it could have been effective if used?

- ○ Yes
- ○ No

d. If no, why?

6. Downsizing workforce

a. Did you downsize the workforce?

- ○ Yes
- ○ No

b. If yes, please rate the effectiveness of using this technique

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

c. If no, do you think it could have been effective if used?

- Yes
- No

d. If no, why?

II. Diversification Techniques:

1. Vertical integration

The vertical integration can be classified into two main categories. The First can be described as the improvement of businesses whose products are inputs to the company's own main operation, while the second indicates to development into activities that are related to the company's outputs. In another way, vertical integration is when the company develops in term of the in-house functions executed.

a. Did you apply Vertical integration strategy?

- Yes
- No

b. If yes, please rate the effectiveness of using this technique

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

c. If no, do you think it could have been effective if used?

- Yes
- No

d. If no, why?

2. Horizontal diversification

The horizontal diversification can be defined as the movement of the company to new markets where the company has no engagement in it. This type of diversification can be either related or unrelated to the actual business of the company.

a. Did you apply horizontal diversification technique?

- Yes
- No

b. If yes, please rate the effectiveness of using this technique

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

c. If no, do you think it could have been effective if used?

- Yes
- No

d. If no, why?

3. Geographical diversification

The geographical diversification can be defined as the movement of the company's work into new geographic markets either nationally or internationally.

a. Did you apply geographical diversification technique?

- Yes
- No

b. If yes, please rate the effectiveness of using this technique

1 (Negative effective)	2 (Somehow negative effective)	3 No Effect	4 (Somehow positive effect)	5 (Positive effect)

c. If no, do you think it could have been effective if used?

- Yes

○ No

d. If no, why?

III. Techniques Rating:

1. Please, from your point of view, rate the following strategies based on their efficiency (from 1 to 9, 1 is the least efficient and 9 is the most efficient)

Strategy	Rank
Reduction in overhead cost	
Outsourcing of jobs	
Avoiding cost estimation errors and budget overruns	
Prudent management of cash	
Accepting low profit-margin projects	
Downsizing workforce	
Vertical integration	
Horizontal diversification	
Geographical diversification	

7.3 Appendix C: Interview of the Framework Validation

Q.1 Are you familiar with the strategies and techniques used by your company?

Response:

Comment:

Q.2 Applicability and Efficiency of the proposed Framework (Low, Average, High)

Response:

Comment:

Q.3 Applicability and Efficiency of the proposed techniques and strategies (Low, Average, High)

a. Accept low profit margin projects

Applicability:

- High
- Average
- Low

Efficiency:

- High
- Average
- Low

Comment:

b. Amend Contract Price

Applicability:

- High
- Average
- Low

Efficiency:

- High
- Average
- Low

Comment:

c. Avoiding Cost Estimation Errors & Budget Overruns

Applicability:

- High
- Average
- Low

Efficiency:

- High
- Average
- Low

Comment:

d. Geographical Diversification

Applicability:

- High
- Average
- Low

Efficiency:

- High
- Average
- Low

Comment:

e. Horizontal Diversification

Applicability:

- High
- Average
- Low

Efficiency:

- High
- Average
- Low

Comment:

f. Implementing Prudent Management of Cash

Applicability:

- High
- Average
- Low

Efficiency:

- High

- Average
- Low

Comment:

g. Receive portion of the contract price in foreign currency

Applicability

- High
- Average
- Low

Efficiency:

- High
- Average
- Low

Comment:

h. Reducing Overhead Costs

Applicability

- High
- Average
- Low

Efficiency:

- High
- Average
- Low

Comment:

Q.4 Do you think that the proposed framework is user friendly or not?

(Rank from 1 to 5, where 1 is slightly user friendly and 5 is extremely user friendly)

Response:

1	2	3	4	5

Comment:

Q.5 Do you think that the proposed strategies and techniques of the framework are beneficial for both small and big contractors?

Response:

- ○ Medium contractors only
- ○ Large contractors only
- ○ Both medium and large contractors

Comment:

Q.6 Do you think that the proposed strategies and techniques of the framework could improve the Company's performance?

(Rank from 1 to 5, where 1 is the least effective and 5 is the most effective)

Response:

1	2	3	4	5

Comment: